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Motorized Travel Management

Draft Environmental Impact Statement

Volume IV: Appendices B through T

Volunteers assisting Forest Service with maintenance of the Rubicon Jeep Trail

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Motorized Travel Management Draft Environmental Impact Statement

Nevada, Placer, Plumas, Sierra and Yuba Counties, California
September 2008

Volume IV: Appendices B through T

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Abstract: This Draft Environmental Impact Statement (DEIS) describes the environmental effects of a proposal by the Tahoe National Forest (TNF) to;

1. Prohibit cross country motorized travel off of National Forest Transportation System (NFTS) roads, NFTS trails and areas designated as "Open Areas" for motorized vehicle use,
2. Make limited motorized trail additions to the existing National Forest Transportation System.
3. Make limited changes to current prohibitions and allowances for public motorized vehicle travel by vehicle class and season of use.

The areas affected by this proposal are outside of congressionally designated wilderness areas. These actions are needed in order to implement the 2005 Travel Management Rule (36 CFR Part 261) while providing for a diversity of motorized vehicle recreation opportunities, and providing motorized access to dispersed recreation opportunities on the TNF. The DEIS discloses environmental impacts associated with the proposed action, a no action alternative and five additional action alternatives developed in response to issues raised by the public. Of the alternatives under consideration at this stage, Alternative 6 is the alternative preferred by the responsible official.

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Appendix B: Modeling

Introduction

The purpose of Appendix B is to provide a technical overview of the analysis process and models used. Due to the complexity and magnitude of this project, a number of analytical models and techniques were utilized requiring development of a decision support system to integrate these processes. This appendix covers the basic assumptions, modeling components, inputs, rules, and constraints and is meant to supplement the broader and less technical descriptions included in the body of the EIS.

The Route Designation Project decision support system [RDPdss] is a science and planning based framework developed for this EIS. RDPdss uses data from GIS-based resource inventories, operations research decision analysis, and mapping tools to support decision-making for the route designation process. RDPdss is a multi-scale and hierarchical modeling approach used to analyze the various alternatives described in the EIS. Designation of National Forest System roads, trails and areas, and the resulting environmental consequences including watershed, wildlife, and botanical conditions are evaluated. The RDPdss creates a framework for existing and proposed changes in designation of National Forest System roads, trails, and areas.

Modeling Limitations

Results from the modeling process are only approximations of what to expect when any given alternative is implemented. The objective of modeling is to aid planners in estimating likely future consequences of alternative management actions. A choice between alternatives can be made even though the model may lack precision in describing specific attributes of a given alternative.

Overview of Modeling Process

Figure B-1 provides an overview of the modeling process. The initial starting point for the modeling process was the Travel Routes database. The Travel Routes database was then updated to reflect current information on National Forest System Roads, Trails and Areas from the INFRA Data Base. Next the unauthorized routes were inventoried and included in the data. As part of the alternative development, the class of vehicle and season of use was assigned for each route for each alternative. Next each route was attributed for hydrologic resource information such was water quality and erosion issues. Finally, the routes were overlaid with all the resource information in the corporate data base to perform the effects analysis for each alternative. Each of these steps is described in more detail in the following sections.

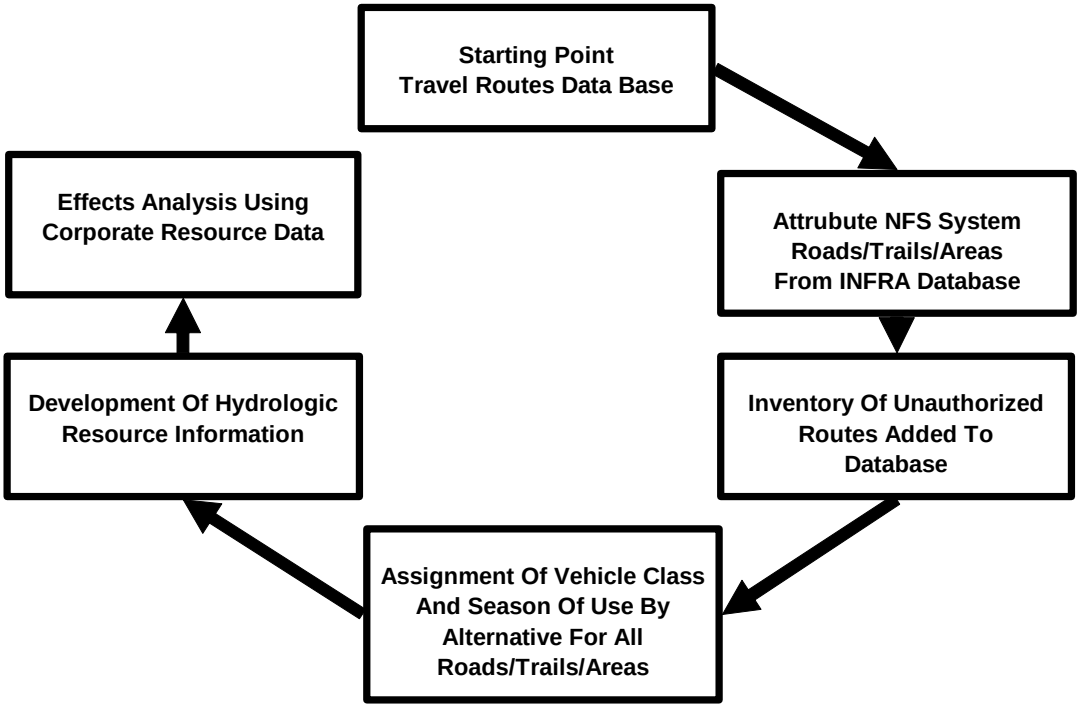

Figure B-1. Overview of the Modeling Process

Step 1: Travel Routes Data Base

The starting point for the modeling process was the travel routes data base. This data base is a coverage describing the spatial location of roads and trails within or in close proximity to the Tahoe National Forest. This data base has two components; 1) travel_route.ratroad (roads) and 2) travel_route.rattrail (trails).

1. **travel_route.ratroad (roads)** is a route system depicting all roads within or in close proximity to the Tahoe National Forest. A road is a motor vehicle travel way over 50 inches wide, unless classified and managed as a trail. A road may be classified or unclassified. Classified roads are roads within National Forest System lands planned and managed for motor vehicle access including State roads, county roads, private roads, permitted roads, and Forest Service roads. Unclassified roads are roads not intended to be a part of nor managed as a part of the forest transportation system, such as temporary roads, and unplanned, unengineered, unauthorized offroad vehicle tracks and abandoned travel ways.
2. **travel_route.rattrail (trails)** is a route system depicting all trails within or in close proximity to the Tahoe National Forest A trail is a linear feature constructed for the purpose of allowing the free movement of people, stock, or Off Highway Vehicles (OHV).

Step 2: Attributing Routes From INFRA Data Base

Congress, Forest Service managers, partners, and visitors to the National Forests all need complete, accurate and current information about National Forest resources. The INFRA (short for infrastructure)

Database helps the Agency meet these needs by providing an integrated data management tool where Forests can enter, manage, and report accurate information and associated financial data on the inventory of their constructed features - features such as buildings, dams, bridges, water systems, roads, trails, developed recreation sites, range improvements, administrative sites, heritage sites, general forest areas and wilderness. The following information from the Infra Data Base was assigned to each of the National Forest System Roads, Trails and Areas in the Routes Data Base:

ID: The official identifier of the route. EM710015 Sign and Poster Guidelines for the Forest Service, Chapter 11.6 Guide Signs contains USFS policy on route markers.

JURISDICTION: The legal right to control or regulate use of a transportation facility. Jurisdiction requires authority but not necessarily ownership. The authority to construct or maintain a road or trail may be derived from a fee title, an easement, an agreement, or some other similar method.

OBJECTIVE_MAINT_LEVEL: The maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget constraints, and environmental concerns. Operational maintenance levels include:

1-BASIC CUSTODIAL CARE (CLOSED) - Assigned to intermittent service roads when they are closed to vehicular traffic.

2-HIGH CLEARANCE VEHICLES - Assigned to roads operated for use by high clearance vehicles.

3-SUITABLE FOR PASSENGER CARS - Assigned to roads operated and maintained for travel by a prudent driver in a standard passenger car.

4-MODERATE DEGREE OF USER COMFORT - Assigned to roads that provide a moderate degree of user comfort and convenience at moderate speeds.

5-HIGH DEGREE OF USER COMFORT - Assigned to roads that provide a high degree of user comfort and convenience.

C-CONVERT USE - Convert use of the facility to another use such as a trail.

D-DECOMMISSION - Assigned to roads that have been or are to be decommissioned.

OPER_MAINT_LEVEL: The maintenance level currently assigned to a road considering today's needs, road condition, budget constraints and environmental concerns; in other words, it defines the level to which a road is currently being maintained. Operational Maintenance Levels include:

1-BASIC CUSTODIAL CARE (CLOSED) - Assigned to intermittent service roads during the time they are closed to vehicular traffic.

2-HIGH CLEARANCE VEHICLES - Assigned to roads operated for use by high clearance vehicles.

3-SUITABLE FOR PASSENGER CARS - Assigned to roads operated and maintained for travel by a prudent driver in a standard passenger car.

4-MODERATE DEGREE OF USER COMFORT - Assigned to roads that provide a moderate degree of user comfort and convenience at moderate speeds.

5-HIGH DEGREE OF USER COMFORT - Assigned to roads that provide a high degree of user comfort and convenience.

ROUTE_STATUS: Current physical state of being of the route segment. Route status's include

EX-EXISTING - A route that physically exists.

DE-DECOMMISSIONED - A route that was no longer needed and has been removed from service.

PL-PLANNED - Planned route identified in a complete NEPA document with a Record of Decision.

CV-CONVERTED - A route that was no longer needed and has been converted to another use.

SEG_LENGTH: The length of a segment of road or trail that is defined by a unique set of linear events.

SYSTEM: A network of travel ways serving a common need or purpose, managed by an entity with the authority to finance, build, operate and maintain the routes. Systems include;

C-COUNTY, PARISH, BOROUGH - County, Parish, or Borough

NFSR-NATIONAL FOREST SYSTEM ROAD - A classified forest road under the jurisdiction of the Forest Service. FSM 7705 (23 U.S.C. 101

I-INTERSTATE HIGHWAY - Interstate highway

L-LOCAL - Town, Township, Municipal Agency (City or other local civil government).

NOT-NOT NEEDED - A road not needed for long term management of National Forest Resources (FSM 7712.01 B(2), (36 CFR 212))

OF-OTHER FEDERAL - Other Federal agency (such as BLM, NPS, BIA, etc.)

OS-OTHER STATE - State roads other then those in the State Highway System.

P-PRIVATE - Private

SH-STATE HIGHWAY - State highway (primary or secondary)

TMP-TEMPORARY - Roads authorized by contract, permit, lease, other written authorization, or emergency operation not intended to be part of the forest transportation system and not necessary for Long term resource management. (36 CFR 212.1)

TRAIL_TYPE: A Trail classification that identifies the predominant foundation material upon which the trail exists.

SNOW TRAIL-The predominant foundation of the trail is snow.

STANDARD/TERRA TRAIL-The predominant foundation of the trail is ground.

WATER TRAIL-The predominant foundation of the trail is water.

TRAIL_SYSTEM: The transportation network to which the trail segment belongs

L-LOCAL GOVERNMENT TRAIL - Local Government trail, including County, City, Municipal, Parish or Borough.

NFST-NATIONAL FOREST SYSTEM TRAIL - National Forest System Trail.

OF-OTHER FEDERAL TRAIL - Other Federal Agency Trail (Ex: NPS, BLM...)

P-PRIVATE TRAIL - Private Trail

S-STATE GOVERNMENT TRAIL - Trail that is part of a State Trail system.

MANAGED_USE: Actively managed/appropriate use(s) considering the design and management of the trail. Note: there may be more than one managed use type on a segment of trail. Types of Managed Use include;

ATV-ALL TERRAIN VEHICLE All Terrain Vehicle
BIKE-BICYCLE Bicycle, Mountain or Touring Bike
HIKE-HIKER/PEDESTRIAN Hiker/Pedestrian traffic
LIVESTOCK-Livestock including cattle, sheep, goats, etc.
MTRCYCL-MOTORCYCLE Motorcycle
PACK-PACK/SADDLE Pack and Saddle including horses, mules, llamas, etc.
SNOMO-SNOWMOBILE Snowmobile
SNOWSHU-SNOW SHOE Snow shoeing
WCRAFT-WATERCRAFT Watercraft – motorized and nonmotorized
WCRAFT- (MTR) - MTR WATERCRAFT Motorized Watercraft
WCRAFT- (NMTR) - NMTR WATERCRAFT Nonmotorized Watercraft
XSKI-CROSS COUNTRY SKI Cross Country Skiing

DESIGNED_USE: The use that controls the desired geometric design of the trail. Designed Uses include;

ATV-ALL TERRAIN VEHICLE All Terrain Vehicle
BIKE-BICYCLE Bicycle, Mountain or Touring Bike
HIKE-HIKER/PEDESTRIAN Hiker/Pedestrian traffic
LIVESTOCK-Livestock including cattle, sheep, goats, etc.
MTRCYCL-MOTORCYCLE Motorcycle
PACK-PACK AND SADDLE Pack and Saddle including horses, mules, donkeys, llamas
SNOMO-SNOWMOBILE Snowmobile
SNOSHU-SNOWSHOE Snow shoeing
WCRAFT-WATERCRAFT Watercraft – motorized and nonmotorized
WCRAFT (MTR) -MTR WATERCRAFT Motorized Watercraft
WCRAFT (NMTR) -NMTR WATERCRAFT Nonmotorized Watercraft
XSKI-CROSS COUNTRY SKI Cross Country Skiing

TRAIL_CLASS: The prescribed scale of trail development. Represents the intended design and management standards of the trail. Trail Classes include:

TC1-PRIMITIVE/UNDEVELOPED - Primitive trail, minimum to nonexistent constructed features

TC2-SIMPLE/MINOR DEVELOPMENT - Simple trail, minor development, constructed features for trail resource protection.

TC3-DEVELOPED/IMPROVED - Substantial trail, structures common, designed for user convenience.

TC4-HIGHLY DEVELOPED - High standard trail with significant structures, tread hardening possible.

TC5-FULLY DEVELOPED - Highest standard trail, significant features and tread hardening likely.

TRAIL_STATUS: Current physical state of being of the trail segment

DE-DECOMMISSIONED A trail that was no longer needed and has been removed from service.

EX-EXISTING - A trail that physically exists.

PL-PLANNED - Planned trail identified by an appropriate management decision (ex: NEPA, Regional CIP list, Forest)

Step 3: Inventory of Unauthorized Routes

The Tahoe National Forest signed an agreement with TEAMS Enterprise Team to develop an accurate and complete GPS and GIS inventory of all unclassified roads, OHV trails, and OHV off-route impact areas. These inventoried roads and trails were then added to the Routes Database. The result was a complete and accurate GIS depiction of the complete Forest OHV route system and provided the basis for all maps.

Step 4: Assigning Class Vehicle and Season of Use for all Routes by Alternative

Based on the theme of each alternative as described in Chapter 2 of this EIS every road trail and area within the boundary of the Tahoe National Forest was assigned a three digit code to describe how it would be managed in that alternative. The code specified the class of vehicle to be allowed, the season of use, and if that class of vehicle and season of use was a change from how the road was currently being managed. These codes are shown in Table B-1.

Table B-1. Class of Vehicle and Season of Use Codes

Legend for Alternatives		
Class of Vehicle	**Change in Management**	**Season of Use**
A – Roads open to highway legal vehicles only	**1** – Existing National Forest Transportation System road, trail or area with no change in management	**V** – April 1 to December 31
B – Roads open to all vehicles	**2** – Proposed addition of road, trail or area to National Forest Transportation System	**W** – May 1 to December 31
C – Trails open to high clearance vehicles	**3** – Existing National Forest Transportation System road, trail or area with a change in class of vehicle allowed	**X** – May 1 to November 1
D – Trails open to ATV's and motorcycles (<48")	**4** – Existing National Forest Transportation System road, trail or area with a change in season of use.	**Y** – January 1 to September 15 (Alternatives 1, 2, 3, 7) May 1 to September 15 (Alternatives 4, 5 and 6)
E – Trails open to motorcycles	**5** – Existing National Forest Transportation System road, trail or area with a change in both class of vehicle and season of use allowed.	**Z** – Open All Year
F – National Forest Transportation System roads and trails closed to wheeled motor vehicles	**6** – Not Applicable	
G – Other jurisdiction roads (i.e. County and State)		
H – Other non-system roads (Private)		
I – Non-motorized trails		
J – Trails closed wheeled vehicles (including mountain bikes)		
K – Decommissioned Roads		
L – Un-authorized roads and trails remaining open to wheeled motorized vehicles		
M – Areas open to wheeled motor vehicles		
N – Access routes to dispersed sites		

Table B-2 shows the lengths of routes assigned by code for each of the alternative.

Table B-2. Modeling Codes for All Routes in Alternatives

Class of Vehicle	Change in Management	Season of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
A – Roads open to highway legal vehicles only	1 – Existing National Forest Transportation System road, trail or area with no change in management	W – May 1 to December 31	23.6	0.0	23.6	23.6	0.0	18.0	23.6
A – Roads open to highway legal vehicles only	1 – Existing National Forest Transportation System road, trail or area with no change in management	X – May 1 to November 1	7.5	0.0	7.5	7.5	0.0	0.0	7.5
A – Roads open to highway legal vehicles only	1 – Existing National Forest Transportation System road, trail or area with no change in management	Z – Open All Year	601.7	213.0	598.3	598.3	213.1	369.9	598.3
A – Roads open to highway legal vehicles only	3 – Existing National Forest Transportation System road, trail or area with a change in class of vehicle allowed	X – May 1 to November 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
A – Roads open to highway legal vehicles only	5 - Existing National Forest Transportation System road, trail or area with a change in both class of vehicle and season of use allowed.	W – May 1 to December 31	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B – Roads open to all vehicles	1 – Existing National Forest Transportation System road, trail or area with no change in management	V – April 1 to December 31	0.0	0.0	0.0	1.5	1.5	1.5	0.0
B – Roads open to all vehicles	1 – Existing National Forest Transportation System road, trail or area with no change in management	W – May 1 to December 31	6.6	6.6	6.6	0.0	0.0	0.0	6.6
B – Roads open to all vehicles	1 – Existing National Forest Transportation System road, trail or area with no change in management	X – May 1 to November 1	98.0	98.2	98.2	92.3	92.3	96.4	97.9
B – Roads open to all vehicles	1 – Existing National Forest Transportation System road, trail or area with no change in management	Y – January 1 to September 15 (Alternatives 1, 2, 3, 7)	5.5	5.5	5.5	5.5	5.5	5.5	5.5
B – Roads open to all vehicles	1 – Existing National Forest Transportation System road, trail or area with no change in management	Z – Open All Year	1,786.1	1,785.9	1,786.0	0.0	0.0	0.0	1,786.3

Class of Vehicle	Change in Management	Season of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
B – Roads open to all vehicles	2 – Proposed addition of road, trail or area to National Forest Transportation System	W – May 1 to December 31	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B – Roads open to all vehicles	2 – Proposed addition of road, trail or area to National Forest Transportation System	Z – Open All Year	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B – Roads open to all vehicles	3 – Existing National Forest Transportation System road, trail or area with a change in class of vehicle allowed	V – April 1 to December 31	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B – Roads open to all vehicles	3 – Existing National Forest Transportation System road, trail or area with a change in class of vehicle allowed	W – May 1 to December 31	0.0	23.5	0.0	0.0	18.0	0.0	0.0
B – Roads open to all vehicles	3 – Existing National Forest Transportation System road, trail or area with a change in class of vehicle allowed	X – May 1 to November 1	0.0	7.5	0.0	0.0	7.5	7.5	0.0
B – Roads open to all vehicles	3 – Existing National Forest Transportation System road, trail or area with a change in class of vehicle allowed	Z – Open All Year	0.0	388.7	3.4	0.0	229.9	75.6	3.4
B – Roads open to all vehicles	4 – Existing National Forest Transportation System road, trail or area with a change in season of use.	V – April 1 to December 31	0.0	0.0	0.0	38.4	38.4	38.4	0.0
B – Roads open to all vehicles	4 – Existing National Forest Transportation System road, trail or area with a change in season of use.	W – May 1 to December 31	0.0	0.0	0.0	1,758.6	1,758.6	1,754.4	0.0
B – Roads open to all vehicles	4 – Existing National Forest Transportation System road, trail or area with a change in season of use.	Y – January 1 to September 15 (Alternatives 1, 2, 3, 7)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B – Roads open to all vehicles	5 - Existing National Forest Transportation System road, trail or area with a change in both class of vehicle and season of use allowed.	V – April 1 to December 31	0.0	0.0	0.0	0.0	3.3	3.3	0.0
B – Roads open to all vehicles	5 - Existing National Forest Transportation System road, trail or area with a change in both class of vehicle and season of use allowed.	W – May 1 to December 31	0.0	0.0	0.0	3.4	161.3	158.4	0.0

Class of Vehicle	Change in Management	Season of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
B – Roads open to all vehicles	5 - Existing National Forest Transportation System road, trail or area with a change in both class of vehicle and season of use allowed.	X – May 1 to November 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
B – Roads open to all vehicles	5 - Existing National Forest Transportation System road, trail or area with a change in both class of vehicle and season of use allowed.	Y – January 1 to September 15 (Alternatives 1, 2, 3, 7)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
C- Trails open to high clearance vehicles	1 – Existing National Forest Transportation System road, trail or area with no change in management	X – May 1 to November 1	5.3	5.3	5.3	5.3	5.3	5.3	5.3
C- Trails open to high clearance vehicles	1 – Existing National Forest Transportation System road, trail or area with no change in management	Z – Open All Year	184.5	184.5	184.5	0.0	0.0	0.0	184.5
C- Trails open to high clearance vehicles	2 – Proposed addition of road, trail or area to National Forest Transportation System	V – April 1 to December 31	0.0	0.0	0.0	0.0	1.9	1.1	0.0
C- Trails open to high clearance vehicles	2 – Proposed addition of road, trail or area to National Forest Transportation System	W – May 1 to December 31	0.0	0.0	0.0	12.3	228.0	34.6	0.0
C- Trails open to high clearance vehicles	2 – Proposed addition of road, trail or area to National Forest Transportation System	X – May 1 to November 1	0.0	1.2	0.0	1.1	13.9	1.7	1.1
C- Trails open to high clearance vehicles	2 – Proposed addition of road, trail or area to National Forest Transportation System	Y – January 1 to September 15 (Alternatives 1, 2, 3, 7)	0.0	0.0	0.0	0.0	0.7	0.0	0.0
C- Trails open to high clearance vehicles	2 – Proposed addition of road, trail or area to National Forest Transportation System	Z – Open All Year	0.0	42.4	0.0	0.0	0.0	0.0	23.7
C- Trails open to high clearance vehicles	4 – Existing National Forest Transportation System road, trail or area with a change in season of use.	V – April 1 to December 31	0.0	0.0	0.0	0.8	0.8	0.8	0.0
C- Trails open to high clearance vehicles	4 – Existing National Forest Transportation System road, trail or area with a change in season of use.	W – May 1 to December 31	0.0	0.0	0.0	183.7	183.7	183.7	0.0

Class of Vehicle	Change in Management	Season of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
D – Trails open to ATV's and motorcycles (<48")	1 – Existing National Forest Transportation System road, trail or area with no change in management	X – May 1 to November 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
D – Trails open to ATV's and motorcycles (<48")	1 – Existing National Forest Transportation System road, trail or area with no change in management	Z – Open All Year	17.5	17.5	17.5	0.0	0.0	0.0	17.5
D – Trails open to ATV's and motorcycles (<48")	2 – Proposed addition of road, trail or area to National Forest Transportation System	W – May 1 to December 31	0.0	0.0	0.0	2.9	11.8	11.8	0.0
D – Trails open to ATV's and motorcycles (<48")	2 – Proposed addition of road, trail or area to National Forest Transportation System	Z – Open All Year	0.0	2.9	0.0	0.0	0.0	0.0	2.9
D – Trails open to ATV's and motorcycles (<48")	4 – Existing National Forest Transportation System road, trail or area with a change in season of use.	W – May 1 to December 31	0.0	0.0	0.0	17.5	17.5	17.5	0.0
E – Trails open to motorcycles	1 – Existing National Forest Transportation System road, trail or area with no change in management	X – May 1 to November 1	0.8	0.8	0.8	0.8	0.8	0.8	0.8
E – Trails open to motorcycles	1 – Existing National Forest Transportation System road, trail or area with no change in management	Z – Open All Year	126.6	126.6	126.6	0.0	0.0	0.0	126.6
E – Trails open to motorcycles	2 – Proposed addition of road, trail or area to National Forest Transportation System	V – April 1 to December 31	0.0	0.0	0.0	6.8	12.4	7.4	0.0
E – Trails open to motorcycles	2 – Proposed addition of road, trail or area to National Forest Transportation System	W – May 1 to December 31	0.0	0.0	0.0	7.3	14.5	13.8	0.0
E – Trails open to motorcycles	2 – Proposed addition of road, trail or area to National Forest Transportation System	X – May 1 to November 1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
E – Trails open to motorcycles	2 – Proposed addition of road, trail or area to National Forest Transportation System	Z – Open All Year	0.0	25.8	0.0	0.0	0.0	0.0	17.3
E – Trails open to motorcycles	4 – Existing National Forest Transportation System road, trail or area with a change in season of use.	Change Season of Use	0.0	0.0	0.0	24.9	24.9	24.9	0.0

Class of Vehicle	Change in Management	Season of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
E – Trails open to motorcycles	4 – Existing National Forest Transportation System road, trail or area with a change in season of use.	W – May 1 to December 31	0.0	0.0	0.0	101.7	101.7	101.7	0.0
F – National Forest Transportation System roads and trails closed to wheeled motor vehicles	1 – Existing National Forest Transportation System road, trail or area with no change in management	Z – Open All Year	12.9	502.3	504.7	503.5	353.6	495.7	501.3
F – National Forest Transportation System roads and trails closed to wheeled motor vehicles	6 – Not Applicable	Z – Open All Year	9.0	837.3	906.2	876.9	784.3	845.2	865.1
G – Other jurisdiction roads (i.e. County and State)	6 – Not Applicable	Z – Open All Year	928.8	928.8	928.8	928.8	928.8	928.8	928.8
H – Other non-system roads (Private)	6 – Not Applicable	Z – Open All Year	1,584.9	1,583.8	1,584.7	1,584.6	1,574.3	1,584.3	1,584.3
I – Non-motorized trails	1 – Existing National Forest Transportation System road, trail or area with no change in management	Z – Open All Year	286.3	286.3	286.3	286.3	286.3	286.3	286.3
J – Trails closed wheeled vehicles (including mountain bikes)	1 – Existing National Forest Transportation System road, trail or area with no change in management	Z – Open All Year	145.1	145.1	145.1	145.1	145.1	145.1	145.1
K – Decommissioned Roads	1 – Existing National Forest Transportation System road, trail or area with no change in management	Z – Open All Year	106.4	106.4	106.4	106.4	106.4	106.4	106.4
L – Un-authorized roads and trails remaining open to wheeled motorized vehicles	1 – Existing National Forest Transportation System road, trail or area with no change in management	X – May 1 to November 1	45.2	0.0	0.0	0.0	0.0	0.0	0.0

Class of Vehicle	Change in Management	Season of Use	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
L – Un-authorized roads and trails remaining open to wheeled motorized vehicles	1 – Existing National Forest Transportation System road, trail or area with no change in management	Y – January 1 to September 15 (Alternatives 1, 2, 3, 7)	1.7	0.0	0.0	0.0	0.0	0.0	0.0
L – Un-authorized roads and trails remaining open to wheeled motorized vehicles	1 – Existing National Forest Transportation System road, trail or area with no change in management	Z – Open All Year	445.0	0.0	0.0	0.0	0.0	0.0	0.0
L – Un-authorized roads and trails remaining open to wheeled motorized vehicles	6 – Not Applicable	X – May 1 to November 1	66.1	0.0	0.0	0.0	0.0	0.0	0.0
L – Un-authorized roads and trails remaining open to wheeled motorized vehicles	6 – Not Applicable	Y – January 1 to September 15 (Alternatives 1, 2, 3, 7)	1.9	0.0	0.0	0.0	0.0	0.0	0.0
L – Un-authorized roads and trails remaining open to wheeled motorized vehicles	6 – Not Applicable	Z – Open All Year	829.0	0.0	0.0	0.0	0.0	0.0	0.0
		Total	**7,326.0**	**7,326.0**	**7,326.0**	**7,326.0**	**7,326.0**	**7,326.0**	**7,326.0**

Step 5: Development of Hydrologic Resource Information

A model developed by USFS Pacific Northwest Research Station, Ecosystem Management Decision Support (EMDS), was used to assess potential hydrologic environmental risk from the road system. EMDS integrates a user-developed fuzzy logic knowledge base with a grid-based geographic information system to evaluate the degree of truth for assertions about the environmental impact of a road. (A knowledge base is a hierarchy of information and rules for interaction describing a system.) Using spatial data for natural and human processes, the TNF evaluated the assertion “the road has a high potential for damaging the hydrologic environment.”

EMDS uses the knowledge base structure to combine the necessary spatial base data using fuzzy logic rules to determine the degree of truth for an assertion (Reynolds et al., 1996 and Reynolds, 1999). Conventional, or Boolean, logic is a subset of fuzzy logic, which was introduced in order to accommodate “partial truths” (Zadeh, 1965). Partial truth refers to truth-values between “completely true” and

"completely false." The user of the system decides what is "true" and "false" for an assertion, such as "the slope is steep," and intermediate values for the parameter (e.g., steepness) get intermediate truth-values.

For this project, UC Davis staff demonstrated the use of a decision-support system, the interaction of the geographic information system with the knowledge base, and the application of the products to real-world assessments of hydrologic resources. The inter-disciplinary team (IDT) developed a fuzzy logic network that tested the assertion that "the road segment has a high potential for causing hydrologic impacts." The team then made a determination about data and knowledge availability and revised the knowledge base. Approximately fifty percent of the identified data layers did not exist at all or were not in a GIS format or the data existed but was not reliable. The original knowledge base was modified to reflect only known information. The modified knowledge base was used to run the hydrologic risk part of the EMDS analysis for all known roads on the Tahoe NF. All risk ratings for the road segments are internally referenced against mapped roads on the TNF (i.e., risks are assessed only on those roads, regardless of jurisdiction, within the Forest boundary). Geology, soil and hydrology data included in the EMDS model included soil erosivity (K factor), slope, precipitation, proximity to aquatic features (e.g., steams, lakes, springs, seeps, etc.),

The EMDS model approach demonstrated here is relatively inexpensive, fast to implement, and is easily modified and rerun so it serves as a continuing decision-support tool for road system management. The EMDS model shows the assumptions made during the analysis, provides products immediately useful for prioritizing areas and roads for management action, and aids the agency and the public in discussing and potentially refining future analysis runs.

Even though the model predictions had significant correlation with expert opinion, this tool is not a mathematical model in terms of providing quantified relationships between features of a road system and probability of road impact. Potential impacts ranged from 1 (low risk) to 0 (high risk) for all EMDS modeling. The results should be used cautiously in this application. Rather, the method gives a relative degree of truth for hydrologic impact based on the assumptions laid out in the knowledge base.

The model was spot checked by field verification during development. The results of that validation exercise were a high degree of correlation between the modeled results and expert opinion. The model does seem to over estimate the number of active debris slides and route/stream crossings, especially on ephemeral streams. When the model results were compared to the GIS information used to generate the model and the field inventory results, the model correlated very well with the GIS data. The field data found fewer debris slides and route/stream crossings, especially ephemeral stream crossings. This is due to the fact that most of the routes were above the active debris slide or ephemeral channel. Another issue is the fact that the ephemeral stream layer was generated in the office from computer maps with very little field verification, so not all computer generated streams were found on the ground. The EMDS risk assessment did function as a good risk assessment for potential route related risks to geology, soil and watershed resources. Site specific knowledge of individual routes was used to refine the actual effects analysis.

The EMDS model erosion and water quality risk scores were then assigned to each 300 meter segment of all roads and trail for use in the effects analysis.

Step 6: Effects Analysis Using Corporate Resource Data

The final step in the modeling process was to overlay the roads, trails and areas as coded for each of the seven alternatives with the information in the Tahoe National Forest corporate resource data contained the Forest's Geographic Information System (GIS). The corporate resource information used is shown in Table B-3. The results of this information were then used to complete the effects analysis contained in this document.

Table B-3. Tahoe National Forest Corporate Resource Data

	FUNCTIONAL Feature Data Sets		Feature
GIS Library Feature Data Set	**TahoeGIS_Library.gdb (GDB)**		
	Feature Class	**Description and date added or last modified**	**Type**
Aquatic	Amphibian	Reptile & Amphibian Sightings	point
	Fish	Fish Bearing Stream Reaches	line
Botany	plants	Plant locations by - Genus_Species	poly
	weed	Noxious Weed areas 3/02	poly
Fire	CommunityAtRisk	Communities at Risk 4/04 per National Fire Plan	point
	FireHistory_freq	Fire History - Frequency	poly
	FireHistory_pl	Large Fire History - class C & greater thru 2005	poly
	FireHistory_pt	Fire History - Fire Starts 1949-Present (from PCHA database)	point
	Urban	Wildland Urban Intermix Zones	poly
Geology	AbandonedInventoryMines	Excerpted from the U.S. Abandoned Mine Inventory	point
	Geology	Bedrock Geology - 1:24,000	poly
	Geomorphology	Geomorphology 1:24,000	poly
Indexes	QuadIndex	Index of Names, Numbers, Corners, and more for each Quad	poly
Land	AdminForest	Administrated Forest Boundary	poly
	City	Cities/Towns on the Tahoe National Forest	point
	CountyForest	County Boundaries Within the Forest Boundary	poly
	DistrictBoundary	Ranger District Boundaries (Full 4 Districts NO Exclusions)	poly
	ExperimentalForest	Onion Creek Experimental Forest	poly
	ForestBoundary	Exterior Boundry of the Forest (for clipping or locality maps)	poly
	RangerDistrict	Ranger District Boundaries (All 4 Districts shows Exclusions)	poly
	Surf_Own	Surface Ownership (FS, Private, Other)	poly
	TnRnSec	Township, Range, Section (search or label by Tn Rn or Sec)	poly
LMP	LandSuitabilityClass	LMP Land Suitability Class (Regulation Classes)	poly
	ManagementAreas	LMP Management Areas updated 11/6/2006	poly
	RecreationalOpportunitySpectrum	Recreation Opportunity Spectrum (ROS Areas)	poly
	ResearchNaturalArea	Research Natural Areas	poly
	RoadlessArea	RARE I & II roadless areas	poly
	SagehenExpFor	Sagehen Experimental Forest Boundary	poly

	FUNCTIONAL Feature Data Sets		Feature
GIS Library Feature Data Set	**TahoeGIS_Library.gdb (GDB)**		
	Feature Class	**Description and date added or last modified**	**Type**
	SpecialInterestAreas	LRMP Special Interest Areas updated 11/6/2006	poly
	VisualQualityObjectives	LMP Visual Quality Objectives	poly
	Wilderness	Wilderness Boundary Granite Chief	poly
	WildScenicDesignated	Desig. Recom. & Eligible - Wild & Scenic Rivers 4/14	poly
	WithdrawnArea	Administratively Withdrawn Areas	poly
Range	InvasivePlant	Invasive Plant Specie Locations	poly
	RangeAllotment	Range Grazing Allotments 9/03	poly
	Range Pasture	Range Grazing Pasturess 9/03	poly
Recreation	RecPoint	Recreation sites as displayed on Tahoe NF. Visitor(Rec) map	point
	rec_site_pl_patdelvoped	Recreation Polygon Sites	poly
	rec_site_pt_pat	Recreation Point Sites	point
	SkiLifts	Ski Lifts (Alpine, Boreal, Sugar Bowl only)	line
	SpecialUseSites	Administrative Special Use Sites	poly
TEU	sri	Order III Soil Resource Inventory (SRI)	poly
	TimberProductivityClass	Timber Productivity Classes (1-7) derived from Soils layer	poly
Topography	Aspect30m	Aspect (NE,NW,SE,SW,N,E,S,W,Level - from 30M DEMs)	poly
	Contour40	Countour Lines from the USGS/GSTC Quads	line
	Elevation100ft	Elevation Classes (100' classes)	poly
Transportation	Highway	Major Forest Highways (80,49,89,20,etc.)	line
	PacificCrestTrail	Pacific Crest Trail (completely through R5)	line
	PacificCrestTrail_tnf	Pacific Crest Trail within the TNF Boundary	line
	Railroad	Railroad Lines Through the Forest from CFF files	line
	RoadMaintenanceZone	Forest Transportation Road Maintenance Zone	poly
Vegetation	eveg00_3	Existing Vegetation from RSL-updated 2000	poly
	veg2000	Update VegOwn00 with Pvt Land Clearcuts through 2000	poly
Water	Lake060306	Lakes on the Tahoe, updated 03/06	poly
	HUC7	Watersheds at the HUC 7 level	poly
	LakeTahoe	Lake Tahoe, the lake itself	poly
	Meadow	Meadows as defined for the Sierra Nevada Framework	poly

	FUNCTIONAL Feature Data Sets		Feature
GIS Library Feature Data Set	**TahoeGIS_Library.gdb (GDB)**		
	Feature Class	**Description and date added or last modified**	**Type**
	SierraCrest	East/West Crest Drainage	poly
	spring	Springs from USGS quad sheets (cff's)	point
	stream	Streams - only Perennial & Seasonal	line
	stream_all	Streams -Perennial,Seasonal & Ephemeral	line
Wildlife	carnivore	Forest Carnivore Network	poly
	cso_hrca	Spotted Owl Home Range Core Area (HRCA)	poly
	cso_pac	Spotted Owl Protected Activity Center (PAC)	poly
	deer	Deer Migration 10/02	poly
	goshawk_alp	Goshawk Management Areas 6/02	poly
	wiflggo_polygon	Willow Fly Catcher and Great Gray Owl Habitat	poly
	WilloFlyCatcher_snfp	Willow Fly Catcher for Sierra Nevada Framework Proj. 4/02	poly

Project Feature Data Set	**DEIS_GIS_Data.gdb (GDB)**		
	Feature Class	**Description and date**	**Type**
DEIS_Transportation	DEIS_TNF_Routes	Roads, trails, & other routes with IDs and alternatives	line
	travel_route_AAT20060721	Forest Road & Trail System – Arcs (capture of 7/21/06)	line
	Road_Linear_Events20060721	Routed Road system – INFRA (capture of 7/21/06)	line
	Trail_Linear_Events20060721	Routed Trail system – INFRA (capture of 7/21/06)	line
	OHV Use Areas	Proposed OHV use area polygons	poly
DEIS_Wildlife	CSO_ActCenter	Spotted owl activity centers	poly
	Goshawk_ActCent	Goshawk activity centers	poly
	Eagle_nest_center	Bald eagle nest centers	poly
DEIS_Terrestrial	SRI_K_factor	Order III Soil Resource Inventory (SRI) with K factor (erosivity)	poly
DEIS_EMDS	EMDS_TV4	Hydrologic Ecosystem Management Decision Suport "truth value" model	line

Appendix C: Glossary of Terms

Adaptive Management	A type of natural resource management that implies making decisions as part of an on-going process. Monitoring the results of actions will provide a flow of information that may indicate the need to change a course of action. Scientific findings and the needs of society may also indicate the need to adapt resource management to new information.
Administrative Unit	A National Forest, a National Grassland, a purchase unit, a land utilization project, Columbia River Gorge National Scenic Area, Land Between the Lakes, Lake Tahoe Basin Management Unit, Midewin National Tallgrass Prairie, or other comparable unit of the National Forest System.
Alluvial	Pertaining to processes or materials associated with transportation or deposition by running water.
Anadromous Fish	Species of fish that mature in the sea and migrate into streams to spawn. Salmon is an example.
Andic	Specific physical and chemical properties of soils formed in volcanic materials.
Annual Maintenance	Work performed to maintain serviceability or repair failures during the year in which they occur. Includes preventive and/or cyclic maintenance performed in the year in which it is scheduled to occur. Unscheduled or catastrophic failures of components or assets may need to be repaired as a part of annual maintenance (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998).
Aquatic	Growing or living in or frequenting water; taking place in or on water.
Aquatic Diversity Area	A watershed generally ranging from 13,000-600,000 acres selected for special consideration and management because of relatively good water quality, free-flowing character (without dams) and/or the presence of the best remaining populations of native fish and amphibians in the Sierra Nevada Province. A feature of Alternative 5.
Aquatic Ecosystem	A stream channel, lake or estuary bed, the water itself, and the biotic (living) communities that occur therein.
Arc Macro Language (AML)	AML is ARC/INFO's computer programming language.
ARC/INFO	The name of a Geographic Information System software program.

Area	A discrete, specifically delineated space that is smaller, and in most cases much smaller, than a Ranger District.
Area of Potential Effects (APE)	This is the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.
Arterial roads	Classified roads that provide service to large land areas; arterial roads are usually developed and operated for long-term land and resource management purposes and constant service.
Aspect	The direction a slope faces. For example, a hillside facing east has an eastern aspect.
Biological Diversity (Biodiversity)	The number and abundance of species found within a common environment. This includes the variety of genes, species, ecosystems, and the ecological processes that connect everything in a common environment.
Biota	The plant and animal life of a particular region.
Biotic Potential	Factors that influence the ability of an animal to utilize its environment, including: reproductive rates, dispersal ability, habitat and life requisite specificity, and adaptability. Combine, these factors assign biotic potential of the animal.
Blue Oak Woodlands	An ecosystem dominated by blue oak, valley oak, interior live oak (tree form), or Oregon white oak.
Buffer	Used in the context of GIS; a buffer is a zone of a specified distance around a feature in a coverage.
California Wildlife Habitat Relationships (CWHR)	A system of classifying vegetation in relation to its function as wildlife habitat. Tree-dominated habitat is classified according to tree size and canopy closure.
Canopy	The part of any stand of trees represented by the tree crowns. It usually refers to the uppermost layer of foliage, but it can be used to describe lower layers in a multi-storied forest.

CASPO (California Spotted Owl Sierran Province Interim Guidelines)	A specific set of management guidelines introduced in 1993 that protects California spotted owl populations. The guidelines prescribe silvicultural practices for retaining specific levels of large trees.
Classified roads	Roads wholly or partially within or adjacent to National Forest System lands that are determined to be needed for motor vehicle access, such as State roads, County roads, privately owned roads, National Forest System roads, and roads authorized by the Forest Service that are intended for long-term use.
Collaboration	Managers, scientists and citizens working together to plan, implement and monitor national forest management. The intention is to engage people who have information, knowledge, expertise and an interest in the health of national forest ecosystems and nearby communities.
Collector roads	Classified roads serving smaller land areas than arterial roads; collector roads collect traffic from local roads and usually connect to forest arterial roads or State and County highways. They are operated for either constant or intermittent service depending on land use and resource management objectives.
Connectivity (of Habitats)	The linkage of similar but separated vegetation stands by patches, corridors, or “stepping stones” of like vegetation. This term can also refer to the degree to which similar habitats are linked.
Coverage	A digital map or layer of data in the ARC/INFO software program.
Critical Aquatic Refuge	A relatively small watershed, ranging in size from about 3,000 to 85,000 acres, that is sometimes nested within an emphasis watershed and has localized populations of rare and/or at-risk populations of native fish and/or amphibians. A feature of Alternatives 2, 6 and 8.
Critical Habitat	Areas designated for the survival and recovery of federally listed threatened or endangered species.
Critical Refuge	A relatively small watershed, ranging in size from about 3,000 to 85,000 acres, that is sometimes nested within an emphasis watershed and has localized populations of rare and/or at-risk populations of native fish and/or amphibians. A feature of Alternative 5.

Cryptogamic Soil Crusts (Microbiotic Soil Crusts)	Arid and semi-arid soil surface communities consisting of green algae, cyanobacteria, diatoms, non-lichenized fungi, lichens, bryophytes, bacteria, protozoans in various combinations. They stabilize soil surfaces, concentrate certain mineral and organic nutrients, alter water infiltration while consistently reducing sedimentation, and facilitating seed germination and seedling establishment.
Deferred Maintenance	Maintenance that was not performed when it should have been or when it was scheduled and which, therefore, was put off or delayed for a future period. When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair, and decrease in asset value. Deferred maintenance needs may be categorized as critical or non-critical at any point in time. Continued deferral of non-critical maintenance will normally result in an increase in critical deferred maintenance. Code compliance (e.g. life safety, ADA, OSHA, environmental, etc.), Forest Plan Direction, Best Management Practices, Biological Evaluations other regulatory or Executive Order compliance requirements, or applicable standards not met on schedule are considered deferred maintenance (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998).
Degradation	Reduction in quality. The process whereby the water quality and chemical, physical or biological integrity of a water body is decreased. Habitat quality can be changed by certain management activities. If the quality is reduced then habitat degradation has occurred.
DEIS	**Draft Environmental Impact Statement.** A working document that is released to governmental agencies and the general public for review and comment.
Demographic Stochasticity	Random fluctuations in birth and death rates.
Designated Road, Trail or Area	A National Forest System road, a National Forest System trail, or an area on National Forest System lands that is designated for motor vehicle use pursuant to § 212.51 on a motor vehicle use map.
Desired Future Conditions	Land or resource conditions that are expected to result if goals and objectives are fully achieved.

DFPZ	Defensible Fuel Profile Zone. A system of linear treatments of forest or shrub vegetation designed and treated to reduce fire spread, intensity, and create barriers to fire spread.
Digital Elevation Model (DEM)	A DEM is a digital GIS file typically used to represent terrain relief.
Early Forest Succession	The biotic (or life) community that develops immediately following the removal or destruction of vegetation in an area. For example, grasses may be the first plants to grow in an area that was burned.
Ecology	The interrelationships of living things to one another and to their environment, or the study of these interrelationships.
Ecosystem	An arrangement of living and non-living things and the forces that move them. Living things include plants and animals. Non-living parts of ecosystems may be rocks and minerals. Weather and wildfire are two of the forces that act within ecosystems.
Emphasis Watershed	A watershed generally ranging from 13,000-130,000 acres selected for special consideration and management because of relatively good water quality, free-flowing character (without dams) and/or the presence of the best remaining populations of native fish and amphibians in the Sierra Nevada Province. A feature of Alternatives 2, 6 and 8.
Endangered Species	Those plant or animal species that are in danger of extinction throughout all or a significant portion of their range. Endangered species are identified by the Secretary of the Interior in accordance with the Endangered Species Act of 1973.
Endemic	An organism that evolved in and is restricted to a particular locality. The Little Kern golden trout found only in the Sierra Nevada region is an example.
Environmental Stochasticity	Random variation in environmental attributes such as temperature, precipitation, and fire frequency.
Ephemeral Stream	Streams that flow only as the direct result of rainfall or snowmelt. They have no permanent flow.
Escarpment	A long, more or less continuous cliff or relatively steep slope produced by erosion or by faulting.
Fauna	The animal life of an area.

Fire Return Interval	Expressed as a range of years or as the arithmetic average (mean fire return interval) of all fire intervals in a given area over a given time period.
Fire Risk	See wildland fire risk.
Flora	The plant life of an area.
Focal Species	A species of concern.
Forest Road or Trail	A road or trail wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources.
Forest Transportation Atlas	A display of the system of roads, trails, and airfields of an administrative unit.
Forest Transportation Facility	A forest road or trail or an airfield that is displayed in a forest transportation atlas, including bridges, culverts, parking lots, marine access facilities, safety devices, and other improvements appurtenant to the forest transportation system.
Forest Transportation System	The system of National Forest System roads, National Forest System trails, and airfields on National Forest System lands.
Fuel Hazard	A fuel complex defined by kind, arrangement, volume, condition, and location that forms a special threat of ignition and resistance to control.
Fuelbreak	A system of linear or mosaic patch treatments of forest or shrub vegetation designed and treated to reduce fire spread, intensity, and create barriers to fire spread.
Fuels	Plants and woody vegetation, both living and dead, that are capable of burning.
Fuels Management	The planned manipulation and/or reduction of living and dead forest fuels for forest management and other land use objectives.
Fuels Treatment	The treatment of fuels that left untreated, would otherwise interfere with effective fire management or control. For example, prescribed fire can reduce the amount of fuels that accumulate on the forest floor.
Fuelwood	Wood cut into short lengths for burning in a fireplace, woodstove or fire pit.

Functional Classification	The grouping of roads by the character of service they provide (American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, 2001).
General Forest	National Forest System lands that do not carry a specific designation, i.e., protected activity center, wilderness area, etc.
Geographic Information Systems (GIS)	A computer system capable of storing, manipulating, analyzing, and displaying geographic information.
Great Gray Owl PACs	See Protected Activity Centers.
Habitat	The area where a plant or animal lives and grows under natural conditions.
Herbaceous	A plant having little or no woody tissue.
Heritage Program	The comprehensive Forest Service program of responsibilities with regard to historic preservation. A pro-active program to manage prehistoric and historic cultural resources and cultural traditions for the benefit of the public through preservation, public use, and research.
Image	A graphic representation of a person or thing, typically produced by an electronic device. Common examples include remotely sensed data and photographs.
Indigenous (Species)	Any species of plant or animals native to a given land or water area by natural occurrence.
Interdisciplinary Team	A diverse group of professional resource specialists who analyze the effects of Alternatives on natural and other resources. Through interaction, participants bring different points of view and a broader range of expertise.
Intermittent Stream	A stream that flows only at certain times of the year when it receives water from streams or from some surface, such as melting snow.
Juvenile Return Rates	Rate at which juvenile birds return to the nesting grounds. Generally reported as percentage of migratory juvenile birds returning to the nesting grounds, after wintering elsewhere (e.g., tropics), from total number of hatched birds marked with leg bands in the previous year. Juvenile return rates may indirectly indicate ability of young birds to survive migration.
Lahars	Landslide or mudflow material of pyroclastic (hot ash or tephra) on the flank of a volcano or the deposit formed by such a landslide or mudflow.
Landscape	A large land area composed of interacting ecosystems that are repeated due to factors such as geology, soils, climate, and human impacts.

Late Forest Succession	The stage of forest succession in which most of the trees are mature or over mature.
Long-Term Risk	A risk to be experienced within the next 50 to 100 years.
Maintained for Public Use	A Memorandum of Understanding with the Federal Highway Administration defines national forest system roads open to the public as those roads open to unrestricted use by the general public in standard passenger cars, including those roads open on a seasonal basis or for emergencies.
Maintenance	The upkeep of the entire forest transportation facility including surface and shoulders, parking and side areas, structures, and such traffic-control devices as are necessary for its safe and efficient utilization (36 CFR 212.1).
Management Action	Any activity undertaken as part of the administration of the national forest.
Meadow	Tracks of moist low lying and usually level grasslands. Generally, the water table is just below the surface of the soil and the most abundant vegetation is usually favored by wet but not constantly flooded soil.
Mesic	1. Moderately moist climates or environments. 2. Vegetation: generally refers to vegetation found in moist environments. 3. Soils: refers specifically to soils with mean annual temperatures of 8 to 15 degrees centigrade.
Montane Hardwood Forests	For the purposes of this DEIS, it refers to vegetation communities dominated by California black oak, canyon live oak, Pacific madrone, or tanoak.
Mosaic	Areas with a variety of plant communities over a landscape. For example, areas with trees and areas without trees occurring over a landscape.
Motor Vehicle	Any vehicle which is self-propelled, other than: (1) A vehicle operated on rails; and (2) Any wheelchair or mobility device, including one that is battery powered, that is designed solely for use by a mobility-impaired person for locomotion, and that is suitable for use in an indoor pedestrian area.
Motor Vehicle Use Map	A map reflecting designated roads, trails, and areas on an administrative unit or a Ranger District of the National Forest System.

National Forest System road	A forest road other than a road which has been authorized by a legally documented right-of-way held by a State, county or other local public road authority.
National Forest System trail	A forest trail other than a trail which has been authorized by a legally documented right-of-way held by a State, county, or other local public road authority.
Natural Resource	A feature of the natural environment that is of value in serving human needs.
Natural Succession	The natural replacement, in time, of one plant community with another. Conditions of the prior plant community (or successional stage) create conditions that are favorable for the establishment of the next stage.
Nitrogen oxides (NO_x)	A general term pertaining to compounds of nitric oxide (NO) nitrogen dioxide (NO_2) and other oxides of nitrogen. Nitrogen oxides are typically created during combustion processes and are major contributors to smog formation and acid deposition.
Nonroad	A diverse collection of engines, equipment, vehicles, and vessels. Sometimes referred to as off-road or off-highway. It includes outdoor power equipment, recreational vehicles, farm and construction machinery, lawn and garden equipment, marine vessels, locomotives, and many other applications (EPA 2003).
Noxious Weeds	Aggressive, non-native plant species that have been introduced. They can be difficult to manage, poisonous, toxic, parasitic, or carrier of insects or disease. Examples of noxious weeds would be scotch broom, yellow star thistle, and cheatgrass.
Off-highway vehicle	Any motor vehicle designed for or capable of crosscountry travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other natural terrain.
Old Forest (Old Growth)	Areas that contain large, old trees relative to the species-specific, environmentally-constrained growth capacity of the site.
Open to Public Travel	Except during scheduled periods, extreme weather conditions, or emergencies, open to the general public for use with a standard passenger auto, without restrictive gates or prohibitive signs or regulations, other than for general traffic control or restrictions based on size, weight, or class of registration (23 CFR 660.103).

Over-snow vehicle	A motor vehicle that is designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow.
Owl and Goshawk PACs	See Protected Activity Centers.
Paleoecological	The study of ancient or prehistoric ecosystems.
Patch	An area of vegetation, similar in structure and composition.
Perennial Stream	A stream that typically has running water on a year-round basis.
Polygon	Used in a GIS to represent an area, a polygon is a digital feature class defined by arcs, or lines, that make up its boundary. A polygon would be used to represent areas such as lakes and land parcels on a map.
Prescribed Fire or Burn	A type of fuel treatment whereby fire is intentionally set in wildland fuels under prescribed conditions and circumstances.
Protected Activity Centers (PACs)	Designated areas that are afforded protection to specific species by restricting certain management activities. For example, California spotted owl PACs protect owl habitat and breeding areas by restricting timber harvest.
Public Involvement	The use of appropriate procedures to: inform the public, obtain early and continuing public participation, and consider the views of interested parties in planning and decision-making.
Public Land	Land for which title and control rests with a government – Federal, state, regional, county, or municipal.
Public road	Roads under the jurisdiction of and maintained by a public authority that are open to public travel (23 U.S.C 101(a)).
Reactive organic gas (ROG)	A photochemically reactive chemical gas composed of non-methane hydrocarbons, that may contribute to the formation of SMOG; volatile organic compounds.
Remote Sensing	Acquiring information about a geographic feature without contacting it physically. Methods include aerial photography and satellite imaging.
Resilience	The ability of an ecosystem to maintain diversity, integrity, and ecological processes following a disturbance.
Riparian Area	The area along a watercourse or around a lake or pond.

Riparian Ecosystem	The ecosystem around or next to water areas that support unique vegetation and animal communities as a result of the influence of water.
Road	A motor vehicle route over 50 inches wide, unless identified and managed as a trail.
Road construction or reconstruction	Supervising, inspecting, actual building, and incurrence of all costs incidental to the construction or reconstruction of a road.
Road decommissioning	Activities that result in the stabilization and restoration of unneeded roads to a more natural state (FSM 7703.2(1)).
Road improvement	Activities that result in an increase of an existing road's traffic service level, expand its capacity, or change its original design function.
Road maintenance	The ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective.
Road obliteration	A form of road decommissioning that re-contours and restores natural slopes.
Road realignment	Activities that result in a new location for an existing road or portions of an existing road, including treatment of the old roadway.
Road reconstruction	Activities that result in road realignment or road improvement, as defined below:
Roadless areas	For the purposes of this EIS, a generic term that includes inventoried roadless area and unroaded areas.
ROD (Record of Decision)	An official document in which a deciding official states the alternative that will be implemented from a prepared EIS.
Satellite Image	A picture of the earth taken from a satellite in orbit around the earth.
Sensitive Species	Plant or animal species which are susceptible to habitat changes or impacts from activities. The official designation is made by the USDA Forest Service at the regional level and is not part of the designation of threatened or endangered species made by the U.S. Fish And Wildlife Service.
Seral Stage	The stage of succession of a plant or animal community that is transitional. If left alone, the seral stage will give way to another plant or animal community that represents a further stage of succession.
Short-Term Risk	A risk to be experienced within the next 10 to 15 years. For example, prescribed burns can disturb habitat in the short-term, but in the long-term the fire resiliency of the habitat may be improved.

Silvicultural System	The cultivation of forests; the result is a forest of a distinct form. Silvicultural systems are classified according to harvest and regeneration methods and the type of forest that results.
Silviculture	The art and science that promotes the growth of single trees and the forest as a biological unit.
SMOG	A combination of smoke and other particulates, ozone, hydrocarbons, nitrogen oxides and other chemically reactive compounds which under certain conditions of weather and sunlight may result in a murky brown haze. The primary source of smog in California is motor vehicles.
Snag	A standing dead tree. Snags are important as habitat for a variety of wildlife species and their prey.
Spatial Analysis	See Spatial Data.
Spatial Data	A GIS contains spatial data. The spatial data represents geographic features associated with real-world locations.
Species	A class of individuals having common attributes and designated by a common name; a category of biological classification ranking immediately below the genus or subgenus; comprising related organisms or populations potentially capable of interbreeding.
SPLAT	Strategically Placed Local Area Treatment. A system of mosaic patch treatments of forest or shrub vegetation designed and treated to reduce fire spread, intensity, and create barriers to fire spread.
Stand	A group of trees that occupies a specific area and is similar in species, age, and condition.
Standards and Guidelines (S&Gs)	The primary instructions for land managers. Standards address mandatory actions, while guidelines are recommended actions necessary to a land management decision.
Stand-Replacing Fire	A fire that burns with sufficient intensity to kill the majority of living vegetation over a given area (grass and brush fires are stand replacement fires for that vegetation type, in forest vegetation types when 75- 80% of the stand is killed by fire are also considered stand replacement fires).
Stewardship	Caring for the land and its resources in order to pass healthy ecosystems on to future generations.

Suitability	The appropriateness of certain resource management to an area of land. Suitability can be determined by environmental and economic analysis of management practices.
Sulfur oxides (SO_x)	Pungent colorless gases formed primarily by the combustion of sulfur containing fossil fuels, especially coal and oil. Considered a major air pollutant.
Sustainability	The ability of an ecosystem to maintain ecological processes and functions, biological diversity, and productivity over time.
Sustainable	The yield of a natural resource that can be produced continually at a given intensity of management is said to be sustainable.
Taxa	The name applied to any one group or entity in the scientific classification system.
Temporary road or trail	A road or trail necessary for emergency operations or authorized by contract, permit, lease, or other written authorization that is not a forest road or trail and that is not included in a forest transportation atlas.
Thermic	A soil with a mean annual soil temperature of greater than or equal to 15 degrees centigrade, but less than 22 degrees centigrade and a difference between the mean summer and winter soil temperatures of greater than 5 degrees centigrade measured at 50 cm below the surface.
Threatened Species	Those plant or animal species likely to become endangered throughout all or a specific portion of their range within the foreseeable future as designated by the U.S. Fish and Wildlife Service under the Endangered Species Act of 1973.
Total Organic Gases (TOG)	Gaseous organic compounds including relative organic gases and the relatively unreactive organic gases such as methane.
Traffic Management Strategies	These strategies are: encourage, accept, discourage, eliminate, and prohibit. The ‘encourage’ strategy directs forest visitors to important destinations via desirable routes. The discourage strategy informs potential users of road conditions that may detract from the experience they seek when visiting a national forest. The ‘eliminate’ and prohibit strategies are used to close roads with physical barriers or regulatory signs and orders (USDA Forest Service, Forest Service Handbook 7709.59-25.31).
Trail	A route 50 inches or less in width or a route over 50 inches wide that is identified and managed as a trail.

Travel Management Atlas	An atlas that consists of a forest transportation atlas and a motor vehicle use map or maps.
Un-authorized road or trail	A road or trail that is not a forest road or trail or a temporary road or trail and that is not included in a forest transportation atlas.
Understory	The trees and woody shrubs growing beneath branches and foliage formed collectively by the upper portions of adjacent trees.
Unroaded area	Any area, without the presence of a classified road, of a size and configuration sufficient to protect the inherent characteristics associated with its roadless condition. Unroaded areas do not overlap with inventoried roadless areas.
Visual Quality	The forest visual resources; terrain, geological features, or vegetation.
Watershed	The entire region drained by a waterway, lake, or reservoir. More specifically, a watershed is an area of land above a given point on a stream that contributes water to the streamflows at that point.
Wilderness and Wild and Scenic River	Wilderness and Wild and Scenic Rivers are Congressionally mandated areas withdrawn from location and entry under the US mining laws.
Wildland	An area in which development is essentially non-existent, except for roads, railroads, powerlines, and similar transportation facilities
Xeric	A soil moisture regime common to Mediterranean climates that have moist cool winters and warm dry summers. A limited amount of water is present but does not occur at optimum periods for plant growth.

Appendix D: Watershed Risk Assessment

Introduction

The purpose of Appendix D is to provide a technical overview of the analysis process and models used. Due to the complexity and magnitude of this project, a number of analytical models and techniques were utilized requiring development of a decision support system to integrate these processes.

Within the TNF boundary, drainages have been designated into hydrologic unit code 7 (HUC7) watersheds with area (acres) designated as TNF or other. Total HUC7 area and the percent area on TNF is defined. Per classified route, route distance (miles) on forest service lands and private lands is defined and route density defined (miles route/square mile) as a sum of density on forest service lands and density on private lands. Stream crossings are quantified as perennial, intermittent, or ephemeral and designated as crossing through private or TNF land. For each HUC7 watershed total area, route distance, route density, quantity of stream crossings, and density (quantity per square mile) of stream crossings are calculated. This data is then presented to include only routes classified as native surface system roads (2-FS Sys Rd ML2), motorized trails (3-FS Sys Trail Moto) and user created routes or routes previously closed and not decommissioned (6-unclassified).

EMDS model analyses identifies watersheds with high risks to watershed function and/or aquatic species affected by the wheeled motorized vehicle route system. Specific concepts of the EMDS model selected include landscape erosion risk, and water quality and drainage. The landscape erosion risk truth value (TV) data includes precipitation, soil erodibility, slope steepness, and geomorphology (including slides and mass wasting). The water quality and drainage TV data includes trail slope position, stream proximity, and stream crossings. Both specific concepts of analyzed data are calculated on a scale of zero to one. High watershed risks are represented as lower values (closer to zero) and lower watershed risks are represented as high values (closer to one).

The riparian conservation area (H7 aquatic area or RCA) is defined as an area (acres) 300 feet on either side of perennial streams and 150 feet on either side of intermittent streams. The RCA is designated by route distance and density on FS and private lands. Total density is calculated per classified route and total distance of all routes in the H7 aquatic area is calculated on FS and private lands. This data is then presented to include only routes classified as dirt system roads (2-FS Sys Rd ML2), motorized trails (3-FS Sys Trail Moto) and unclassified roads (6-Unclassified).

Stream crossings (on TNF) proposed for alternatives for each HUC7 are quantified (total TNF stream crossings (TNF intermittent crossings, TNF ephemeral crossings)) by alternative.

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
16050102010101	Upper Middle Truckee River	AY	0.69	0.69	0.69	0.69	0.69	0.69	0.69	4,606.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	534.87	0.16	0.16	0.16	0.16	0.16	0.16	0.16
16050102010101	Upper Middle Truckee River	BS*	0.00	0.00	0.00	9.70	9.70	9.70	0.00	4,606.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	534.87	0.00	0.00	0.00	0.30	0.30	0.30	0.00
16050102010101	Upper Middle Truckee River	BY*	9.70	9.70	9.70	0.00	0.00	0.00	9.70	4,606.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	534.87	0.30	0.30	0.30	0.00	0.00	0.00	0.30
16050102010101	Upper Middle Truckee River	CS*	0.00	0.00	0.00	0.29	0.29	0.29	0.00	4,606.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	534.87	0.00	0.00	0.00	0.29	0.29	0.29	0.00
16050102010101	Upper Middle Truckee River	CY*	0.29	0.29	0.29	0.00	0.00	0.00	0.29	4,606.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	534.87	0.29	0.29	0.29	0.00	0.00	0.00	0.29
16050102010101	Upper Middle Truckee River	FY	0.00	4.69	4.69	4.69	4.69	4.69	4.69	4,606.11	0	0	2	0	2	0	2	0	2	0	2	0	2	0	534.87	0.00	0.44	0.44	0.44	0.44	0.44	0.44
16050102010101	Upper Middle Truckee River	GY	6.75	6.75	6.75	6.75	6.75	6.75	6.75	4,606.11	6	0	6	0	6	0	6	0	6	0	6	0	6	0	534.87	3.33	3.33	3.33	3.33	3.33	3.33	3.33
16050102010101	Upper Middle Truckee River	HY*	8.55	8.55	8.55	8.55	8.55	8.55	8.55	4,606.11	7	0	7	0	7	0	7	0	7	0	7	0	7	0	534.87	4.15	4.15	4.15	4.15	4.15	4.15	4.15
16050102010101	Upper Middle Truckee River	IY	3.13	3.13	3.13	3.13	3.13	3.13	3.13	4,606.11	2	0	2	0	2	0	2	0	2	0	2	0	2	0	534.87	0.28	0.28	0.28	0.28	0.28	0.28	0.28
16050102010101	Upper Middle Truckee River	JY	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4,606.11	2	0	2	0	2	0	2	0	2	0	2	0	2	0	534.87	0.14	0.14	0.14	0.14	0.14	0.14	0.14
16050102010101	Upper Middle Truckee River	LY*	4.69	0.00	0.00	0.00	0.00	0.00	0.00	4,606.11	2	0	0	0	0	0	0	0	0	0	0	0	0	0	534.87	0.44	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		38.20	38.20	38.20	38.20	38.20	38.20	38.20	4606.11	19	0	19	0	19	0	19	0	19	0	19	0	19	0	534.87	9.09	9.09	9.09	9.09	9.09	9.09	9.09
	*** Value Per SqMi All =**		**5.31**	**5.31**	**5.31**	**5.31**	**5.31**	**5.31**	**5.31**	**7.20**	**2.6**	**0.0**	**2.6**	**0.0**	**2.6**	**0.0**	**2.6**	**0.0**	**2.6**	**0.0**	**2.6**	**0.0**	**2.6**	**0.0**	**0.84**	**10.88**	**10.88**	**10.88**	**10.88**	**10.88**	**10.88**	**10.88**
	*** Sum Open-Motorized, Native Surface Routes =**		23.23	18.55	18.55	18.55	18.55	18.55	18.55		9	0	7	0	7	0	7	0	7	0	7	0	7	0		5.18	4.74	4.74	4.74	4.74	4.74	4.74
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.23**	**2.58**	**2.58**	**2.58**	**2.58**	**2.58**	**2.58**	**7.20**	**1.3**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**0.84**	**6.20**	**5.67**	**5.67**	**5.67**	**5.67**	**5.67**	**5.67**
16050102010102	Squaw Creek	FY	0.00	0.43	0.43	0.43	0.43	0.43	0.43	5,113.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,001.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010102	Squaw Creek	GY	4.32	4.32	4.32	4.32	4.32	4.32	4.32	5,113.15	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,001.61	2.39	2.39	2.39	2.39	2.39	2.39	2.39
16050102010102	Squaw Creek	HY*	40.37	40.37	40.37	40.37	40.37	40.37	40.37	5,113.15	15	0	15	0	15	0	15	0	15	0	15	0	15	0	1,001.61	10.10	10.10	10.10	10.10	10.10	10.10	10.10
16050102010102	Squaw Creek	IY	1.63	1.63	1.63	1.63	1.63	1.63	1.63	5,113.15	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,001.61	0.62	0.62	0.62	0.62	0.62	0.62	0.62
16050102010102	Squaw Creek	JY	8.15	8.15	8.15	8.15	8.15	8.15	8.15	5,113.15	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,001.61	0.72	0.72	0.72	0.72	0.72	0.72	0.72
16050102010102	Squaw Creek	LY*	0.43	0.00	0.00	0.00	0.00	0.00	0.00	5,113.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,001.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		54.91	54.91	54.91	54.91	54.91	54.91	54.91	5113.15	19	1	19	1	19	1	19	1	19	1	19	1	19	1	1001.61	13.83	13.83	13.83	13.83	13.83	13.83	13.83
	*** Value Per SqMi All =**		**6.87**	**6.87**	**6.87**	**6.87**	**6.87**	**6.87**	**6.87**	**7.99**	**2.4**	**0.1**	**2.4**	**0.1**	**2.4**	**0.1**	**2.4**	**0.1**	**2.4**	**0.1**	**2.4**	**0.1**	**2.4**	**0.1**	**1.57**	**8.84**	**8.84**	**8.84**	**8.84**	**8.84**	**8.84**	**8.84**
	*** Sum Open-Motorized, Native Surface Routes =**		40.80	40.37	40.37	40.37	40.37	40.37	40.37		15	0	15	0	15	0	15	0	15	0	15	0	15	0		10.10	10.10	10.10	10.10	10.10	10.10	10.10
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**5.11**	**5.05**	**5.05**	**5.05**	**5.05**	**5.05**	**5.05**	**7.99**	**1.9**	**0.0**	**1.9**	**0.0**	**1.9**	**0.0**	**1.9**	**0.0**	**1.9**	**0.0**	**1.9**	**0.0**	**1.9**	**0.0**	**1.57**	**6.45**	**6.45**	**6.45**	**6.45**	**6.45**	**6.45**	**6.45**
16050102010103	Middle Truckee River-Silver Creek	AS	3.38	0.00	3.38	3.38	0.00	3.38	3.38	5,042.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	547.99	0.07	0.00	0.07	0.07	0.00	0.07	0.07
16050102010103	Middle Truckee River-Silver Creek	AY	3.74	2.43	3.74	3.74	2.43	2.43	3.74	5,042.11	1	1	0	1	1	1	1	1	0	1	0	1	1	1	547.99	0.49	0.42	0.49	0.49	0.42	0.42	0.49
16050102010103	Middle Truckee River-Silver Creek	BS*	0.00	3.38	0.00	11.90	16.58	13.20	0.00	5,042.11	0	0	0	0	0	0	4	2	5	2	5	2	0	0	547.99	0.00	0.07	0.00	2.01	2.15	2.08	0.00
16050102010103	Middle Truckee River-Silver Creek	BY*	11.90	13.20	11.90	0.00	0.00	0.00	11.90	5,042.11	4	2	5	2	4	2	0	0	0	0	0	0	4	2	547.99	2.01	2.08	2.01	0.00	0.00	0.00	2.01
16050102010103	Middle Truckee River-Silver Creek	FY	0.00	5.29	5.29	5.29	5.29	5.29	5.29	5,042.11	0	0	0	1	0	1	0	1	0	1	0	1	0	1	547.99	0.00	0.78	0.78	0.78	0.78	0.78	0.78
16050102010103	Middle Truckee River-Silver Creek	GY	1.80	1.80	1.80	1.80	1.80	1.80	1.80	5,042.11	2	2	2	2	2	2	2	2	2	2	2	2	2	2	547.99	1.50	1.50	1.50	1.50	1.50	1.50	1.50
16050102010103	Middle Truckee River-Silver Creek	HY*	4.54	4.54	4.54	4.54	4.54	4.54	4.54	5,042.11	4	0	4	0	4	0	4	0	4	0	4	0	4	0	547.99	0.56	0.56	0.56	0.56	0.56	0.56	0.56
16050102010103	Middle Truckee River-Silver Creek	IY	3.52	3.52	3.52	3.52	3.52	3.52	3.52	5,042.11	1	0	1	0	1	0	1	0	1	0	1	0	1	0	547.99	2.55	2.55	2.55	2.55	2.55	2.55	2.55
16050102010103	Middle Truckee River-Silver Creek	JY	0.96	0.96	0.96	0.96	0.96	0.96	0.96	5,042.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	547.99	0.03	0.03	0.03	0.03	0.03	0.03	0.03
16050102010103	Middle Truckee River-Silver Creek	LY*	5.29	0.00	0.00	0.00	0.00	0.00	0.00	5,042.11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	547.99	0.78	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		35.11	35.11	35.11	35.11	35.11	35.11	35.11	5042.11	12	6	12	6	12	6	12	6	12	6	12	6	12	6	547.99	7.99	7.99	7.99	7.99	7.99	7.99	7.99
	*** Value Per SqMi All =**		**4.46**	**4.46**	**4.46**	**4.46**	**4.46**	**4.46**	**4.46**	**7.88**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**0.86**	**9.33**	**9.33**	**9.33**	**9.33**	**9.33**	**9.33**	**9.33**
	*** Sum Open-Motorized, Native Surface Routes =**		21.72	21.12	16.43	16.43	21.12	17.74	16.43		8	3	9	2	8	2	8	2	9	2	9	2	8	2		3.35	2.71	2.57	2.57	2.71	2.64	2.57
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.76**	**2.68**	**2.09**	**2.09**	**2.68**	**2.25**	**2.09**	**7.88**	**1.0**	**0.4**	**1.1**	**0.3**	**1.0**	**0.3**	**1.0**	**0.3**	**1.1**	**0.3**	**1.1**	**0.3**	**1.0**	**0.3**	**0.86**	**3.91**	**3.17**	**3.00**	**3.00**	**3.17**	**3.08**	**3.00**
16050102010104	Middle Truckee River-Pole Creek	AS	0.29	0.00	0.29	0.29	0.00	0.29	0.29	6,082.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	845.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010104	Middle Truckee River-Pole Creek	AY	1.91	0.29	1.91	1.91	0.29	0.29	1.91	6,082.05	2	0	1	0	2	0	2	0	1	0	1	0	2	0	845.69	1.08	0.24	1.08	1.08	0.24	0.24	1.08
16050102010104	Middle Truckee River-Pole Creek	BS*	0.00	0.29	0.00	12.94	14.85	14.56	0.00	6,082.05	0	0	0	0	0	0	1	1	2	1	2	1	0	0	845.69	0.00	0.00	0.00	2.88	3.73	3.73	0.00
16050102010104	Middle Truckee River-Pole Creek	BY*	12.94	14.56	12.94	0.00	0.00	0.00	12.94	6,082.05	1	1	2	1	1	1	0	0	0	0	0	0	1	1	845.69	2.88	3.73	2.88	0.00	0.00	0.00	2.88
16050102010104	Middle Truckee River-Pole Creek	CS*	0.00	0.00	0.00	2.49	2.49	2.49	0.00	6,082.05	0	0	0	0	0	0	1	0	1	0	1	0	0	0	845.69	0.00	0.00	0.00	0.15	0.15	0.15	0.00
16050102010104	Middle Truckee River-Pole Creek	CY*	2.49	2.49	2.49	0.00	0.00	0.00	2.49	6,082.05	1	0	1	0	1	0	0	0	0	0	0	0	1	0	845.69	0.15	0.15	0.15	0.00	0.00	0.00	0.15
16050102010104	Middle Truckee River-Pole Creek	FY	0.00	6.44	6.44	6.44	6.44	6.44	6.44	6,082.05	0	0	3	2	3	2	3	2	3	2	3	2	3	2	845.69	0.00	2.66	2.66	2.66	2.66	2.66	2.66
16050102010104	Middle Truckee River-Pole Creek	GY	1.64	1.64	1.64	1.64	1.64	1.64	1.64	6,082.05	3	1	3	1	3	1	3	1	3	1	3	1	3	1	845.69	1.51	1.51	1.51	1.51	1.51	1.51	1.51
16050102010104	Middle Truckee River-Pole Creek	HY*	3.50	3.50	3.50	3.50	3.50	3.50	3.50	6,082.05	2	0	2	0	2	0	2	0	2	0	2	0	2	0	845.69	0.83	0.83	0.83	0.83	0.83	0.83	0.83
16050102010104	Middle Truckee River-Pole Creek	IY	0.28	0.28	0.28	0.28	0.28	0.28	0.28	6,082.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	845.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010104	Middle Truckee River-Pole Creek	JY	0.16	0.16	0.16	0.16	0.16	0.16	0.16	6,082.05	0	2	0	2	0	2	0	2	0	2	0	2	0	2	845.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010104	Middle Truckee River-Pole Creek	LY*	6.44	0.00	0.00	0.00	0.00	0.00	0.00	6,082.05	3	2	0	0	0	0	0	0	0	0	0	0	0	0	845.69	2.66	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		29.66	29.66	29.66	29.66	29.66	29.66	29.66	6082.05	12	6	12	6	12	6	12	6	12	6	12	6	12	6	845.69	9.11	9.12	9.11	9.11	9.12	9.12	9.11
	*** Value Per SqMi All =**		**3.12**	**3.12**	**3.12**	**3.12**	**3.12**	**3.12**	**3.12**	**9.50**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.32**	**6.89**	**6.90**	**6.89**	**6.89**	**6.90**	**6.90**	**6.89**
	*** Sum Open-Motorized, Native Surface Routes =**		25.37	20.84	18.93	18.93	20.84	20.55	18.93		7	3	5	1	4	1	4	1	5	1	5	1	4	1		6.52	4.71	3.86	3.86	4.71	4.71	3.86
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.67**	**2.19**	**1.99**	**1.99**	**2.19**	**2.16**	**1.99**	**9.50**	**0.7**	**0.3**	**0.5**	**0.1**	**0.4**	**0.1**	**0.4**	**0.1**	**0.5**	**0.1**	**0.5**	**0.1**	**0.4**	**0.1**	**1.32**	**4.93**	**3.56**	**2.92**	**2.92**	**3.56**	**3.56**	**2.92**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
16050102010105	Middle Truckee River-Cabin Creek	AS	3.85	0.00	3.85	3.85	0.00	3.85	3.85	7432.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1144.94	0	0	0	0	0	0	0
16050102010105	Middle Truckee River-Cabin Creek	AY	3.79	0.82	3.79	3.79	0.82	0.82	3.79	7432.52	1	1	1	0	1	1	1	1	1	0	1	0	1	1	1144.94	1.17	0.76	1.17	1.17	0.76	0.76	1.17
16050102010105	Middle Truckee River-Cabin Creek	BS*	0.00	3.85	0.00	17.53	24.36	20.50	0.00	7432.52	0	0	0	0	0	0	4	0	4	1	4	1	0	0	1144.94	0	0	0	3.14	3.55	3.55	0
16050102010105	Middle Truckee River-Cabin Creek	BY*	17.53	20.50	17.53	0.00	0.00	0.00	17.53	7432.52	4	0	4	1	4	0	0	0	0	0	0	0	4	0	1144.94	3.14	3.55	3.14	0	0	0	3.14
16050102010105	Middle Truckee River-Cabin Creek	CS*	0.00	0.00	0.00	0.00	0.64	0.00	0.00	7432.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1144.94	0	0	0	0	0	0	0
16050102010105	Middle Truckee River-Cabin Creek	ES*	0.00	0.00	0.00	1.60	1.60	1.60	0.00	7432.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1144.94	0	0	0	0	0	0	0
16050102010105	Middle Truckee River-Cabin Creek	EY*	0.00	1.60	0.00	0.00	0.00	0.00	1.60	7432.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1144.94	0	0	0	0	0	0	0
16050102010105	Middle Truckee River-Cabin Creek	FY	0.00	15.70	17.29	15.70	15.06	15.70	15.70	7432.52	0	0	1	0	1	0	1	0	1	0	1	0	1	0	1144.94	0	2.66	2.66	2.66	2.66	2.66	2.66
16050102010105	Middle Truckee River-Cabin Creek	GY	10.15	10.15	10.15	10.15	10.15	10.15	10.15	7432.52	11	1	11	1	11	1	11	1	11	1	11	1	11	1	1144.94	5.85	5.85	5.85	5.85	5.85	5.85	5.85
16050102010105	Middle Truckee River-Cabin Creek	HY*	23.19	23.19	23.19	23.19	23.19	23.19	23.19	7432.52	6	0	6	0	6	0	6	0	6	0	6	0	6	0	1144.94	7.5	7.5	7.5	7.5	7.5	7.5	7.5
16050102010105	Middle Truckee River-Cabin Creek	IY	6.53	6.53	6.53	6.53	6.53	6.53	6.53	7432.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1144.94	0.07	0.07	0.07	0.07	0.07	0.07	0.07
16050102010105	Middle Truckee River-Cabin Creek	KY	0.46	0.46	0.46	0.46	0.46	0.46	0.46	7432.52	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1144.94	0.17	0.17	0.17	0.17	0.17	0.17	0.17
16050102010105	Middle Truckee River-Cabin Creek	LY*	17.29	0.00	0.00	0.00	0.00	0.00	0.00	7432.52	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1144.94	2.66	0	0	0	0	0	0
	Sum All =		82.80	82.80	82.80	82.80	82.80	82.80	82.80	7432.52	24	2	24	2	24	2	24	2	24	2	24	2	24	2	1144.94	20.56	20.56	20.56	20.56	20.56	20.56	20.56
	*** Value Per SqMi All =**		**7.13**	**7.13**	**7.13**	**7.13**	**7.13**	**7.13**	**7.13**	**11.61**	**2.1**	**0.2**	**2.1**	**0.2**	**2.1**	**0.2**	**2.1**	**0.2**	**2.1**	**0.2**	**2.1**	**0.2**	**2.1**	**0.2**	**1.79**	**11.49**	**11.49**	**11.49**	**11.49**	**11.49**	**11.49**	**11.49**
	*** Sum Open-Motorized, Native Surface Routes =**		58.01	49.14	40.72	42.31	49.78	45.29	42.31		11	0	10	1	10	0	10	0	10	1	10	1	10	0		13.3	11.05	10.64	10.64	11.05	11.05	10.64
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**5.00**	**4.23**	**3.51**	**3.64**	**4.29**	**3.90**	**3.64**	**11.61**	**0.9**	**0.0**	**0.9**	**0.1**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.1**	**0.9**	**0.1**	**0.9**	**0.0**	**1.79**	**7.43**	**6.18**	**5.95**	**5.95**	**6.18**	**6.18**	**5.95**
16050102010106	Trout Creek	FY	0.00	0.46	0.46	0.46	0.46	0.46	0.46	3,086.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	465.06	0.00	0.19	0.19	0.19	0.19	0.19	0.19
16050102010106	Trout Creek	GY	38.54	38.54	38.54	38.54	38.54	38.54	38.54	3,086.38	8	0	8	0	8	0	8	0	8	0	8	0	8	0	465.06	4.54	4.54	4.54	4.54	4.54	4.54	4.54
16050102010106	Trout Creek	HY*	15.63	15.63	15.63	15.63	15.63	15.63	15.63	3,086.38	4	0	4	0	4	0	4	0	4	0	4	0	4	0	465.06	3.05	3.05	3.05	3.05	3.05	3.05	3.05
16050102010106	Trout Creek	LY*	0.46	0.00	0.00	0.00	0.00	0.00	0.00	3,086.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	465.06	0.19	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		54.64	54.64	54.64	54.64	54.64	54.64	54.64	3086.38	12	0	12	0	12	0	12	0	12	0	12	0	12	0	465.06	7.78	7.78	7.78	7.78	7.78	7.78	7.78
	*** Value Per SqMi All =**		**11.33**	**11.33**	**11.33**	**11.33**	**11.33**	**11.33**	**11.33**	**4.82**	**2.5**	**0.0**	**2.5**	**0.0**	**2.5**	**0.0**	**2.5**	**0.0**	**2.5**	**0.0**	**2.5**	**0.0**	**2.5**	**0.0**	**0.73**	**10.71**	**10.71**	**10.71**	**10.71**	**10.71**	**10.71**	**10.71**
	*** Sum Open-Motorized, Native Surface Routes =**		16.10	15.63	15.63	15.63	15.63	15.63	15.63		4	0	4	0	4	0	4	0	4	0	4	0	4	0		3.24	3.05	3.05	3.05	3.05	3.05	3.05
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.34**	**3.24**	**3.24**	**3.24**	**3.24**	**3.24**	**3.24**	**4.82**	**0.8**	**0.0**	**0.8**	**0.0**	**0.8**	**0.0**	**0.8**	**0.0**	**0.8**	**0.0**	**0.8**	**0.0**	**0.8**	**0.0**	**0.73**	**4.46**	**4.20**	**4.20**	**4.20**	**4.20**	**4.20**	**4.20**
16050102010201	Donner Lake	BS*	0.00	0.00	0.00	2.51	2.51	2.51	0.00	9214.07	0	0	0	0	0	0	1	0	1	0	1	0	0	0	921.26	0	0	0	0.42	0.42	0.42	0
16050102010201	Donner Lake	BY*	2.51	2.51	2.51	0.00	0.00	0.00	2.51	9214.07	1	0	1	0	1	0	0	0	0	0	0	0	1	0	921.26	0.42	0.42	0.42	0	0	0	0.42
16050102010201	Donner Lake	CS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9214.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	921.26	0	0	0	0	0	0	0
16050102010201	Donner Lake	CY*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9214.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	921.26	0	0	0	0	0	0	0
16050102010201	Donner Lake	FY	0.00	3.65	3.65	3.65	3.65	3.65	3.65	9214.07	0	0	1	0	1	0	1	0	1	0	1	0	1	0	921.26	0	0.16	0.16	0.16	0.16	0.16	0.16
16050102010201	Donner Lake	GY	22.49	22.49	22.49	22.49	22.49	22.49	22.49	9214.07	9	0	9	0	9	0	9	0	9	0	9	0	9	0	921.26	4.08	4.08	4.08	4.08	4.08	4.08	4.08
16050102010201	Donner Lake	HY*	49.33	49.33	49.33	49.33	49.33	49.33	49.33	9214.07	10	5	10	5	10	5	10	5	10	5	10	5	10	5	921.26	10.71	10.71	10.71	10.71	10.71	10.71	10.71
16050102010201	Donner Lake	IY	2.96	2.96	2.96	2.96	2.96	2.96	2.96	9214.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	921.26	0.2	0.2	0.2	0.2	0.2	0.2	0.2
16050102010201	Donner Lake	JY	3.98	3.98	3.98	3.98	3.98	3.98	3.98	9214.07	1	0	1	0	1	0	1	0	1	0	1	0	1	0	921.26	0.65	0.65	0.65	0.65	0.65	0.65	0.65
16050102010201	Donner Lake	LY*	3.65	0.00	0.00	0.00	0.00	0.00	0.00	9214.07	1	0	0	0	0	0	0	0	0	0	0	0	0	0	921.26	0.16	0	0	0	0	0	0
	Sum All =		84.93	84.93	84.93	84.93	84.93	84.93	84.93	9214.07	22	5	22	5	22	5	22	5	22	5	22	5	22	5	921.26	16.22	16.22	16.22	16.22	16.22	16.22	16.22
	*** Value Per SqMi All =**		**5.90**	**5.90**	**5.90**	**5.90**	**5.90**	**5.90**	**5.90**	**14.40**	**1.5**	**0.3**	**1.5**	**0.3**	**1.5**	**0.3**	**1.5**	**0.3**	**1.5**	**0.3**	**1.5**	**0.3**	**1.5**	**0.3**	**1.44**	**11.27**	**11.27**	**11.27**	**11.27**	**11.27**	**11.27**	**11.27**
	*** Sum Open-Motorized, Native Surface Routes =**		55.50	51.85	51.84	51.84	51.85	51.85	51.85		12	5	11	5	11	5	11	5	11	5	11	5	11	5		11.29	11.13	11.13	11.13	11.13	11.13	11.13
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.85**	**3.60**	**3.60**	**3.60**	**3.60**	**3.60**	**3.60**	**14.40**	**0.8**	**0.3**	**0.8**	**0.3**	**0.8**	**0.3**	**0.8**	**0.3**	**0.8**	**0.3**	**0.8**	**0.3**	**0.8**	**0.3**	**1.44**	**7.84**	**7.73**	**7.73**	**7.73**	**7.73**	**7.73**	**7.73**
16050102010202	Donner Creek	BS*	0.00	0.00	0.00	5.34	5.34	5.34	0.00	9,586.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,389.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010202	Donner Creek	BY*	5.34	5.34	5.34	0.00	0.00	0.00	5.34	9,586.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,389.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010202	Donner Creek	CS*	0.00	0.00	0.00	1.58	1.58	1.58	0.00	9,586.59	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1,389.55	0.00	0.00	0.00	0.58	0.58	0.58	0.00
16050102010202	Donner Creek	CY*	1.58	1.58	1.58	0.00	0.00	0.00	1.58	9,586.59	1	0	1	0	1	0	0	0	0	0	0	0	1	0	1,389.55	0.58	0.58	0.58	0.00	0.00	0.00	0.58
16050102010202	Donner Creek	ES*	0.00	0.00	0.00	2.11	2.11	2.11	0.00	9,586.59	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1,389.55	0.00	0.00	0.00	0.60	0.60	0.60	0.00
16050102010202	Donner Creek	EY*	2.11	2.11	2.11	0.00	0.00	0.00	2.11	9,586.59	1	0	1	0	1	0	0	0	0	0	0	0	1	0	1,389.55	0.60	0.60	0.60	0.00	0.00	0.00	0.60
16050102010202	Donner Creek	FY	0.00	3.24	3.24	3.24	3.24	3.24	3.24	9,586.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,389.55	0.00	0.01	0.01	0.01	0.01	0.01	0.01
16050102010202	Donner Creek	GY	15.07	15.07	15.07	15.07	15.07	15.07	15.07	9,586.59	8	0	8	0	8	0	8	0	8	0	8	0	8	0	1,389.55	5.75	5.75	5.75	5.75	5.75	5.75	5.75
16050102010202	Donner Creek	HY*	47.57	47.57	47.57	47.57	47.57	47.57	47.57	9,586.59	16	0	16	0	16	0	16	0	16	0	16	0	16	0	1,389.55	9.13	9.13	9.13	9.13	9.13	9.13	9.13
16050102010202	Donner Creek	IY	0.76	0.76	0.76	0.76	0.76	0.76	0.76	9,586.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,389.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010202	Donner Creek	JY	1.44	1.44	1.44	1.44	1.44	1.44	1.44	9,586.59	0	2	0	2	0	2	0	2	0	2	0	2	0	2	1,389.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010202	Donner Creek	LY*	3.24	0.00	0.00	0.00	0.00	0.00	0.00	9,586.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,389.55	0.01	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		77.12	77.12	77.12	77.12	77.12	77.12	77.12	9586.59	26	2	26	2	26	2	26	2	26	2	26	2	26	2	1389.55	16.07	16.07	16.07	16.07	16.07	16.07	16.07
	*** Value Per SqMi All =**		**5.15**	**5.15**	**5.15**	**5.15**	**5.15**	**5.15**	**5.15**	**14.98**	**52.0**	**4.0**	**52.0**	**4.0**	**52.0**	**4.0**	**52.0**	**4.0**	**52.0**	**4.0**	**52.0**	**4.0**	**52.0**	**4.0**	**2.17**	**7.40**	**7.40**	**7.40**	**7.40**	**7.40**	**7.40**	**7.40**
	*** Sum Open-Motorized, Native Surface Routes =**		59.85	56.61	56.61	56.61	56.61	56.61	56.61		18	0	18	0	18	0	18	0	18	0	18	0	18	0		10.32	10.31	10.31	10.31	10.31	10.31	10.31
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.00**	**3.78**	**3.78**	**3.78**	**3.78**	**3.78**	**3.78**	**14.98**	**1.2**	**0.0**	**1.2**	**0.0**	**1.2**	**0.0**	**1.2**	**0.0**	**1.2**	**0.0**	**1.2**	**0.0**	**1.2**	**0.0**	**2.17**	**4.75**	**4.75**	**4.75**	**4.75**	**4.75**	**4.75**	**4.75**
16050102010301	Prosser Creek North Fork	AY	3.97	0.00	3.97	3.97	0.00	3.97	3.97	8,476.75	2	2	0	0	2	2	2	2	0	0	2	2	2	2	1,829.25	3.01	0.00	3.01	3.01	0.00	3.01	3.01
16050102010301	Prosser Creek North Fork	BS*	0.00	0.00	0.00	1.44	1.44	1.44	0.00	8,476.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,829.25	0.00	0.00	0.00	0.02	0.02	0.02	0.00
16050102010301	Prosser Creek North Fork	BY*	1.44	5.40	1.44	0.00	3.97	0.00	1.44	8,476.75	0	0	2	2	0	0	0	0	2	2	0	0	0	0	1,829.25	0.02	3.03	0.02	0.00	3.01	0.00	0.02
16050102010301	Prosser Creek North Fork	FY	0.00	0.82	0.82	0.82	0.82	0.82	0.82	8,476.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,829.25	0.00	0.30	0.30	0.30	0.30	0.30	0.30
16050102010301	Prosser Creek North Fork	HY*	1.28	1.28	1.28	1.28	1.28	1.28	1.28	8,476.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,829.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010301	Prosser Creek North Fork	IY	4.99	4.99	4.99	4.99	4.99	4.99	4.99	8,476.75	3	2	3	2	3	2	3	2	3	2	3	2	3	2	1,829.25	1.87	1.87	1.87	1.87	1.87	1.87	1.87
16050102010301	Prosser Creek North Fork	LY*	0.82	0.00	0.00	0.00	0.00	0.00	0.00	8,476.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,829.25	0.30	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		12.50	12.50	12.50	12.50	12.50	12.50	12.50	8476.75	5	4	5	4	5	4	5	4	5	4	5	4	5	4	1829.25	5.20	5.20	5.20	5.20	5.20	5.20	5.20
	*** Value Per SqMi All =**		**0.94**	**0.94**	**0.94**	**0.94**	**0.94**	**0.94**	**0.94**	**13.24**	**0.4**	**0.3**	**0.4**	**0.3**	**0.4**	**0.3**	**0.4**	**0.3**	**0.4**	**0.3**	**0.4**	**0.3**	**0.4**	**0.3**	**2.86**	**1.82**	**1.82**	**1.82**	**1.82**	**1.82**	**1.82**	**1.82**
	*** Sum Open-Motorized, Native Surface Routes =**		3.54	6.69	2.72	2.72	6.69	2.72	2.72		0	0	2	2	0	0	0	0	2	2	0	0	0	0		0.32	3.03	0.02	0.02	3.03	0.02	0.02
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.27**	**0.50**	**0.21**	**0.21**	**0.50**	**0.21**	**0.21**	**13.24**	**0.0**	**0.0**	**0.2**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**2.86**	**0.11**	**1.06**	**0.01**	**0.01**	**1.06**	**0.01**	**0.01**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
16050102010302	Prosser Creek South Fork	AY	0.27	0.00	0.27	0.27	0.00	0.27	0.27	5437.7	1	0	0	0	1	0	1	0	0	0	1	0	1	0	1585.64	0.27	0	0.27	0.27	0	0.27	0.27
16050102010302	Prosser Creek South Fork	BS*	0.00	0.00	0.00	0.55	0.55	0.55	0.00	5437.7	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1585.64	0	0	0	0.44	0.44	0.44	0
16050102010302	Prosser Creek South Fork	BY*	0.55	0.83	0.55	0.00	0.27	0.00	0.55	5437.7	1	0	2	0	1	0	0	0	1	0	0	0	1	0	1585.64	0.44	0.71	0.44	0	0.27	0	0.44
16050102010302	Prosser Creek South Fork	CS*	0.00	0.00	0.00	0.00	0.07	0.07	0.00	5437.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1585.64	0	0	0	0	0	0	0
16050102010302	Prosser Creek South Fork	CY*	0.00	0.07	0.00	0.00	0.00	0.00	0.07	5437.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1585.64	0	0	0	0	0	0	0
16050102010302	Prosser Creek South Fork	FY	0.00	1.59	1.66	1.66	1.59	1.59	1.59	5437.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1585.64	0	0.17	0.17	0.17	0.17	0.17	0.17
16050102010302	Prosser Creek South Fork	GY	5.73	5.73	5.73	5.73	5.73	5.73	5.73	5437.7	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1585.64	2.26	2.26	2.26	2.26	2.26	2.26	2.26
16050102010302	Prosser Creek South Fork	HY*	17.99	17.99	17.99	17.99	17.99	17.99	17.99	5437.7	5	1	5	1	5	1	5	1	5	1	5	1	5	1	1585.64	4.99	4.99	4.99	4.99	4.99	4.99	4.99
16050102010302	Prosser Creek South Fork	IY	1.16	1.16	1.16	1.16	1.16	1.16	1.16	5437.7	3	2	3	2	3	2	3	2	3	2	3	2	3	2	1585.64	0.38	0.38	0.38	0.38	0.38	0.38	0.38
16050102010302	Prosser Creek South Fork	LY*	1.66	0.00	0.00	0.00	0.00	0.00	0.00	5437.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1585.64	0.17	0	0	0	0	0	0
	Sum All =		27.36	27.36	27.36	27.36	27.36	27.36	27.36	5437.70	11	3	11	3	11	3	11	3	11	3	11	3	11	3	1585.64	8.51	8.51	8.51	8.51	8.51	8.51	8.51
	*** Value Per SqMi All =**		**3.22**	**3.22**	**3.22**	**3.22**	**3.22**	**3.22**	**3.22**	**8.50**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**2.48**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**
	*** Sum Open-Motorized, Native Surface Routes =**		20.20	18.88	18.54	18.54	18.88	18.61	18.61		6	1	7	1	6	1	6	1	7	1	6	1	6	1		5.6	5.7	5.43	5.43	5.7	5.43	5.43
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.38**	**2.22**	**2.18**	**2.18**	**2.22**	**2.19**	**2.19**	**8.50**	**0.7**	**0.1**	**0.8**	**0.1**	**0.7**	**0.1**	**0.7**	**0.1**	**0.8**	**0.1**	**0.7**	**0.1**	**0.7**	**0.1**	**2.48**	**2.26**	**2.30**	**2.19**	**2.19**	**2.30**	**2.19**	**2.19**
16050102010303	Prosser Creek	AY	1.26	0.38	1.26	1.26	0.38	1.26	1.26	4,808.51	1	0	0	0	1	0	1	0	0	0	1	0	1	0	985.53	0.49	0.11	0.49	0.49	0.11	0.49	0.49
16050102010303	Prosser Creek	BS*	0.00	0.00	0.00	20.45	20.45	20.45	0.00	4,808.51	0	0	0	0	0	0	2	5	2	5	2	5	0	0	985.53	0.00	0.00	0.00	3.86	3.86	3.86	0.00
16050102010303	Prosser Creek	BY*	20.45	21.33	20.45	0.00	0.88	0.00	20.45	4,808.51	2	5	3	5	2	5	0	0	1	0	0	0	2	5	985.53	3.86	4.24	3.86	0.00	0.38	0.00	3.86
16050102010303	Prosser Creek	CS*	0.00	0.00	0.00	4.02	4.02	4.02	0.00	4,808.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	985.53	0.00	0.00	0.00	0.19	0.19	0.19	0.00
16050102010303	Prosser Creek	CY*	4.02	4.02	4.02	0.00	0.00	0.00	4.02	4,808.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	985.53	0.19	0.19	0.19	0.00	0.00	0.00	0.19
16050102010303	Prosser Creek	FY	0.00	8.84	8.84	8.84	8.83	8.84	8.84	4,808.51	0	0	0	2	0	2	0	2	0	2	0	2	0	2	985.53	0.00	2.50	2.50	2.50	2.50	2.50	2.50
16050102010303	Prosser Creek	GY	1.89	1.89	1.89	1.89	1.89	1.89	1.89	4,808.51	2	3	2	3	2	3	2	3	2	3	2	3	2	3	985.53	0.54	0.54	0.54	0.54	0.54	0.54	0.54
16050102010303	Prosser Creek	HY*	2.34	2.34	2.34	2.34	2.34	2.34	2.34	4,808.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	985.53	0.19	0.19	0.19	0.19	0.19	0.19	0.19
16050102010303	Prosser Creek	IY	1.26	1.26	1.26	1.26	1.26	1.26	1.26	4,808.51	2	1	2	1	2	1	2	1	2	1	2	1	2	1	985.53	1.21	1.21	1.21	1.21	1.21	1.21	1.21
16050102010303	Prosser Creek	KY	0.66	0.66	0.66	0.66	0.66	0.66	0.66	4,808.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	985.53	0.62	0.62	0.62	0.62	0.62	0.62	0.62
16050102010303	Prosser Creek	LY*	8.84	0.00	0.00	0.00	0.00	0.00	0.00	4,808.51	0	2	0	0	0	0	0	0	0	0	0	0	0	0	985.53	2.50	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		40.71	40.71	40.71	40.71	40.71	40.71	40.71	4808.51	7	11	7	11	7	11	7	11	7	11	7	11	7	11	985.53	9.60	9.60	9.60	9.60	9.60	9.60	9.60
	*** Value Per SqMi All =**		**5.42**	**5.42**	**5.42**	**5.42**	**5.42**	**5.42**	**5.42**	**7.51**	**0.9**	**1.5**	**0.9**	**1.5**	**0.9**	**1.5**	**0.9**	**1.5**	**0.9**	**1.5**	**0.9**	**1.5**	**0.9**	**1.5**	**1.54**	**6.23**	**6.23**	**6.23**	**6.23**	**6.23**	**6.23**	**6.23**
	*** Sum Open-Motorized, Native Surface Routes =**		35.64	27.68	26.80	26.80	27.69	26.80	26.80		2	7	3	5	2	5	2	5	3	5	2	5	2	5		6.74	4.62	4.24	4.24	4.62	4.24	4.24
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.74**	**3.68**	**3.57**	**3.57**	**3.69**	**3.57**	**3.57**	**7.51**	**0.3**	**0.9**	**0.4**	**0.7**	**0.3**	**0.7**	**0.3**	**0.7**	**0.4**	**0.7**	**0.3**	**0.7**	**0.3**	**0.7**	**1.54**	**4.38**	**3.00**	**2.75**	**2.75**	**3.00**	**2.75**	**2.75**
16050102010304	Alder Creek	AY	0.31	0.00	0.31	0.31	0.00	0.31	0.31	4,988.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	602.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010304	Alder Creek	BS*	0.00	0.00	0.00	4.18	4.18	4.18	0.00	4,988.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	602.66	0.00	0.00	0.00	0.19	0.19	0.19	0.00
16050102010304	Alder Creek	BY*	4.18	4.49	4.18	0.00	0.31	0.00	4.18	4,988.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	602.66	0.19	0.19	0.19	0.00	0.00	0.00	0.19
16050102010304	Alder Creek	CS*	0.00	0.00	0.00	2.17	2.17	2.17	0.00	4,988.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	602.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010304	Alder Creek	CY*	2.17	2.17	2.17	0.00	0.00	0.00	2.17	4,988.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	602.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010304	Alder Creek	FY	0.00	5.76	5.76	5.76	5.76	5.76	5.76	4,988.48	0	0	5	0	5	0	5	0	5	0	5	0	5	0	602.66	0.00	2.58	2.58	2.58	2.58	2.58	2.58
16050102010304	Alder Creek	GY	29.06	29.06	29.06	29.06	29.06	29.06	29.06	4,988.48	5	2	5	2	5	2	5	2	5	2	5	2	5	2	602.66	4.37	4.37	4.37	4.37	4.37	4.37	4.37
16050102010304	Alder Creek	HY*	22.80	22.80	22.80	22.80	22.80	22.80	22.80	4,988.48	4	0	4	0	4	0	4	0	4	0	4	0	4	0	602.66	3.38	3.38	3.38	3.38	3.38	3.38	3.38
16050102010304	Alder Creek	IY	3.28	3.28	3.28	3.28	3.28	3.28	3.28	4,988.48	4	0	4	0	4	0	4	0	4	0	4	0	4	0	602.66	2.66	2.66	2.66	2.66	2.66	2.66	2.66
16050102010304	Alder Creek	LY*	5.76	0.00	0.00	0.00	0.00	0.00	0.00	4,988.48	5	0	0	0	0	0	0	0	0	0	0	0	0	0	602.66	2.58	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		67.57	67.57	67.57	67.57	67.57	67.57	67.57	4988.48	18	2	18	2	18	2	18	2	18	2	18	2	18	2	602.66	13.18	13.18	13.18	13.18	13.18	13.18	13.18
	*** Value Per SqMi All =**		**8.67**	**8.67**	**8.67**	**8.67**	**8.67**	**8.67**	**8.67**	**7.79**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**0.94**	**14.00**	**14.00**	**14.00**	**14.00**	**14.00**	**14.00**	**14.00**
	*** Sum Open-Motorized, Native Surface Routes =**		34.92	29.46	29.16	29.16	29.46	29.16	29.16		9	0	4	0	4	0	4	0	4	0	4	0	4	0		6.15	3.57	3.57	3.57	3.57	3.57	3.57
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.48**	**3.78**	**3.74**	**3.74**	**3.78**	**3.74**	**3.74**	**7.79**	**1.2**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**0.94**	**6.53**	**3.79**	**3.79**	**3.79**	**3.79**	**3.79**	**3.79**
16050102010305	Prosser Creek Reservoir	AY	5.03	5.03	5.03	5.03	5.03	5.03	5.03	8740	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1396.24	1.58	1.58	1.58	1.58	1.58	1.58	1.58
16050102010305	Prosser Creek Reservoir	BS*	0.00	0.00	0.00	26.60	26.60	26.60	0.00	8740	0	0	0	0	0	0	5	7	5	7	5	7	0	0	1396.24	0	0	0	4.65	4.65	4.65	0
16050102010305	Prosser Creek Reservoir	BY*	26.60	26.60	26.60	0.00	0.00	0.00	26.60	8740	5	7	5	7	5	7	0	0	0	0	0	0	5	7	1396.24	4.65	4.65	4.65	0	0	0	4.65
16050102010305	Prosser Creek Reservoir	CS*	0.00	0.00	0.00	4.76	6.96	4.76	0.00	8740	0	0	0	0	0	0	0	1	1	1	0	1	0	0	1396.24	0	0	0	0.71	1.3	0.71	0
16050102010305	Prosser Creek Reservoir	CY*	4.75	5.83	4.75	0.00	0.00	0.00	5.81	8740	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1396.24	0.71	1.21	0.71	0	0	0	1.21
16050102010305	Prosser Creek Reservoir	ES*	0.00	0.00	0.00	0.92	0.92	0.92	0.00	8740	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1396.24	0	0	0	0	0	0	0
16050102010305	Prosser Creek Reservoir	EY*	0.09	0.92	0.09	0.00	0.00	0.00	0.92	8740	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1396.24	0	0	0	0	0	0	0
16050102010305	Prosser Creek Reservoir	FY	0.00	20.35	22.27	21.42	19.23	21.42	20.37	8740	0	0	6	3	6	3	6	3	5	3	6	3	6	3	1396.24	0	8.81	9.31	9.31	8.73	9.31	8.81
16050102010305	Prosser Creek Reservoir	GY	29.13	29.13	29.13	29.13	29.13	29.13	29.13	8740	9	12	9	12	9	12	9	12	9	12	9	12	9	12	1396.24	4.22	4.22	4.22	4.22	4.22	4.22	4.22
16050102010305	Prosser Creek Reservoir	HY*	23.47	23.47	23.47	23.47	23.47	23.47	23.47	8740	1	8	1	8	1	8	1	8	1	8	1	8	1	8	1396.24	2.85	2.85	2.85	2.85	2.85	2.85	2.85
16050102010305	Prosser Creek Reservoir	IY	5.10	5.10	5.10	5.10	5.10	5.10	5.10	8740	4	3	4	3	4	3	4	3	4	3	4	3	4	3	1396.24	2.09	2.09	2.09	2.09	2.09	2.09	2.09
16050102010305	Prosser Creek Reservoir	KY	8.33	8.33	8.33	8.33	8.33	8.33	8.33	8740	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1396.24	2.14	2.14	2.14	2.14	2.14	2.14	2.14
16050102010305	Prosser Creek Reservoir	LY*	22.27	0.00	0.00	0.00	0.00	0.00	0.00	8740	6	3	0	0	0	0	0	0	0	0	0	0	0	0	1396.24	9.31	0	0	0	0	0	0
	Sum All =		124.78	124.78	124.78	124.78	124.78	124.78	124.78	8740.00	27	35	27	35	27	35	27	35	27	35	27	35	27	35	1396.24	27.55	27.55	27.55	27.55	27.56	27.55	27.55
	*** Value Per SqMi All =**		**9.14**	**9.14**	**9.14**	**9.14**	**9.14**	**9.14**	**9.14**	**13.66**	**2.0**	**2.6**	**2.0**	**2.6**	**2.0**	**2.6**	**2.0**	**2.6**	**2.0**	**2.6**	**2.0**	**2.6**	**2.0**	**2.6**	**2.18**	**12.63**	**12.63**	**12.63**	**12.63**	**12.63**	**12.63**	**12.63**
	*** Sum Open-Motorized, Native Surface Routes =**		77.18	56.83	54.91	55.76	57.95	55.76	56.81		12	19	6	16	6	16	6	16	7	16	6	16	6	16		17.52	8.71	8.21	8.21	8.8	8.21	8.71
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**5.65**	**4.16**	**4.02**	**4.08**	**4.24**	**4.08**	**4.16**	**13.66**	**0.9**	**1.4**	**0.4**	**1.2**	**0.4**	**1.2**	**0.4**	**1.2**	**0.5**	**1.2**	**0.4**	**1.2**	**0.4**	**1.2**	**2.18**	**8.03**	**3.99**	**3.76**	**3.76**	**4.03**	**3.76**	**3.99**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary — **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
16050102010306	Middle Truckee River-Lower Prosser Creek	BS*	0.00	0.00	0.00	2.06	2.06	2.06	0.00	8361.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1642.05	0	0	0	1.03	1.03	1.03	0
16050102010306	Middle Truckee River-Lower Prosser Creek	BY*	2.06	2.06	2.06	0.00	0.00	0.00	2.06	8361.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1642.05	1.03	1.03	1.03	0	0	0	1.03
16050102010306	Middle Truckee River-Lower Prosser Creek	CS*	0.00	0.00	0.00	1.27	1.27	1.27	0.00	8361.38	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1642.05	0	0	0	0.13	0.13	0.13	0
16050102010306	Middle Truckee River-Lower Prosser Creek	CY*	1.27	1.27	1.27	0.00	0.00	0.00	1.27	8361.38	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1642.05	0.13	0.13	0.13	0	0	0	0.13
16050102010306	Middle Truckee River-Lower Prosser Creek	ES*	0.00	0.00	0.00	1.15	1.15	1.15	0.00	8361.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1642.05	0	0	0	0	0	0	0
16050102010306	Middle Truckee River-Lower Prosser Creek	EY*	0.00	1.15	0.00	0.00	0.00	0.00	1.15	8361.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1642.05	0	0	0	0	0	0	0
16050102010306	Middle Truckee River-Lower Prosser Creek	FY	0.00	11.17	12.32	11.17	11.17	11.17	11.17	8361.38	0	0	1	2	1	2	1	2	1	2	1	2	1	2	1642.05	0	3.32	3.32	3.32	3.32	3.32	3.32
16050102010306	Middle Truckee River-Lower Prosser Creek	GY	23.96	23.96	23.96	23.96	23.96	23.96	23.96	8361.38	10	0	10	0	10	0	10	0	10	0	10	0	10	0	1642.05	2.99	2.99	2.99	2.99	2.99	2.99	2.99
16050102010306	Middle Truckee River-Lower Prosser Creek	HY*	96.17	96.17	96.17	96.17	96.17	96.17	96.17	8361.38	4	1	4	1	4	1	4	1	4	1	4	1	4	1	1642.05	17.59	17.59	17.59	17.59	17.59	17.59	17.59
16050102010306	Middle Truckee River-Lower Prosser Creek	KY	2.84	2.84	2.84	2.84	2.84	2.84	2.84	8361.38	0	2	0	2	0	2	0	2	0	2	0	2	0	2	1642.05	0.51	0.51	0.51	0.51	0.51	0.51	0.51
16050102010306	Middle Truckee River-Lower Prosser Creek	LY*	12.32	0.00	0.00	0.00	0.00	0.00	0.00	8361.38	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1642.05	3.32	0	0	0	0	0	0
	Sum All =		138.62	138.62	138.62	138.62	138.62	138.62	138.62	8361.38	15	6	15	6	15	6	15	6	15	6	15	6	15	6	1642.05	25.57	25.57	25.57	25.57	25.57	25.57	25.57
	*** Value Per SqMi All =**		**10.61**	**10.61**	**10.61**	**10.61**	**10.61**	**10.61**	**10.61**	**13.06**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**2.57**	**9.97**	**9.97**	**9.97**	**9.97**	**9.97**	**9.97**	**9.97**
	*** Sum Open-Motorized, Native Surface Routes =**		111.82	100.65	99.50	100.65	100.65	100.65	100.65		5	4	4	2	4	2	4	2	4	2	4	2	4	2		22.07	18.75	18.75	18.75	18.75	18.75	18.75
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**8.56**	**7.70**	**7.62**	**7.70**	**7.70**	**7.70**	**7.70**	**13.06**	**0.4**	**0.3**	**0.3**	**0.2**	**0.3**	**0.2**	**0.3**	**0.2**	**0.3**	**0.2**	**0.3**	**0.2**	**0.3**	**0.2**	**2.57**	**8.60**	**7.31**	**7.31**	**7.31**	**7.31**	**7.31**	**7.31**
16050102010401	Headwaters Martis Creek	AS	2.75	0.00	2.75	2.75	0.00	2.75	2.75	5943.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	951.29	0.66	0	0.66	0.66	0	0.66	0.66
16050102010401	Headwaters Martis Creek	BS*	0.00	2.75	0.00	1.93	4.68	1.93	0.00	5943.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	951.29	0	0.66	0	0.39	1.05	0.39	0
16050102010401	Headwaters Martis Creek	BY*	1.93	1.93	1.93	0.00	0.00	0.00	1.93	5943.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	951.29	0.39	0.39	0.39	0	0	0	0.39
16050102010401	Headwaters Martis Creek	ES*	0.00	0.00	0.00	0.87	0.87	0.87	0.00	5943.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	951.29	0	0	0	0	0	0	0
16050102010401	Headwaters Martis Creek	EY*	0.00	0.87	0.00	0.00	0.00	0.00	0.87	5943.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	951.29	0	0	0	0	0	0	0
16050102010401	Headwaters Martis Creek	FY	0.00	3.37	4.24	3.37	3.37	3.37	3.37	5943.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	951.29	0	0.58	0.58	0.58	0.58	0.58	0.58
16050102010401	Headwaters Martis Creek	HY*	24.35	24.35	24.35	24.35	24.35	24.35	24.35	5943.87	7	5	7	5	7	5	7	5	7	5	7	5	7	5	951.29	5.63	5.63	5.63	5.63	5.63	5.63	5.63
16050102010401	Headwaters Martis Creek	IY	2.21	2.21	2.21	2.21	2.21	2.21	2.21	5943.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	951.29	0.27	0.27	0.27	0.27	0.27	0.27	0.27
16050102010401	Headwaters Martis Creek	LY*	4.24	0.00	0.00	0.00	0.00	0.00	0.00	5943.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	951.29	0.58	0	0	0	0	0	0
	Sum All =		35.49	35.49	35.49	35.49	35.49	35.49	35.49	5943.87	7	5	7	5	7	5	7	5	7	5	7	5	7	5	951.29	7.53	7.53	7.53	7.53	7.53	7.53	7.53
	*** Value Per SqMi All =**		**3.82**	**3.82**	**3.82**	**3.82**	**3.82**	**3.82**	**3.82**	**9.29**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**1.49**	**5.07**	**5.07**	**5.07**	**5.07**	**5.07**	**5.07**	**5.07**
	*** Sum Open-Motorized, Native Surface Routes =**		30.52	29.91	26.28	27.16	29.91	27.16	27.16		7	5	7	5	7	5	7	5	7	5	7	5	7	5		6.6	6.68	6.02	6.02	6.68	6.02	6.02
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.29**	**3.22**	**2.83**	**2.92**	**3.22**	**2.92**	**2.92**	**9.29**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**1.49**	**4.44**	**4.49**	**4.05**	**4.05**	**4.49**	**4.05**	**4.05**
16050102010402	Martis Creek-Gooseneck Flat	BS*	0.00	0.00	0.00	0.70	0.70	0.70	0.00	6338.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1685.09	0	0	0	0	0	0	0
16050102010402	Martis Creek-Gooseneck Flat	BY*	0.70	0.70	0.70	0.00	0.00	0.00	0.70	6338.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1685.09	0	0	0	0	0	0	0
16050102010402	Martis Creek-Gooseneck Flat	ES*	0.00	0.00	0.00	0.52	0.52	0.52	0.00	6338.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1685.09	0	0	0	0	0	0	0
16050102010402	Martis Creek-Gooseneck Flat	EY*	0.00	0.52	0.00	0.00	0.00	0.00	0.52	6338.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1685.09	0	0	0	0	0	0	0
16050102010402	Martis Creek-Gooseneck Flat	FY	0.00	1.30	1.82	1.30	1.30	1.30	1.30	6338.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1685.09	0	0	0	0	0	0	0
16050102010402	Martis Creek-Gooseneck Flat	GY	4.01	4.01	4.01	4.01	4.01	4.01	4.01	6338.14	7	0	7	0	7	0	7	0	7	0	7	0	7	0	1685.09	1.16	1.16	1.16	1.16	1.16	1.16	1.16
16050102010402	Martis Creek-Gooseneck Flat	HY*	59.64	59.64	59.64	59.64	59.64	59.64	59.64	6338.14	15	5	15	5	15	5	15	5	15	5	15	5	15	5	1685.09	10.98	10.98	10.98	10.98	10.98	10.98	10.98
16050102010402	Martis Creek-Gooseneck Flat	LY*	1.82	0.00	0.00	0.00	0.00	0.00	0.00	6338.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1685.09	0	0	0	0	0	0	0
	Sum All =		66.17	69.39	69.00	69.09	69.39	69.09	69.09	6338.14	23	6	23	6	23	6	23	6	23	6	23	6	23	6	1685.09	16.58	16.63	16.19	16.19	16.63	16.19	16.19
	*** Value Per SqMi All =**		**6.68**	**7.01**	**6.97**	**6.98**	**7.01**	**6.98**	**6.98**	**9.90**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.63**	**6.30**	**6.32**	**6.15**	**6.15**	**6.32**	**6.15**	**6.15**
	*** Sum Open-Motorized, Native Surface Routes =**		62.16	60.87	60.35	60.87	60.87	60.87	60.87		15	5	15	5	15	5	15	5	15	5	15	5	15	5		10.98	10.98	10.98	10.98	10.98	10.98	10.98
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**6.28**	**6.15**	**6.09**	**6.15**	**6.15**	**6.15**	**6.15**	**9.90**	**1.5**	**0.5**	**1.5**	**0.5**	**1.5**	**0.5**	**1.5**	**0.5**	**1.5**	**0.5**	**1.5**	**0.5**	**1.5**	**0.5**	**2.63**	**4.17**	**4.17**	**4.17**	**4.17**	**4.17**	**4.17**	**4.17**
16050102010403	Middle Martis Creek	BS*	0.00	0.00	0.00	0.75	0.75	0.75	0.00	6,190.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,100.31	0.00	0.00	0.00	0.73	0.73	0.73	0.00
16050102010403	Middle Martis Creek	BY*	0.75	0.75	0.75	0.00	0.00	0.00	0.75	6,190.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,100.31	0.73	0.73	0.73	0.00	0.00	0.00	0.73
16050102010403	Middle Martis Creek	GY	4.40	4.40	4.40	4.40	4.40	4.40	4.40	6,190.64	5	0	5	0	5	0	5	0	5	0	5	0	5	0	1,100.31	4.08	4.08	4.08	4.08	4.08	4.08	4.08
16050102010403	Middle Martis Creek	HY*	71.21	71.21	71.21	71.21	71.21	71.21	71.21	6,190.64	14	16	14	16	14	16	14	16	14	16	14	16	14	16	1,100.31	13.93	13.93	13.93	13.93	13.93	13.93	13.93
	Sum All =		76.35	76.35	76.35	76.35	76.35	76.35	76.35	6190.64	19	16	19	16	19	16	19	16	19	16	19	16	19	16	1100.31	18.74	18.74	18.74	18.74	18.74	18.74	18.74
	*** Value Per SqMi All =**		**7.89**	**7.89**	**7.89**	**7.89**	**7.89**	**7.89**	**7.89**	**9.67**	**2.0**	**1.7**	**2.0**	**1.7**	**2.0**	**1.7**	**2.0**	**1.7**	**2.0**	**1.7**	**2.0**	**1.7**	**2.0**	**1.7**	**1.72**	**10.90**	**10.90**	**10.90**	**10.90**	**10.90**	**10.90**	**10.90**
	*** Sum Open-Motorized, Native Surface Routes =**		71.95	71.95	71.95	71.95	71.95	71.95	71.95		14	16	14	16	14	16	14	16	14	16	14	16	14	16		14.66	14.66	14.66	14.66	14.66	14.66	14.66
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**7.44**	**7.44**	**7.44**	**7.44**	**7.44**	**7.44**	**7.44**	**9.67**	**1.4**	**1.7**	**1.4**	**1.7**	**1.4**	**1.7**	**1.4**	**1.7**	**1.4**	**1.7**	**1.4**	**1.7**	**1.4**	**1.7**	**1.72**	**8.53**	**8.53**	**8.53**	**8.53**	**8.53**	**8.53**	**8.53**
16050102010404	East Martis Creek	BS*	0.00	0.00	0.00	0.74	0.74	0.74	0.00	4,632.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	836.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010404	East Martis Creek	BY*	0.74	0.74	0.74	0.00	0.00	0.00	0.74	4,632.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	836.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010404	East Martis Creek	FY	0.00	0.16	0.16	0.16	0.16	0.16	0.16	4,632.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	836.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102010404	East Martis Creek	HY*	32.34	32.34	32.34	32.34	32.34	32.34	32.34	4,632.26	0	1	0	1	0	1	0	1	0	1	0	1	0	1	836.97	6.88	6.88	6.88	6.88	6.88	6.88	6.88
16050102010404	East Martis Creek	LY*	0.16	0.00	0.00	0.00	0.00	0.00	0.00	4,632.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	836.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		33.24	33.24	33.24	33.24	33.24	33.24	33.24	4632.26	0	1	0	1	0	1	0	1	0	1	0	1	0	1	836.97	6.88	6.88	6.88	6.88	6.88	6.88	6.88
	*** Value Per SqMi All =**		**4.59**	**4.59**	**4.59**	**4.59**	**4.59**	**4.59**	**4.59**	**7.24**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**1.31**	**5.26**	**5.26**	**5.26**	**5.26**	**5.26**	**5.26**	**5.26**
	*** Sum Open-Motorized, Native Surface Routes =**		33.24	33.08	33.08	33.08	33.08	33.08	33.08		0	1	0	1	0	1	0	1	0	1	0	1	0	1		6.88	6.88	6.88	6.88	6.88	6.88	6.88
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.59**	**4.57**	**4.57**	**4.57**	**4.57**	**4.57**	**4.57**	**7.24**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**1.31**	**5.26**	**5.26**	**5.26**	**5.26**	**5.26**	**5.26**	**5.26**
16050102010405	Lower Martis Creek	FY	0.00	0.84	0.84	0.84	0.84	0.84	0.84	4,156.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	484.90	0.00	0.34	0.34	0.34	0.34	0.34	0.34
16050102010405	Lower Martis Creek	HY*	33.58	33.58	33.58	33.58	33.58	33.58	33.58	4,156.80	9	2	9	2	9	2	9	2	9	2	9	2	9	2	484.90	5.23	5.23	5.23	5.23	5.23	5.23	5.23
16050102010405	Lower Martis Creek	LY*	0.84	0.00	0.00	0.00	0.00	0.00	0.00	4,156.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	484.90	0.34	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		34.42	34.42	34.42	34.42	34.42	34.42	34.42	4156.80	9	2	9	2	9	2	9	2	9	2	9	2	9	2	484.90	5.57	5.57	5.57	5.57	5.57	5.57	5.57
	*** Value Per SqMi All =**		**5.30**	**5.30**	**5.30**	**5.30**	**5.30**	**5.30**	**5.30**	**6.50**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**0.76**	**7.35**	**7.35**	**7.35**	**7.35**	**7.35**	**7.35**	**7.35**
	*** Sum Open-Motorized, Native Surface Routes =**		34.42	33.58	33.58	33.58	33.58	33.58	33.58		9	2	9	2	9	2	9	2	9	2	9	2	9	2		5.57	5.23	5.23	5.23	5.23	5.23	5.23
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**5.30**	**5.17**	**5.17**	**5.17**	**5.17**	**5.17**	**5.17**	**6.50**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**0.76**	**7.35**	**6.90**	**6.90**	**6.90**	**6.90**	**6.90**	**6.90**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
16050102020101	Lacey Creek	AY	5.01	0.00	5.01	5.01	0.00	5.01	5.01	5,764.44	2	7	0	0	2	7	2	7	0	0	2	7	2	7	1,779.74	2.11	0.00	2.11	2.11	0.00	2.11	2.11
16050102020101	Lacey Creek	BS*	0.00	0.00	0.00	4.58	4.58	4.58	0.00	5,764.44	0	0	0	0	0	0	0	3	0	3	0	3	0	0	1,779.74	0.00	0.00	0.00	1.42	1.42	1.42	0.00
16050102020101	Lacey Creek	BY*	4.58	9.59	4.58	0.00	5.01	0.00	4.58	5,764.44	0	3	2	10	0	3	0	0	2	7	0	0	0	3	1,779.74	1.42	3.53	1.42	0.00	2.11	0.00	1.42
16050102020101	Lacey Creek	FY	0.00	2.99	2.99	2.99	2.99	2.99	2.99	5,764.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,779.74	0.00	0.30	0.30	0.30	0.30	0.30	0.30
16050102020101	Lacey Creek	HY*	3.88	3.88	3.88	3.88	3.88	3.88	3.88	5,764.44	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1,779.74	1.95	1.95	1.95	1.95	1.95	1.95	1.95
16050102020101	Lacey Creek	JY	1.70	1.70	1.70	1.70	1.70	1.70	1.70	5,764.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,779.74	0.17	0.17	0.17	0.17	0.17	0.17	0.17
16050102020101	Lacey Creek	LY*	2.99	0.00	0.00	0.00	0.00	0.00	0.00	5,764.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,779.74	0.30	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		18.16	18.16	18.16	18.16	18.16	18.16	18.16	5764.44	3	12	3	12	3	12	3	12	3	12	3	12	3	12	1779.74	5.95	5.95	5.95	5.95	5.95	5.95	5.95
	*** Value Per SqMi All =**		**2.02**	**2.02**	**2.02**	**2.02**	**2.02**	**2.02**	**2.02**	**9.01**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**2.78**	**2.14**	**2.14**	**2.14**	**2.14**	**2.14**	**2.14**	**2.14**
	*** Sum Open-Motorized, Native Surface Routes =**		11.45	13.47	8.46	8.46	13.47	8.46	8.46		1	5	3	12	1	5	1	5	3	12	1	5	1	5		3.67	5.48	3.37	3.37	5.48	3.37	3.37
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.27**	**1.50**	**0.94**	**0.94**	**1.50**	**0.94**	**0.94**	**9.01**	**0.1**	**0.6**	**0.3**	**1.3**	**0.1**	**0.6**	**0.1**	**0.6**	**0.3**	**1.3**	**0.1**	**0.6**	**0.1**	**0.6**	**2.78**	**1.32**	**1.97**	**1.21**	**1.21**	**1.97**	**1.21**	**1.21**
16050102020102	Webber Lake	AY	9.36	2.62	9.36	9.36	2.62	5.82	9.36	3889.17	6	3	5	0	6	3	6	3	5	0	6	3	6	3	1206.31	2.35	1.53	2.35	2.35	1.53	2.1	2.35
16050102020102	Webber Lake	BS*	0.00	0.00	0.00	4.92	8.46	8.46	0.00	3889.17	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1206.31	0	0	0	0.97	1.23	1.23	0
16050102020102	Webber Lake	BY*	4.92	11.67	4.92	0.00	3.21	0.00	4.92	3889.17	1	0	2	3	1	0	0	0	1	3	0	0	1	0	1206.31	0.97	1.79	0.97	0	0.56	0	0.97
16050102020102	Webber Lake	CS*	0.00	0.00	0.00	0.19	0.19	0.19	0.00	3889.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1206.31	0	0	0	0.19	0.19	0.19	0
16050102020102	Webber Lake	CY*	0.00	0.19	0.00	0.00	0.00	0.00	0.19	3889.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1206.31	0	0.19	0	0	0	0	0.19
16050102020102	Webber Lake	FY	0.00	3.26	3.45	3.26	3.26	3.26	3.26	3889.17	0	0	0	1	0	1	0	1	0	1	0	1	0	1	1206.31	0	0.46	0.65	0.46	0.46	0.46	0.46
16050102020102	Webber Lake	GY	3.81	3.81	3.81	3.81	3.81	3.81	3.81	3889.17	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1206.31	1.52	1.52	1.52	1.52	1.52	1.52	1.52
16050102020102	Webber Lake	HY*	4.62	4.62	4.62	4.62	4.62	4.62	4.62	3889.17	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1206.31	1.93	1.93	1.93	1.93	1.93	1.93	1.93
16050102020102	Webber Lake	LY*	3.45	0.00	0.00	0.00	0.00	0.00	0.00	3889.17	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1206.31	0.65	0	0	0	0	0	0
	Sum All =		26.17	26.17	26.17	26.17	26.17	26.17	26.17	3889.17	10	7	10	7	10	7	10	7	10	7	10	7	10	7	1206.31	7.42	7.42	7.42	7.42	7.42	7.43	7.42
	*** Value Per SqMi All =**		**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**6.08**	**1.6**	**1.2**	**1.6**	**1.2**	**1.6**	**1.2**	**1.6**	**1.2**	**1.6**	**1.2**	**1.6**	**1.2**	**1.6**	**1.2**	**1.88**	**3.94**	**3.94**	**3.94**	**3.94**	**3.94**	**3.94**	**3.94**
	*** Sum Open-Motorized, Native Surface Routes =**		12.99	16.48	9.54	9.73	16.48	13.27	9.73		2	3	3	5	2	2	2	2	3	5	2	2	2	2		3.55	3.91	2.9	3.09	3.91	3.35	3.09
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.14**	**2.71**	**1.57**	**1.60**	**2.71**	**2.18**	**1.60**	**6.08**	**0.3**	**0.5**	**0.5**	**0.8**	**0.3**	**0.3**	**0.3**	**0.3**	**0.5**	**0.8**	**0.3**	**0.3**	**0.3**	**0.3**	**1.88**	**1.88**	**2.07**	**1.54**	**1.64**	**2.07**	**1.78**	**1.64**
16050102020103	Perazzo Canyon	BS*	0.00	0.00	0.00	8.75	8.75	8.75	0.00	5554.87	0	0	0	0	0	0	5	4	5	4	5	4	0	0	1585.55	0	0	0	4.38	4.38	4.38	0
16050102020103	Perazzo Canyon	BY*	8.75	8.75	8.75	0.00	0.00	0.00	8.75	5554.87	5	4	5	4	5	4	0	0	0	0	0	0	5	4	1585.55	4.38	4.38	4.38	0	0	0	4.38
16050102020103	Perazzo Canyon	CS*	0.00	0.00	0.00	0.00	0.56	0.00	0.00	5554.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1585.55	0	0	0	0	0	0	0
16050102020103	Perazzo Canyon	CY*	0.00	0.56	0.00	1.00	0.00	0.00	0.00	5554.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1585.55	0	0	0	0	0	0	0
16050102020103	Perazzo Canyon	FY	0.00	2.22	2.78	2.78	2.22	2.78	2.78	5554.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1585.55	0	0.83	0.84	0.84	0.83	0.84	0.84
16050102020103	Perazzo Canyon	GY	0.17	0.17	0.17	0.17	0.17	0.17	0.17	5554.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1585.55	0.03	0.03	0.03	0.03	0.03	0.03	0.03
16050102020103	Perazzo Canyon	HY*	2.87	2.87	2.87	2.87	2.87	2.87	2.87	5554.87	3	2	3	2	3	2	3	2	3	2	3	2	3	2	1585.55	1.07	1.07	1.07	1.07	1.07	1.07	1.07
16050102020103	Perazzo Canyon	JY	1.04	1.04	1.04	1.04	1.04	1.04	1.04	5554.87	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1585.55	0.39	0.39	0.39	0.39	0.39	0.39	0.39
16050102020103	Perazzo Canyon	LY*	2.78	0.00	0.00	0.00	0.00	0.00	0.00	5554.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1585.55	0.84	0	0	0	0	0	0
	Sum All =		15.61	15.61	15.61	16.61	15.61	15.61	15.61	5554.87	8	7	8	7	8	7	8	7	8	7	8	7	8	7	1585.55	6.71	6.70	6.71	6.71	6.70	6.71	6.71
	*** Value Per SqMi All =**		**1.80**	**1.80**	**1.80**	**1.91**	**1.80**	**1.80**	**1.80**	**8.68**	**0.9**	**0.8**	**0.9**	**0.8**	**0.9**	**0.8**	**0.9**	**0.8**	**0.9**	**0.8**	**0.9**	**0.8**	**0.9**	**0.8**	**2.48**	**2.71**	**2.70**	**2.71**	**2.71**	**2.70**	**2.71**	**2.71**
	*** Sum Open-Motorized, Native Surface Routes =**		14.40	12.18	11.62	12.62	12.18	11.62	11.62		8	6	8	6	8	6	8	6	8	6	8	6	8	6		6.29	5.45	5.45	5.45	5.45	5.45	5.45
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.66**	**1.40**	**1.34**	**1.45**	**1.40**	**1.34**	**1.34**	**8.68**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**2.48**	**2.54**	**2.20**	**2.20**	**2.20**	**2.20**	**2.20**	**2.20**
16050102020104	Upper Little Truckee River	AY	3.48	2.71	3.48	3.48	2.71	2.71	3.48	2,773.84	3	0	3	0	3	0	3	0	3	0	3	0	3	0	974.93	0.16	0.16	0.16	0.16	0.16	0.16	0.16
16050102020104	Upper Little Truckee River	BS*	0.00	0.00	0.00	2.19	2.96	2.96	0.00	2,773.84	0	0	0	0	0	0	2	0	2	0	2	0	0	0	974.93	0.00	0.00	0.00	1.21	1.21	1.21	0.00
16050102020104	Upper Little Truckee River	BY*	2.19	2.96	2.19	0.00	0.00	0.00	2.19	2,773.84	2	0	2	0	2	0	0	0	0	0	0	0	2	0	974.93	1.21	1.21	1.21	0.00	0.00	0.00	1.21
16050102020104	Upper Little Truckee River	FY	0.00	3.68	3.68	3.68	3.68	3.68	3.68	2,773.84	0	0	0	4	0	4	0	4	0	4	0	4	0	4	974.93	0.00	1.40	1.40	1.40	1.40	1.40	1.40
16050102020104	Upper Little Truckee River	GY	2.94	2.94	2.94	2.94	2.94	2.94	2.94	2,773.84	2	2	2	2	2	2	2	2	2	2	2	2	2	2	974.93	2.00	2.00	2.00	2.00	2.00	2.00	2.00
16050102020104	Upper Little Truckee River	HY*	3.84	3.84	3.84	3.84	3.84	3.84	3.84	2,773.84	0	1	0	1	0	1	0	1	0	1	0	1	0	1	974.93	0.44	0.44	0.44	0.44	0.44	0.44	0.44
16050102020104	Upper Little Truckee River	JY	0.02	0.02	0.02	0.02	0.02	0.02	0.02	2,773.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	974.93	0.02	0.02	0.02	0.02	0.02	0.02	0.02
16050102020104	Upper Little Truckee River	LY*	3.68	0.00	0.00	0.00	0.00	0.00	0.00	2,773.84	0	4	0	0	0	0	0	0	0	0	0	0	0	0	974.93	1.40	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		16.15	16.15	16.15	16.15	16.15	16.15	16.15	2773.84	7	7	7	7	7	7	7	7	7	7	7	7	7	7	974.93	5.23	5.23	5.23	5.23	5.23	5.23	5.23
	*** Value Per SqMi All =**		**3.73**	**3.73**	**3.73**	**3.73**	**3.73**	**3.73**	**3.73**	**4.33**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.52**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**	**3.43**
	*** Sum Open-Motorized, Native Surface Routes =**		9.71	6.80	6.03	6.03	6.80	6.80	6.03		2	5	2	1	2	1	2	1	2	1	2	1	2	1		3.05	1.65	1.65	1.65	1.65	1.65	1.65
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.24**	**1.57**	**1.39**	**1.39**	**1.57**	**1.57**	**1.39**	**4.33**	**0.5**	**1.2**	**0.5**	**0.2**	**0.5**	**0.2**	**0.5**	**0.2**	**0.5**	**0.2**	**0.5**	**0.2**	**0.5**	**0.2**	**1.52**	**2.00**	**1.08**	**1.08**	**1.08**	**1.08**	**1.08**	**1.08**
16050102020105	Little Truckee River-Cold Stream	AY	2.58	2.58	2.58	2.58	2.58	2.58	2.58	4060.77	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1484.36	2.07	2.07	2.07	2.07	2.07	2.07	2.07
16050102020105	Little Truckee River-Cold Stream	BS*	0.00	0.00	0.00	4.38	4.38	4.38	0.00	4060.77	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1484.36	0	0	0	1.55	1.55	1.55	0
16050102020105	Little Truckee River-Cold Stream	BY*	4.38	4.38	4.38	0.00	0.00	0.00	4.38	4060.77	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1484.36	1.55	1.55	1.55	0	0	0	1.55
16050102020105	Little Truckee River-Cold Stream	CS*	0.00	0.00	0.00	0.00	0.09	0.09	0.00	4060.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1484.36	0	0	0	0	0.09	0.09	0
16050102020105	Little Truckee River-Cold Stream	CY*	0.00	0.09	0.00	0.00	0.00	0.00	0.09	4060.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1484.36	0	0.09	0	0	0	0	0.09
16050102020105	Little Truckee River-Cold Stream	FY	0.00	1.89	1.97	1.97	1.89	1.89	1.89	4060.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1484.36	0	0.71	0.8	0.8	0.71	0.71	0.71
16050102020105	Little Truckee River-Cold Stream	GY	2.42	2.42	2.42	2.42	2.42	2.42	2.42	4060.77	2	5	2	5	2	5	2	5	2	5	2	5	2	5	1484.36	1.13	1.13	1.13	1.13	1.13	1.13	1.13
16050102020105	Little Truckee River-Cold Stream	HY*	2.85	2.85	2.85	2.85	2.85	2.85	2.85	4060.77	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1484.36	0.98	0.98	0.98	0.98	0.98	0.98	0.98
16050102020105	Little Truckee River-Cold Stream	IY	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4060.77	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1484.36	3.63	3.63	3.63	3.63	3.63	3.63	3.63
16050102020105	Little Truckee River-Cold Stream	JY	0.15	0.15	0.15	0.15	0.15	0.15	0.15	4060.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1484.36	0.15	0.15	0.15	0.15	0.15	0.15	0.15
16050102020105	Little Truckee River-Cold Stream	LY*	1.97	0.00	0.00	0.00	0.00	0.00	0.00	4060.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1484.36	0.8	0	0	0	0	0	0
	Sum All =		18.60	18.60	18.60	18.60	18.60	18.60	18.60	4060.77	5	9	5	9	5	9	5	9	5	9	5	9	5	9	1484.36	10.31	10.31	10.31	10.31	10.31	10.31	10.31
	*** Value Per SqMi All =**		**2.93**	**2.93**	**2.93**	**2.93**	**2.93**	**2.93**	**2.93**	**6.34**	**0.8**	**1.4**	**0.8**	**1.4**	**0.8**	**1.4**	**0.8**	**1.4**	**0.8**	**1.4**	**0.8**	**1.4**	**0.8**	**1.4**	**2.32**	**4.45**	**4.45**	**4.45**	**4.45**	**4.45**	**4.45**	**4.45**
	*** Sum Open-Motorized, Native Surface Routes =**		9.21	7.32	7.23	7.23	7.32	7.32	7.32		2	2	2	2	2	2	2	2	2	2	2	2	2	2		3.33	2.62	2.53	2.53	2.62	2.62	2.62
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.45**	**1.15**	**1.14**	**1.14**	**1.15**	**1.15**	**1.15**	**6.34**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**2.32**	**1.44**	**1.13**	**1.09**	**1.09**	**1.13**	**1.13**	**1.13**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
16050102020201	Independence Lake	FY	0.00	0.31	0.31	0.31	0.31	0.31	0.31	4,864.91	0	0	1	0	1	0	1	0	1	0	1	0	1	0	717.42	0.00	0.16	0.16	0.16	0.16	0.16	0.16
16050102020201	Independence Lake	HY*	8.86	8.86	8.86	8.86	8.86	8.86	8.86	4,864.91	2	1	2	1	2	1	2	1	2	1	2	1	2	1	717.42	4.53	4.53	4.53	4.53	4.53	4.53	4.53
16050102020201	Independence Lake	IY	0.69	0.69	0.69	0.69	0.69	0.69	0.69	4,864.91	4	2	4	2	4	2	4	2	4	2	4	2	4	2	717.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102020201	Independence Lake	LY*	0.31	0.00	0.00	0.00	0.00	0.00	0.00	4,864.91	1	0	0	0	0	0	0	0	0	0	0	0	0	0	717.42	0.16	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		9.86	9.86	9.86	9.86	9.86	9.86	9.86	4864.91	7	3	7	3	7	3	7	3	7	3	7	3	7	3	717.42	4.69	4.69	4.69	4.69	4.69	4.69	4.69
	*** Value Per SqMi All =**		**1.30**	**1.30**	**1.30**	**1.30**	**1.30**	**1.30**	**1.30**	**7.60**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**1.12**	**4.18**	**4.18**	**4.18**	**4.18**	**4.18**	**4.18**	**4.18**
	*** Sum Open-Motorized, Native Surface Routes =**		9.17	8.86	8.86	8.86	8.86	8.86	8.86		3	1	2	1	2	1	2	1	2	1	2	1	2	1		4.69	4.53	4.53	4.53	4.53	4.53	4.53
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.21**	**1.17**	**1.17**	**1.17**	**1.17**	**1.17**	**1.17**	**7.60**	**0.4**	**0.1**	**0.3**	**0.1**	**0.3**	**0.1**	**0.3**	**0.1**	**0.3**	**0.1**	**0.3**	**0.1**	**0.3**	**0.1**	**1.12**	**4.18**	**4.04**	**4.04**	**4.04**	**4.04**	**4.04**	**4.04**
16050102020202	Independence Creek	BS*	0.00	0.00	0.00	15.06	15.06	15.06	0.00	7093.9	0	0	0	0	0	0	3	9	3	9	3	9	0	0	2776.68	0	0	0	4.07	4.07	4.07	0
16050102020202	Independence Creek	BY*	15.06	15.06	15.06	0.00	0.00	0.00	15.06	7093.9	3	9	3	9	3	9	0	0	0	0	0	0	3	9	2776.68	4.07	4.07	4.07	0	0	0	4.07
16050102020202	Independence Creek	CS*	0.00	0.00	0.00	0.00	1.03	1.03	0.00	7093.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2776.68	0	0	0	0	0.16	0.16	0
16050102020202	Independence Creek	CY*	0.00	1.03	0.00	1.00	0.00	0.00	0.00	7093.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2776.68	0	0.16	0	0	0	0	0
16050102020202	Independence Creek	FY	0.00	4.10	5.13	5.13	4.10	4.10	5.13	7093.9	0	0	2	1	2	1	2	1	2	1	2	1	2	1	2776.68	0	1.97	2.13	2.13	1.97	1.97	2.13
16050102020202	Independence Creek	GY	8.91	8.91	8.91	8.91	8.91	8.91	8.91	7093.9	4	6	4	6	4	6	4	6	4	6	4	6	4	6	2776.68	5.25	5.25	5.25	5.25	5.25	5.25	5.25
16050102020202	Independence Creek	HY*	7.21	7.21	7.21	7.21	7.21	7.21	7.21	7093.9	0	4	0	4	0	4	0	4	0	4	0	4	0	4	2776.68	3.51	3.51	3.51	3.51	3.51	3.51	3.51
16050102020202	Independence Creek	LY*	5.13	0.00	0.00	0.00	0.00	0.00	0.00	7093.9	2	1	0	0	0	0	0	0	0	0	0	0	0	0	2776.68	2.13	0	0	0	0	0	0
	Sum All =		36.31	36.31	36.31	37.31	36.31	36.31	36.31	7093.90	9	20	9	20	9	20	9	20	9	20	9	20	9	20	2776.68	14.96	14.96	14.96	14.96	14.96	14.96	14.96
	*** Value Per SqMi All =**		**3.28**	**3.28**	**3.28**	**3.37**	**3.28**	**3.28**	**3.28**	**11.08**	**0.8**	**1.8**	**0.8**	**1.8**	**0.8**	**1.8**	**0.8**	**1.8**	**0.8**	**1.8**	**0.8**	**1.8**	**0.8**	**1.8**	**4.34**	**3.45**	**3.45**	**3.45**	**3.45**	**3.45**	**3.45**	**3.45**
	*** Sum Open-Motorized, Native Surface Routes =**		27.40	23.30	22.27	23.27	23.30	23.30	22.27		5	14	3	13	3	13	3	13	3	13	3	13	3	13		9.71	7.74	7.58	7.58	7.74	7.74	7.58
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.47**	**2.10**	**2.01**	**2.10**	**2.10**	**2.10**	**2.01**	**11.08**	**0.5**	**1.3**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**4.34**	**2.24**	**1.78**	**1.75**	**1.75**	**1.78**	**1.78**	**1.75**
16050102020203	Kyburz Flat	BS*	0.00	0.00	0.00	10.25	10.25	10.25	0.00	3,024.22	0	0	0	0	0	0	1	13	1	13	1	13	0	0	702.70	0.00	0.00	0.00	1.23	1.23	1.23	0.00
16050102020203	Kyburz Flat	BY*	10.25	10.25	10.25	0.00	0.00	0.00	10.25	3,024.22	1	13	1	13	1	13	0	0	0	0	0	0	1	13	702.70	1.23	1.23	1.23	0.00	0.00	0.00	1.23
16050102020203	Kyburz Flat	CS*	0.00	0.00	0.00	0.79	0.79	0.79	0.00	3,024.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102020203	Kyburz Flat	CY*	0.79	0.79	0.79	0.00	0.00	0.00	0.79	3,024.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	702.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102020203	Kyburz Flat	FY	0.00	4.36	4.36	4.36	4.36	4.36	4.36	3,024.22	0	0	0	3	0	3	0	3	0	3	0	3	0	3	702.70	0.00	1.06	1.06	1.06	1.06	1.06	1.06
16050102020203	Kyburz Flat	GY	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3,024.22	2	3	2	3	2	3	2	3	2	3	2	3	2	3	702.70	2.09	2.09	2.09	2.09	2.09	2.09	2.09
16050102020203	Kyburz Flat	LY*	4.36	0.00	0.00	0.00	0.00	0.00	0.00	3,024.22	0	3	0	0	0	0	0	0	0	0	0	0	0	0	702.70	1.06	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		18.68	18.68	18.68	18.68	18.68	18.68	18.68	3024.22	3	19	3	19	3	19	3	19	3	19	3	19	3	19	702.70	4.38	4.38	4.38	4.38	4.38	4.38	4.38
	*** Value Per SqMi All =**		**3.95**	**3.95**	**3.95**	**3.95**	**3.95**	**3.95**	**3.95**	**4.73**	**0.6**	**4.0**	**0.6**	**4.0**	**0.6**	**4.0**	**0.6**	**4.0**	**0.6**	**4.0**	**0.6**	**4.0**	**0.6**	**4.0**	**1.10**	**3.99**	**3.99**	**3.99**	**3.99**	**3.99**	**3.99**	**3.99**
	*** Sum Open-Motorized, Native Surface Routes =**		15.40	11.04	11.04	11.04	11.04	11.04	11.04		1	16	1	13	1	13	1	13	1	13	1	13	1	13		2.29	1.23	1.23	1.23	1.23	1.23	1.23
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.26**	**2.34**	**2.34**	**2.34**	**2.34**	**2.34**	**2.34**	**4.73**	**0.2**	**3.4**	**0.2**	**2.8**	**0.2**	**2.8**	**0.2**	**2.8**	**0.2**	**2.8**	**0.2**	**2.8**	**0.2**	**2.8**	**1.10**	**2.09**	**1.12**	**1.12**	**1.12**	**1.12**	**1.12**	**1.12**
16050102020204	Little Truckee River-Saddle Meadow	AS	0.52	0.00	0.52	0.52	0.00	0.00	0.52	6824.18	1	2	0	0	1	2	1	2	0	0	0	0	1	2	1638.33	0	0	0	0	0	0	0
16050102020204	Little Truckee River-Saddle Meadow	AY	0.60	0.60	0.60	0.60	0.60	0.60	0.60	6824.18	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1638.33	0.6	0.6	0.6	0.6	0.6	0.6	0.6
16050102020204	Little Truckee River-Saddle Meadow	BS*	0.00	0.52	0.00	18.47	18.98	18.98	0.00	6824.18	0	0	1	2	0	0	2	11	3	13	3	13	0	0	1638.33	0	0	0	2.49	2.49	2.49	0
16050102020204	Little Truckee River-Saddle Meadow	BY*	18.47	18.47	18.47	0.00	0.00	0.00	18.47	6824.18	2	11	2	11	2	11	0	0	0	0	0	0	2	11	1638.33	2.49	2.49	2.49	0	0	0	2.49
16050102020204	Little Truckee River-Saddle Meadow	CS*	0.00	0.00	0.00	0.00	0.28	0.28	0.00	6824.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1638.33	0	0	0	0	0.28	0.28	0
16050102020204	Little Truckee River-Saddle Meadow	CY*	0.00	0.28	0.00	0.00	0.00	0.00	0.22	6824.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1638.33	0	0.28	0	0	0	0	0.22
16050102020204	Little Truckee River-Saddle Meadow	FY	0.00	4.91	5.19	5.19	4.91	4.91	4.97	6824.18	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1638.33	0	1.73	2.01	2.01	1.73	1.73	1.79
16050102020204	Little Truckee River-Saddle Meadow	GY	11.74	11.74	11.74	11.74	11.74	11.74	11.74	6824.18	5	6	5	6	5	6	5	6	5	6	5	6	5	6	1638.33	6.6	6.6	6.6	6.6	6.6	6.6	6.6
16050102020204	Little Truckee River-Saddle Meadow	HY*	2.01	2.01	2.01	2.01	2.01	2.01	2.01	6824.18	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1638.33	0.2	0.2	0.2	0.2	0.2	0.2	0.2
16050102020204	Little Truckee River-Saddle Meadow	KY	0.38	0.38	0.38	0.38	0.38	0.38	0.38	6824.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1638.33	0	0	0	0	0	0	0
16050102020204	Little Truckee River-Saddle Meadow	LY*	5.19	0.00	0.00	0.00	0.00	0.00	0.00	6824.18	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1638.33	2.01	0	0	0	0	0	0
	Sum All =		38.90	38.90	38.90	38.90	38.90	38.90	38.90	6824.18	10	21	10	21	10	21	10	21	10	21	10	21	10	21	1638.33	11.90	11.90	11.90	11.90	11.90	11.90	11.90
	*** Value Per SqMi All =**		**3.65**	**3.65**	**3.65**	**3.65**	**3.65**	**3.65**	**3.65**	**10.66**	**0.9**	**2.0**	**0.9**	**2.0**	**0.9**	**2.0**	**0.9**	**2.0**	**0.9**	**2.0**	**0.9**	**2.0**	**0.9**	**2.0**	**2.56**	**4.65**	**4.65**	**4.65**	**4.65**	**4.65**	**4.65**	**4.65**
	*** Sum Open-Motorized, Native Surface Routes =**		25.66	21.27	20.47	20.47	21.27	21.27	20.70		3	13	3	14	2	12	2	12	3	14	3	14	2	12		4.70	2.97	2.69	2.69	2.97	2.97	2.91
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.41**	**1.99**	**1.92**	**1.92**	**1.99**	**1.99**	**1.94**	**10.66**	**0.3**	**1.2**	**0.3**	**1.3**	**0.2**	**1.1**	**0.2**	**1.1**	**0.3**	**1.3**	**0.3**	**1.3**	**0.2**	**1.1**	**2.56**	**1.84**	**1.16**	**1.05**	**1.05**	**1.16**	**1.16**	**1.14**
16050102020301	Upper Sagehen Creek	AS	4.27	0.00	4.27	4.27	0.00	0.00	4.27	6856.93	1	2	0	0	1	2	1	2	0	0	0	0	1	2	875.26	0.91	0	0.91	0.91	0	0	0.91
16050102020301	Upper Sagehen Creek	AY	0.14	0.00	0.14	0.14	0.00	0.00	0.14	6856.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	875.26	0.13	0	0.13	0.13	0	0	0.13
16050102020301	Upper Sagehen Creek	BS*	0.00	4.27	0.00	14.59	19.01	19.01	0.00	6856.93	0	0	1	2	0	0	0	3	1	5	1	5	0	0	875.26	0	0.91	0	0.86	1.9	1.9	0
16050102020301	Upper Sagehen Creek	BY*	14.59	14.74	14.59	0.00	0.00	0.00	14.59	6856.93	0	3	0	3	0	3	0	0	0	0	0	0	0	3	875.26	0.86	0.99	0.86	0	0	0	0.86
16050102020301	Upper Sagehen Creek	CS*	0.00	0.00	0.00	2.53	2.88	2.53	0.00	6856.93	0	0	0	0	0	0	0	1	0	1	0	1	0	0	875.26	0	0	0	0.12	0.14	0.12	0
16050102020301	Upper Sagehen Creek	CY*	2.53	2.88	2.53	0.00	0.00	0.00	2.53	6856.93	0	1	0	1	0	1	0	0	0	0	0	0	0	1	875.26	0.12	0.14	0.12	0	0	0	0.12
16050102020301	Upper Sagehen Creek	FY	0.00	6.71	7.06	7.06	6.71	7.06	7.06	6856.93	0	0	1	2	1	2	1	2	1	2	1	2	1	2	875.26	0	1.9	1.92	1.92	1.9	1.92	1.92
16050102020301	Upper Sagehen Creek	GY	1.39	1.39	1.39	1.39	1.39	1.39	1.39	6856.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	875.26	0	0	0	0	0	0	0
16050102020301	Upper Sagehen Creek	HY*	4.34	4.34	4.34	4.34	4.34	4.34	4.34	6856.93	0	1	0	1	0	1	0	1	0	1	0	1	0	1	875.26	0.2	0.2	0.2	0.2	0.2	0.2	0.2
16050102020301	Upper Sagehen Creek	LY*	7.06	0.00	0.00	0.00	0.00	0.00	0.00	6856.93	1	2	0	0	0	0	0	0	0	0	0	0	0	0	875.26	1.92	0	0	0	0	0	0
	Sum All =		34.33	34.33	34.33	34.33	34.33	34.33	34.33	6856.93	2	9	2	9	2	9	2	9	2	9	2	9	2	9	875.26	4.14	4.14	4.14	4.14	4.14	4.14	4.14
	*** Value Per SqMi All =**		**3.20**	**3.20**	**3.20**	**3.20**	**3.20**	**3.20**	**3.20**	**10.71**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**1.37**	**3.03**	**3.03**	**3.03**	**3.03**	**3.03**	**3.03**	**3.03**
	*** Sum Open-Motorized, Native Surface Routes =**		28.52	26.22	21.46	21.46	26.22	25.87	21.46		1	7	1	7	0	5	0	5	1	7	1	7	0	5		3.10	2.24	1.18	1.18	2.24	2.22	1.18
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.66**	**2.45**	**2.00**	**2.00**	**2.45**	**2.42**	**2.00**	**10.71**	**0.1**	**0.7**	**0.1**	**0.7**	**0.0**	**0.5**	**0.0**	**0.5**	**0.1**	**0.7**	**0.1**	**0.7**	**0.0**	**0.5**	**1.37**	**2.27**	**1.64**	**0.86**	**0.86**	**1.64**	**1.62**	**0.86**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
16050102020302	Lower Sagehen Creek	AS	0.79	0.00	0.79	0.79	0.00	0.00	0.79	3,517.39	1	2	0	0	1	2	1	2	0	0	0	0	1	2	503.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102020302	Lower Sagehen Creek	BS*	0.00	0.79	0.00	14.05	14.83	14.83	0.00	3,517.39	0	0	1	2	0	0	1	10	2	12	2	12	0	0	503.14	0.00	0.00	0.00	2.39	2.39	2.39	0.00
16050102020302	Lower Sagehen Creek	BY*	14.05	14.05	14.05	0.00	0.00	0.00	14.05	3,517.39	1	10	1	10	1	10	0	0	0	0	0	0	1	10	503.14	2.39	2.39	2.39	0.00	0.00	0.00	2.39
16050102020302	Lower Sagehen Creek	CS*	0.00	0.00	0.00	1.57	1.63	1.63	0.00	3,517.39	0	0	0	0	0	0	0	2	0	2	0	2	0	0	503.14	0.00	0.00	0.00	0.06	0.06	0.06	0.00
16050102020302	Lower Sagehen Creek	CY*	1.57	1.63	1.57	0.00	0.00	0.00	1.57	3,517.39	0	2	0	2	0	2	0	0	0	0	0	0	0	2	503.14	0.06	0.06	0.06	0.00	0.00	0.00	0.06
16050102020302	Lower Sagehen Creek	FY	0.16	4.47	4.52	4.52	4.47	4.47	4.52	3,517.39	0	0	0	1	0	1	0	1	0	1	0	1	0	1	503.14	0.05	1.28	1.28	1.28	1.28	1.28	1.28
16050102020302	Lower Sagehen Creek	GY	2.09	2.09	2.09	2.09	2.09	2.09	2.09	3,517.39	1	2	1	2	1	2	1	2	1	2	1	2	1	2	503.14	0.52	0.52	0.52	0.52	0.52	0.52	0.52
16050102020302	Lower Sagehen Creek	IY	1.75	1.75	1.75	1.75	1.75	1.75	1.75	3,517.39	0	1	0	1	0	1	0	1	0	1	0	1	0	1	503.14	0.07	0.07	0.07	0.07	0.07	0.07	0.07
16050102020302	Lower Sagehen Creek	KY	0.42	0.42	0.42	0.42	0.42	0.42	0.42	3,517.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	503.14	0.17	0.17	0.17	0.17	0.17	0.17	0.17
16050102020302	Lower Sagehen Creek	LY*	4.36	0.00	0.00	0.00	0.00	0.00	0.00	3,517.39	0	1	0	0	0	0	0	0	0	0	0	0	0	0	503.14	1.23	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		25.19	25.19	25.19	25.19	25.19	25.19	25.19	3517.39	3	18	3	18	3	18	3	18	3	18	3	18	3	18	503.14	4.49	4.49	4.49	4.49	4.49	4.49	4.49
	*** Value Per SqMi All =**		**4.58**	**4.58**	**4.58**	**4.58**	**4.58**	**4.58**	**4.58**	**5.50**	**0.5**	**3.3**	**0.5**	**3.3**	**0.5**	**3.3**	**0.5**	**3.3**	**0.5**	**3.3**	**0.5**	**3.3**	**0.5**	**3.3**	**0.79**	**5.71**	**5.71**	**5.71**	**5.71**	**5.71**	**5.71**	**5.71**
	*** Sum Open-Motorized, Native Surface Routes =**		19.98	16.46	15.62	15.62	16.46	16.46	15.62		1	13	2	14	1	12	1	12	2	14	2	14	1	12		3.68	2.45	2.45	2.45	2.45	2.45	2.45
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.64**	**2.99**	**2.84**	**2.84**	**2.99**	**2.99**	**2.84**	**5.50**	**0.2**	**2.4**	**0.4**	**2.5**	**0.2**	**2.2**	**0.2**	**2.2**	**0.4**	**2.5**	**0.4**	**2.5**	**0.2**	**2.2**	**0.79**	**4.68**	**3.12**	**3.12**	**3.12**	**3.12**	**3.12**	**3.12**
16050102020401	Upper Davies Creek	BS*	0.00	0.00	0.00	20.08	20.08	20.08	0.00	5,518.00	0	0	0	0	0	0	4	8	4	8	4	8	0	0	1,127.68	0.00	0.00	0.00	2.63	2.63	2.63	0.00
16050102020401	Upper Davies Creek	BY*	20.08	20.08	20.08	0.00	0.00	0.00	20.08	5,518.00	4	8	4	8	4	8	0	0	0	0	0	0	4	8	1,127.68	2.63	2.63	2.63	0.00	0.00	0.00	2.63
16050102020401	Upper Davies Creek	CS*	0.00	0.00	0.00	0.36	0.36	0.36	0.00	5,518.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,127.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102020401	Upper Davies Creek	CY*	0.36	0.36	0.36	0.00	0.00	0.00	0.36	5,518.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,127.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16050102020401	Upper Davies Creek	FY	0.00	7.20	7.20	7.20	7.20	7.20	7.20	5,518.00	0	0	2	2	2	2	2	2	2	2	2	2	2	2	1,127.68	0.00	1.37	1.37	1.37	1.37	1.37	1.37
16050102020401	Upper Davies Creek	GY	8.57	8.57	8.57	8.57	8.57	8.57	8.57	5,518.00	4	12	4	12	4	12	4	12	4	12	4	12	4	12	1,127.68	7.84	7.84	7.84	7.84	7.84	7.84	7.84
16050102020401	Upper Davies Creek	HY*	0.01	0.01	0.01	0.01	0.01	0.01	0.01	5,518.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,127.68	0.01	0.01	0.01	0.01	0.01	0.01	0.01
16050102020401	Upper Davies Creek	LY*	7.20	0.00	0.00	0.00	0.00	0.00	0.00	5,518.00	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1,127.68	1.37	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		36.23	36.23	36.23	36.23	36.23	36.23	36.23	5518.00	10	22	10	22	10	22	10	22	10	22	10	22	10	22	1127.68	11.85	11.85	11.85	11.85	11.85	11.85	11.85
	*** Value Per SqMi All =**		**4.20**	**4.20**	**4.20**	**4.20**	**4.20**	**4.20**	**4.20**	**8.62**	**1.2**	**2.6**	**1.2**	**2.6**	**1.2**	**2.6**	**1.2**	**2.6**	**1.2**	**2.6**	**1.2**	**2.6**	**1.2**	**2.6**	**1.76**	**6.73**	**6.73**	**6.73**	**6.73**	**6.73**	**6.73**	**6.73**
	*** Sum Open-Motorized, Native Surface Routes =**		27.66	20.46	20.46	20.46	20.46	20.46	20.46		6	10	4	8	4	8	4	8	4	8	4	8	4	8		4.01	2.64	2.64	2.64	2.64	2.64	2.64
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.21**	**2.37**	**2.37**	**2.37**	**2.37**	**2.37**	**2.37**	**8.62**	**0.7**	**1.2**	**0.5**	**0.9**	**0.5**	**0.9**	**0.5**	**0.9**	**0.5**	**0.9**	**0.5**	**0.9**	**0.5**	**0.9**	**1.76**	**2.28**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**
16050102020402	Upper Sardine Valley	BS*	0.00	0.00	0.00	13.49	13.49	13.49	0.00	4,175.11	0	0	0	0	0	0	0	15	0	15	0	15	0	0	776.11	0.00	0.00	0.00	3.29	3.29	3.29	0.00
16050102020402	Upper Sardine Valley	BY*	13.49	13.49	13.49	0.00	0.00	0.00	13.49	4,175.11	0	15	0	15	0	15	0	0	0	0	0	0	0	15	776.11	3.29	3.29	3.29	0.00	0.00	0.00	3.29
16050102020402	Upper Sardine Valley	FY	0.00	5.11	5.11	5.11	5.11	5.11	5.11	4,175.11	0	0	0	6	0	6	0	6	0	6	0	6	0	6	776.11	0.00	2.19	2.19	2.19	2.19	2.19	2.19
16050102020402	Upper Sardine Valley	GY	2.37	2.37	2.37	2.37	2.37	2.37	2.37	4,175.11	1	6	1	6	1	6	1	6	1	6	1	6	1	6	776.11	0.67	0.67	0.67	0.67	0.67	0.67	0.67
16050102020402	Upper Sardine Valley	HY*	0.17	0.17	0.17	0.17	0.17	0.17	0.17	4,175.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	776.11	0.09	0.09	0.09	0.09	0.09	0.09	0.09
16050102020402	Upper Sardine Valley	LY*	5.11	0.00	0.00	0.00	0.00	0.00	0.00	4,175.11	0	6	0	0	0	0	0	0	0	0	0	0	0	0	776.11	2.19	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		21.15	21.15	21.15	21.15	21.15	21.15	21.15	4175.11	1	27	1	27	1	27	1	27	1	27	1	27	1	27	776.11	6.24	6.24	6.24	6.24	6.24	6.24	6.24
	*** Value Per SqMi All =**		**3.24**	**3.24**	**3.24**	**3.24**	**3.24**	**3.24**	**3.24**	**6.52**	**0.2**	**4.1**	**0.2**	**4.1**	**0.2**	**4.1**	**0.2**	**4.1**	**0.2**	**4.1**	**0.2**	**4.1**	**0.2**	**4.1**	**1.21**	**5.15**	**5.15**	**5.15**	**5.15**	**5.15**	**5.15**	**5.15**
	*** Sum Open-Motorized, Native Surface Routes =**		18.78	13.66	13.66	13.66	13.66	13.66	13.66		0	21	0	15	0	15	0	15	0	15	0	15	0	15		5.57	3.38	3.38	3.38	3.38	3.38	3.38
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.88**	**2.09**	**2.09**	**2.09**	**2.09**	**2.09**	**2.09**	**6.52**	**0.0**	**3.2**	**0.0**	**2.3**	**0.0**	**2.3**	**0.0**	**2.3**	**0.0**	**2.3**	**0.0**	**2.3**	**0.0**	**2.3**	**1.21**	**4.59**	**2.79**	**2.79**	**2.79**	**2.79**	**2.79**	**2.79**
16050102020403	Lower Davies Creek	BS*	0.00	0.00	0.00	17.53	17.53	17.53	0.00	6301.71	0	0	0	0	0	0	7	15	7	15	7	15	0	0	1772.83	0	0	0	9.97	9.97	9.97	0
16050102020403	Lower Davies Creek	BY*	17.53	17.53	17.53	0.00	0.00	0.00	17.53	6301.71	7	15	7	15	7	15	0	0	0	0	0	0	7	15	1772.83	9.97	9.97	9.97	0	0	0	9.97
16050102020403	Lower Davies Creek	CS*	0.00	0.00	0.00	0.57	1.49	0.57	0.00	6301.71	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1772.83	0	0	0	0.39	1.07	0.39	0
16050102020403	Lower Davies Creek	CY*	0.07	0.57	0.07	0.00	0.00	0.00	0.52	6301.71	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1772.83	0	0.39	0	0	0	0	0.39
16050102020403	Lower Davies Creek	FY	0.00	4.36	4.87	4.36	3.44	4.36	4.41	6301.71	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1772.83	0	2.19	2.58	2.19	1.5	2.19	2.19
16050102020403	Lower Davies Creek	GY	3.16	3.16	3.16	3.16	3.16	3.16	3.16	6301.71	3	0	3	0	3	0	3	0	3	0	3	0	3	0	1772.83	1.69	1.69	1.69	1.69	1.69	1.69	1.69
16050102020403	Lower Davies Creek	HY*	0.52	0.52	0.52	0.52	0.52	0.52	0.52	6301.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1772.83	0.36	0.36	0.36	0.36	0.36	0.36	0.36
16050102020403	Lower Davies Creek	LY*	4.87	0.00	0.00	0.00	0.00	0.00	0.00	6301.71	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1772.83	2.58	0	0	0	0	0	0
	Sum All =		26.15	26.15	26.15	26.15	26.15	26.15	26.15	6301.71	10	16	10	16	10	16	10	16	10	16	10	16	10	16	1772.83	14.60	14.60	14.60	14.60	14.59	14.60	14.60
	*** Value Per SqMi All =**		**2.66**	**2.66**	**2.66**	**2.66**	**2.66**	**2.66**	**2.66**	**9.85**	**1.0**	**1.6**	**1.0**	**1.6**	**1.0**	**1.6**	**1.0**	**1.6**	**1.0**	**1.6**	**1.0**	**1.6**	**1.0**	**1.6**	**2.77**	**5.27**	**5.27**	**5.27**	**5.27**	**5.27**	**5.27**	**5.27**
	*** Sum Open-Motorized, Native Surface Routes =**		22.98	18.63	18.12	18.63	19.54	18.63	18.57		7	16	7	16	7	15	7	16	7	16	7	16	7	16		12.91	10.72	10.33	10.72	11.40	10.72	10.72
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.33**	**1.89**	**1.84**	**1.89**	**1.98**	**1.89**	**1.89**	**9.85**	**0.7**	**1.6**	**0.7**	**1.6**	**0.7**	**1.5**	**0.7**	**1.6**	**0.7**	**1.6**	**0.7**	**1.6**	**0.7**	**1.6**	**2.77**	**4.66**	**3.87**	**3.73**	**3.87**	**4.12**	**3.87**	**3.87**
16050102020404	Hoke Valley	AY	4.43	0.00	4.43	4.43	0.00	0.00	4.43	3375.98	2	1	0	0	2	1	2	1	0	0	0	0	2	1	517.88	1.5	0	1.5	1.5	0	0	1.5
16050102020404	Hoke Valley	BS*	0.00	0.00	0.00	8.92	13.35	13.35	0.00	3375.98	0	0	0	0	0	0	1	3	3	4	3	4	0	0	517.88	0	0	0	1.46	2.96	2.96	0
16050102020404	Hoke Valley	BY*	8.92	13.35	8.92	0.00	0.00	0.00	8.92	3375.98	1	3	3	4	1	3	0	0	0	0	0	0	1	3	517.88	1.46	2.96	1.46	0	0	0	1.46
16050102020404	Hoke Valley	CS*	0.00	0.00	0.00	1.45	3.50	3.00	0.00	3375.98	0	0	0	0	0	0	0	1	1	2	1	2	0	0	517.88	0	0	0	0.13	0.77	0.77	0
16050102020404	Hoke Valley	CY*	0.89	3.00	0.89	0.00	0.00	0.00	1.92	3375.98	0	1	1	2	0	1	0	0	0	0	0	0	1	2	517.88	0.06	0.77	0.06	0	0	0	0.24
16050102020404	Hoke Valley	FY	0.00	4.62	6.73	6.16	4.12	4.62	5.69	3375.98	0	0	1	0	2	1	2	1	1	0	1	0	1	0	517.88	0	0.72	1.42	1.36	0.72	0.72	1.25
16050102020404	Hoke Valley	GY	2.16	2.16	2.16	2.16	2.16	2.16	2.16	3375.98	4	5	4	5	4	5	4	5	4	5	4	5	4	5	517.88	0.28	0.28	0.28	0.28	0.28	0.28	0.28
16050102020404	Hoke Valley	KY	0.73	0.73	0.73	0.73	0.73	0.73	0.73	3375.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	517.88	0	0	0	0	0	0	0
16050102020404	Hoke Valley	LY*	6.73	0.00	0.00	0.00	0.00	0.00	0.00	3375.98	2	1	0	0	0	0	0	0	0	0	0	0	0	0	517.88	1.42	0	0	0	0	0	0
	Sum All =		23.86	23.86	23.86	23.86	23.86	23.86	23.86	3375.98	9	11	9	11	9	11	9	11	9	11	9	11	9	11	517.88	4.72	4.73	4.72	4.73	4.73	4.73	4.73
	*** Value Per SqMi All =**		**4.52**	**4.52**	**4.52**	**4.52**	**4.52**	**4.52**	**4.52**	**5.27**	**1.7**	**2.1**	**1.7**	**2.1**	**1.7**	**2.1**	**1.7**	**2.1**	**1.7**	**2.1**	**1.7**	**2.1**	**1.7**	**2.1**	**0.81**	**5.83**	**5.85**	**5.83**	**5.85**	**5.85**	**5.85**	**5.85**
	*** Sum Open-Motorized, Native Surface Routes =**		16.54	16.35	9.81	10.37	16.85	16.35	10.84		3	5	4	6	1	4	1	4	4	6	4	6	2	5		2.94	3.73	1.52	1.59	3.73	3.73	1.70
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.13**	**3.10**	**1.86**	**1.97**	**3.19**	**3.10**	**2.06**	**5.27**	**0.6**	**0.9**	**0.8**	**1.1**	**0.2**	**0.8**	**0.2**	**0.8**	**0.8**	**1.1**	**0.8**	**1.1**	**0.4**	**0.9**	**0.81**	**3.63**	**4.61**	**1.88**	**1.96**	**4.61**	**4.61**	**2.10**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
16050102020405	Stampede Reservoir	AY	4.98	1.59	4.98	4.98	1.59	1.59	4.98	12521.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1716.74	1.04	0.47	1.04	1.04	0.47	0.47	1.04
16050102020405	Stampede Reservoir	BS*	0.00	0.00	0.00	29.22	29.22	29.22	0.00	12521.13	0	0	0	0	0	0	10	13	10	13	10	13	0	0	1716.74	0	0	0	7.43	7.43	7.43	0
16050102020405	Stampede Reservoir	BY*	29.22	32.61	29.22	0.00	3.39	3.39	29.22	12521.13	10	13	10	13	10	13	0	0	0	0	0	0	10	13	1716.74	7.43	8	7.43	0	0.57	0.57	7.43
16050102020405	Stampede Reservoir	CS*	0.00	0.00	0.00	2.72	7.50	2.72	0.00	12521.13	0	0	0	0	0	0	3	1	4	1	3	1	0	0	1716.74	0	0	0	1.68	3.04	1.68	0
16050102020405	Stampede Reservoir	CY*	0.41	2.72	0.41	0.00	0.00	0.00	2.70	12521.13	0	1	3	1	0	1	0	0	0	0	0	0	3	1	1716.74	0	1.68	0	0	0	0	1.68
16050102020405	Stampede Reservoir	FY	0.00	19.25	21.56	19.25	14.46	19.25	19.27	12521.13	0	0	20	3	23	3	20	3	19	3	20	3	20	3	1716.74	0	9.9	11.58	9.9	8.54	9.9	9.9
16050102020405	Stampede Reservoir	GY	4.14	4.14	4.14	4.14	4.14	4.14	4.14	12521.13	5	4	5	4	5	4	5	4	5	4	5	4	5	4	1716.74	0.98	0.98	0.98	0.98	0.98	0.98	0.98
16050102020405	Stampede Reservoir	IY	1.79	1.79	1.79	1.79	1.79	1.79	1.79	12521.13	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1716.74	1.08	1.08	1.08	1.08	1.08	1.08	1.08
16050102020405	Stampede Reservoir	KY	1.26	1.26	1.26	1.26	1.26	1.26	1.26	12521.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1716.74	0.65	0.65	0.65	0.65	0.65	0.65	0.65
16050102020405	Stampede Reservoir	LY*	21.56	0.00	0.00	0.00	0.00	0.00	0.00	12521.13	23	3	0	0	0	0	0	0	0	0	0	0	0	0	1716.74	11.58	0	0	0	0	0	0
	Sum All =		63.36	63.36	63.36	63.36	63.36	63.36	63.36	12521.13	38	22	38	22	38	22	38	22	38	22	38	22	38	22	1716.74	22.76	22.76	22.76	22.76	22.76	22.76	22.76
	*** Value Per SqMi All =**		**3.24**	**3.24**	**3.24**	**3.24**	**3.24**	**3.24**	**3.24**	**19.56**	**1.9**	**1.1**	**1.9**	**1.1**	**1.9**	**1.1**	**1.9**	**1.1**	**1.9**	**1.1**	**1.9**	**1.1**	**1.9**	**1.1**	**2.68**	**8.48**	**8.48**	**8.48**	**8.48**	**8.48**	**8.48**	**8.48**
	*** Sum Open-Motorized, Native Surface Routes =**		51.19	35.34	29.63	31.94	40.12	35.34	31.92		33	17	13	14	10	14	13	14	14	14	13	14	13	14		19.01	9.68	7.43	9.11	11.04	9.68	9.11
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.62**	**1.81**	**1.51**	**1.63**	**2.05**	**1.81**	**1.63**	**19.56**	**1.7**	**0.9**	**0.7**	**0.7**	**0.5**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**2.68**	**7.09**	**3.61**	**2.77**	**3.40**	**4.12**	**3.61**	**3.40**
16050102020501	Little Truckee River-Canyon	AY	5.79	0.22	5.79	5.79	0.22	0.22	5.79	7297.31	3	6	0	0	3	6	3	6	0	0	0	0	3	6	1648.96	0.8	0	0.8	0.8	0	0	0.8
16050102020501	Little Truckee River-Canyon	BS*	0.00	0.00	0.00	25.50	31.04	31.04	0.00	7297.31	0	0	0	0	0	0	7	9	10	15	10	15	0	0	1648.96	0	0	0	3.58	4.38	4.38	0
16050102020501	Little Truckee River-Canyon	BY*	25.50	31.07	25.50	0.00	0.03	0.03	25.50	7297.31	7	9	10	15	7	9	0	0	0	0	0	0	7	9	1648.96	3.58	4.38	3.58	0	0	0	3.58
16050102020501	Little Truckee River-Canyon	CS*	0.00	0.00	0.00	3.02	6.54	3.02	0.00	7297.31	0	0	0	0	0	0	0	4	0	5	0	4	0	0	1648.96	0	0	0	0.32	0.53	0.32	0
16050102020501	Little Truckee River-Canyon	CY*	1.99	3.02	1.99	0.00	0.00	0.00	3.00	7297.31	0	3	0	4	0	3	0	0	0	0	0	0	0	4	1648.96	0.17	0.32	0.17	0	0	0	0.32
16050102020501	Little Truckee River-Canyon	FY	0.00	12.40	13.44	12.40	9.42	12.40	12.42	7297.31	0	0	1	5	1	6	1	5	1	4	1	5	1	5	1648.96	0	2.73	2.89	2.73	2.52	2.73	2.73
16050102020501	Little Truckee River-Canyon	GY	6.90	6.90	6.90	6.90	6.90	6.90	6.90	7297.31	6	11	6	11	6	11	6	11	6	11	6	11	6	11	1648.96	2.7	2.7	2.7	2.7	2.7	2.7	2.7
16050102020501	Little Truckee River-Canyon	HY*	2.04	1.82	1.82	1.82	1.28	1.82	1.82	7297.31	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1648.96	0.09	0	0	0	0	0	0
16050102020501	Little Truckee River-Canyon	KY	7.94	7.94	7.94	7.94	7.94	7.94	7.94	7297.31	0	7	0	7	0	7	0	7	0	7	0	7	0	7	1648.96	2.55	2.55	2.55	2.55	2.55	2.55	2.55
16050102020501	Little Truckee River-Canyon	LY*	13.21	0.00	0.00	0.00	0.00	0.00	0.00	7297.31	1	5	0	0	0	0	0	0	0	0	0	0	0	0	1648.96	2.8	0	0	0	0	0	0
	Sum All =		63.37	63.37	63.37	63.37	63.37	63.37	63.37	7297.31	17	42	17	42	17	42	17	42	17	42	17	42	17	42	1648.96	12.69	12.68	12.69	12.68	12.68	12.68	12.68
	*** Value Per SqMi All =**		**5.56**	**5.56**	**5.56**	**5.56**	**5.56**	**5.56**	**5.56**	**11.40**	**1.5**	**3.7**	**1.5**	**3.7**	**1.5**	**3.7**	**1.5**	**3.7**	**1.5**	**3.7**	**1.5**	**3.7**	**1.5**	**3.7**	**2.58**	**4.93**	**4.92**	**4.93**	**4.92**	**4.92**	**4.92**	**4.92**
	*** Sum Open-Motorized, Native Surface Routes =**		42.74	35.91	29.30	30.34	38.89	35.91	30.32		8	18	10	19	7	12	7	13	10	20	10	19	7	13		6.64	4.7	3.75	3.9	4.91	4.7	3.9
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.75**	**3.15**	**2.57**	**2.66**	**3.41**	**3.15**	**2.66**	**11.40**	**0.7**	**1.6**	**0.9**	**1.7**	**0.6**	**1.1**	**0.6**	**1.1**	**0.9**	**1.8**	**0.9**	**1.7**	**0.6**	**1.1**	**2.58**	**2.58**	**1.82**	**1.46**	**1.51**	**1.91**	**1.82**	**1.51**
16050102020502	Russel Valley	BS*	0.00	0.00	0.00	34.81	34.81	34.81	0.00	6950.32	0	0	0	0	0	0	3	26	3	26	3	26	0	0	1553.16	0	0	0	8.56	8.56	8.56	0
16050102020502	Russel Valley	BY*	34.81	34.81	34.81	0.00	0.00	0.00	34.81	6950.32	3	26	3	26	3	26	0	0	0	0	0	0	3	26	1553.16	8.56	8.56	8.56	0	0	0	8.56
16050102020502	Russel Valley	CS*	0.00	0.00	0.00	2.36	10.09	2.95	0.00	6950.32	0	0	0	0	0	0	1	4	1	5	1	4	0	0	1553.16	0	0	0	0.7	3.01	0.78	0
16050102020502	Russel Valley	CY*	2.36	2.95	2.36	0.00	0.00	0.00	2.36	6950.32	1	4	1	4	1	4	0	0	0	0	0	0	1	4	1553.16	0.7	0.78	0.7	0	0	0	0.7
16050102020502	Russel Valley	ES*	0.00	0.00	0.00	0.06	3.42	3.42	0.00	6950.32	0	0	0	0	0	0	0	1	0	2	0	2	0	0	1553.16	0	0	0	0.06	0.61	0.61	0
16050102020502	Russel Valley	EY*	0.06	3.42	0.06	0.00	0.00	0.00	0.06	6950.32	0	1	0	2	0	1	0	0	0	0	0	0	0	1	1553.16	0.06	0.61	0.06	0	0	0	0.06
16050102020502	Russel Valley	FY	0.00	17.86	21.81	21.81	10.72	17.86	21.81	6950.32	0	0	0	7	0	8	0	8	0	6	0	7	0	8	1553.16	0	4.34	4.98	4.98	2.11	4.34	4.98
16050102020502	Russel Valley	GY	5.99	5.99	5.99	5.99	5.99	5.99	5.99	6950.32	2	5	2	5	2	5	2	5	2	5	2	5	2	5	1553.16	2.74	2.74	2.74	2.74	2.74	2.74	2.74
16050102020502	Russel Valley	HY*	6.43	6.43	6.43	6.43	6.43	6.43	6.43	6950.32	0	7	0	7	0	7	0	7	0	7	0	7	0	7	1553.16	3.13	3.13	3.13	3.13	3.13	3.13	3.13
16050102020502	Russel Valley	IY	5.60	5.60	5.60	5.60	5.60	5.60	5.60	6950.32	2	5	2	5	2	5	2	5	2	5	2	5	2	5	1553.16	0.63	0.63	0.63	0.63	0.63	0.63	0.63
16050102020502	Russel Valley	KY	10.33	10.33	10.33	10.33	10.33	10.33	10.33	6950.32	1	6	1	6	1	6	1	6	1	6	1	6	1	6	1553.16	3.59	3.59	3.59	3.59	3.59	3.59	3.59
16050102020502	Russel Valley	LY*	21.81	0.00	0.00	0.00	0.00	0.00	0.00	6950.32	0	8	0	0	0	0	0	0	0	0	0	0	0	0	1553.16	4.98	0	0	0	0	0	0
	Sum All =		87.39	87.39	87.39	87.39	87.39	87.39	87.39	6950.32	9	62	9	62	9	62	9	62	9	62	9	62	9	62	1553.16	24.39	24.38	24.39	24.39	24.38	24.38	24.39
	*** Value Per SqMi All =**		**8.05**	**8.05**	**8.05**	**8.05**	**8.05**	**8.05**	**8.05**	**10.86**	**0.8**	**5.7**	**0.8**	**5.7**	**0.8**	**5.7**	**0.8**	**5.7**	**0.8**	**5.7**	**0.8**	**5.7**	**0.8**	**5.7**	**2.43**	**10.05**	**10.05**	**10.05**	**10.05**	**10.05**	**10.05**	**10.05**
	*** Sum Open-Motorized, Native Surface Routes =**		65.47	47.61	43.66	43.66	54.75	47.61	43.66		4	46	4	39	4	38	4	38	4	40	4	39	4	38		17.43	13.08	12.45	12.45	15.31	13.08	12.45
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**6.03**	**4.38**	**4.02**	**4.02**	**5.04**	**4.38**	**4.02**	**10.86**	**0.4**	**4.2**	**0.4**	**3.6**	**0.4**	**3.5**	**0.4**	**3.5**	**0.4**	**3.7**	**0.4**	**3.6**	**0.4**	**3.5**	**2.43**	**7.18**	**5.39**	**5.13**	**5.13**	**6.31**	**5.39**	**5.13**
16050102020503	Boca Reservoir	AY	4.74	2.76	4.74	4.74	2.76	2.76	4.74	8791.57	1	4	1	1	1	4	1	4	1	1	1	1	1	4	1823.38	2.24	1.25	2.24	2.24	1.25	1.25	2.24
16050102020503	Boca Reservoir	BS*	0.00	0.00	0.00	36.35	38.33	38.33	0.00	8791.57	0	0	0	0	0	0	8	17	8	20	8	20	0	0	1823.38	0	0	0	8.99	9.97	9.97	0
16050102020503	Boca Reservoir	BY*	36.35	38.33	36.35	0.00	0.00	0.00	36.35	8791.57	8	17	8	20	8	17	0	0	0	0	0	0	8	17	1823.38	8.99	9.97	8.99	0	0	0	8.99
16050102020503	Boca Reservoir	CS*	0.00	0.00	0.00	4.68	8.70	5.82	0.00	8791.57	0	0	0	0	0	0	0	4	0	4	0	4	0	0	1823.38	0	0	0	1.16	1.55	1.16	0
16050102020503	Boca Reservoir	CY*	4.02	5.82	4.02	0.00	0.00	0.00	4.68	8791.57	0	4	0	4	0	4	0	0	0	0	0	0	0	4	1823.38	1.16	1.16	1.16	0	0	0	1.16
16050102020503	Boca Reservoir	ES*	0.00	0.00	0.00	1.56	1.56	1.56	0.00	8791.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1823.38	0	0	0	0	0	0	0
16050102020503	Boca Reservoir	EY*	0.00	1.56	0.00	0.00	0.00	0.00	1.56	8791.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1823.38	0	0	0	0	0	0	0
16050102020503	Boca Reservoir	FY	0.00	17.10	20.46	18.24	14.22	17.10	18.24	8791.57	0	0	2	5	2	5	2	5	2	5	2	5	2	5	1823.38	0	6.68	6.68	6.68	6.29	6.68	6.68
16050102020503	Boca Reservoir	GY	8.24	8.24	8.24	8.24	8.24	8.24	8.24	8791.57	4	10	4	10	4	10	4	10	4	10	4	10	4	10	1823.38	4.17	4.17	4.17	4.17	4.17	4.17	4.17
16050102020503	Boca Reservoir	HY*	0.05	0.05	0.05	0.05	0.05	0.05	0.05	8791.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1823.38	0	0	0	0	0	0	0
16050102020503	Boca Reservoir	IY	0.06	0.06	0.06	0.06	0.06	0.06	0.06	8791.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1823.38	0.06	0.06	0.06	0.06	0.06	0.06	0.06
16050102020503	Boca Reservoir	JY	0.09	0.09	0.09	0.09	0.09	0.09	0.09	8791.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1823.38	0.04	0.04	0.04	0.04	0.04	0.04	0.04
16050102020503	Boca Reservoir	KY	10.49	10.49	10.49	10.49	10.49	10.49	10.49	8791.57	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1823.38	1.87	1.87	1.87	1.87	1.87	1.87	1.87
16050102020503	Boca Reservoir	LY*	20.46	0.00	0.00	0.00	0.00	0.00	0.00	8791.57	2	5	0	0	0	0	0	0	0	0	0	0	0	0	1823.38	6.68	0	0	0	0	0	0
	Sum All =		84.50	84.50	84.50	84.50	84.50	84.50	84.50	8791.57	16	44	16	44	16	44	16	44	16	44	16	44	16	44	1823.38	25.21	25.20	25.21	25.21	25.20	25.20	25.21
	*** Value Per SqMi All =**		**6.15**	**6.15**	**6.15**	**6.15**	**6.15**	**6.15**	**6.15**	**13.74**	**1.2**	**3.2**	**1.2**	**3.2**	**1.2**	**3.2**	**1.2**	**3.2**	**1.2**	**3.2**	**1.2**	**3.2**	**1.2**	**3.2**	**2.85**	**8.85**	**8.85**	**8.85**	**8.85**	**8.85**	**8.85**	**8.85**
	*** Sum Open-Motorized, Native Surface Routes =**		60.88	45.75	40.42	42.64	48.63	45.75	42.64		10	26	8	24	8	21	8	21	8	24	8	24	8	21		16.83	11.13	10.15	10.15	11.52	11.13	10.15
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.43**	**3.33**	**2.94**	**3.10**	**3.54**	**3.33**	**3.10**	**13.74**	**0.7**	**1.9**	**0.6**	**1.7**	**0.6**	**1.5**	**0.6**	**1.5**	**0.6**	**1.7**	**0.6**	**1.7**	**0.6**	**1.5**	**2.85**	**5.91**	**3.91**	**3.56**	**3.56**	**4.04**	**3.91**	**3.56**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020123020101	Smithneck Creek-Trosi Canyon	BS*	0.00	0.00	0.00	24.26	24.26	24.26	0.00	6220.18	0	0	0	0	0	0	10	14	10	14	10	14	0	0	1111.59	0	0	0	7.12	7.12	7.12	0
18020123020101	Smithneck Creek-Trosi Canyon	BY*	24.26	24.26	24.26	0.00	0.00	0.00	24.26	6220.18	10	14	10	14	10	14	0	0	0	0	0	0	10	14	1111.59	7.12	7.12	7.12	0	0	0	7.12
18020123020101	Smithneck Creek-Trosi Canyon	CS*	0.00	0.00	0.00	0.18	0.18	0.18	0.00	6220.18	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1111.59	0	0	0	0	0	0	0
18020123020101	Smithneck Creek-Trosi Canyon	CY*	0.00	0.18	0.00	0.00	0.00	0.00	0.18	6220.18	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1111.59	0	0	0	0	0	0	0
18020123020101	Smithneck Creek-Trosi Canyon	FY	0.00	8.95	9.13	8.95	8.95	8.95	8.95	6220.18	0	0	2	2	2	3	2	2	2	2	2	2	2	2	1111.59	0	3.01	3.01	3.01	3.01	3.01	3.01
18020123020101	Smithneck Creek-Trosi Canyon	GY	3.75	3.75	3.75	3.75	3.75	3.75	3.75	6220.18	5	14	5	14	5	14	5	14	5	14	5	14	5	14	1111.59	3.45	3.45	3.45	3.45	3.45	3.45	3.45
18020123020101	Smithneck Creek-Trosi Canyon	HY*	0.21	0.21	0.21	0.21	0.21	0.21	0.21	6220.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1111.59	0.12	0.12	0.12	0.12	0.12	0.12	0.12
18020123020101	Smithneck Creek-Trosi Canyon	IY	0.01	0.01	0.01	0.01	0.01	0.01	0.01	6220.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1111.59	0	0	0	0	0	0	0
18020123020101	Smithneck Creek-Trosi Canyon	LY*	9.13	0.00	0.00	0.00	0.00	0.00	0.00	6220.18	2	3	0	0	0	0	0	0	0	0	0	0	0	0	1111.59	3.01	0	0	0	0	0	0
	Sum All =		37.36	37.36	37.36	37.36	37.36	37.36	37.36	6220.18	17	31	17	31	17	31	17	31	17	31	17	31	17	31	1111.59	13.70	13.70	13.70	13.70	13.70	13.70	13.70
	*** Value Per SqMi All =**		**3.84**	**3.84**	**3.84**	**3.84**	**3.84**	**3.84**	**3.84**	**9.72**	**1.7**	**3.2**	**1.7**	**3.2**	**1.7**	**3.2**	**1.7**	**3.2**	**1.7**	**3.2**	**1.7**	**3.2**	**1.7**	**3.2**	**1.74**	**7.89**	**7.89**	**7.89**	**7.89**	**7.89**	**7.89**	**7.89**
	*** Sum Open-Motorized, Native Surface Routes =**		33.60	24.65	24.47	24.65	24.65	24.65	24.65		12	17	10	15	10	14	10	15	10	15	10	15	10	15		10.25	7.24	7.24	7.24	7.24	7.24	7.24
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.46**	**2.54**	**2.52**	**2.54**	**2.54**	**2.54**	**2.54**	**9.72**	**1.2**	**1.7**	**1.0**	**1.5**	**1.0**	**1.4**	**1.0**	**1.5**	**1.0**	**1.5**	**1.0**	**1.5**	**1.0**	**1.5**	**1.74**	**5.90**	**4.17**	**4.17**	**4.17**	**4.17**	**4.17**	**4.17**
18020123020102	Badenaugh Canyon	BS*	3.54	3.54	3.54	7.99	7.99	7.99	3.54	7148.84	0	3	0	3	0	3	1	3	1	3	1	3	0	3	1113.37	2.53	2.53	2.53	3.07	3.07	3.07	2.53
18020123020102	Badenaugh Canyon	BY*	4.45	4.45	4.45	0.00	0.00	0.00	4.45	7148.84	1	0	1	0	1	0	0	0	0	0	0	0	1	0	1113.37	0.54	0.54	0.54	0	0	0	0.54
18020123020102	Badenaugh Canyon	CS*	0.00	0.00	0.00	0.00	0.90	0.90	0.00	7148.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1113.37	0	0	0	0	0	0	0
18020123020102	Badenaugh Canyon	CY*	0.00	0.90	0.00	0.00	0.00	0.00	0.90	7148.84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1113.37	0	0	0	0	0	0	0
18020123020102	Badenaugh Canyon	FY	0.36	4.18	5.09	5.09	4.18	4.18	4.18	7148.84	0	0	2	3	2	3	2	3	2	3	2	3	2	3	1113.37	0	1.6	1.6	1.6	1.6	1.6	1.6
18020123020102	Badenaugh Canyon	GY	4.39	4.39	4.39	4.39	4.39	4.39	4.39	7148.84	4	6	4	6	4	6	4	6	4	6	4	6	4	6	1113.37	3.54	3.54	3.54	3.54	3.54	3.54	3.54
18020123020102	Badenaugh Canyon	HY*	0.99	0.99	0.99	0.99	0.99	0.99	0.99	7148.84	0	2	0	2	0	2	0	2	0	2	0	2	0	2	1113.37	0.67	0.67	0.67	0.67	0.67	0.67	0.67
18020123020102	Badenaugh Canyon	IY	2.05	2.05	2.05	2.05	2.05	2.05	2.05	7148.84	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1113.37	1.15	1.15	1.15	1.15	1.15	1.15	1.15
18020123020102	Badenaugh Canyon	LS*	2.30	0.00	0.00	0.00	0.00	0.00	0.00	7148.84	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1113.37	1.32	0	0	0	0	0	0
18020123020102	Badenaugh Canyon	LY*	2.43	0.00	0.00	0.00	0.00	0.00	0.00	7148.84	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1113.37	0.28	0	0	0	0	0	0
	Sum All =		20.49	20.49	20.49	20.49	20.49	20.49	20.49	7148.84	8	15	8	15	8	15	8	15	8	15	8	15	8	15	1113.37	10.03	10.03	10.03	10.03	10.03	10.03	10.03
	*** Value Per SqMi All =**		**1.83**	**1.83**	**1.83**	**1.83**	**1.83**	**1.83**	**1.83**	**11.17**	**0.7**	**1.3**	**0.7**	**1.3**	**0.7**	**1.3**	**0.7**	**1.3**	**0.7**	**1.3**	**0.7**	**1.3**	**0.7**	**1.3**	**1.74**	**5.77**	**5.77**	**5.77**	**5.77**	**5.77**	**5.77**	**5.77**
	*** Sum Open-Motorized, Native Surface Routes =**		13.70	9.88	8.97	8.97	9.88	9.88	9.88		3	8	1	5	1	5	1	5	1	5	1	5	1	5		5.34	3.74	3.74	3.74	3.74	3.74	3.74
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.23**	**0.88**	**0.80**	**0.80**	**0.88**	**0.88**	**0.88**	**11.17**	**0.3**	**0.7**	**0.1**	**0.4**	**0.1**	**0.4**	**0.1**	**0.4**	**0.1**	**0.4**	**0.1**	**0.4**	**0.1**	**0.4**	**1.74**	**3.07**	**2.15**	**2.15**	**2.15**	**2.15**	**2.15**	**2.15**
18020123020103	Smithneck Creek-Alder Creek	BS*	0.00	0.00	0.00	17.73	17.73	17.73	0.00	6,690.08	0	0	0	0	0	0	4	5	4	5	4	5	0	0	1,157.83	0.00	0.00	0.00	4.09	4.09	4.09	0.00
18020123020103	Smithneck Creek-Alder Creek	BY*	17.73	17.73	17.73	0.00	0.00	0.00	17.73	6,690.08	4	5	4	5	4	5	0	0	0	0	0	0	4	5	1,157.83	4.09	4.09	4.09	0.00	0.00	0.00	4.09
18020123020103	Smithneck Creek-Alder Creek	CS*	0.00	0.00	0.00	0.00	0.94	0.00	0.00	6,690.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,157.83	0.00	0.00	0.00	0.00	0.26	0.00	0.00
18020123020103	Smithneck Creek-Alder Creek	FY	0.00	7.99	7.99	7.99	7.05	7.99	7.99	6,690.08	0	0	0	2	0	2	0	2	0	2	0	2	0	2	1,157.83	0.00	1.84	1.84	1.84	1.58	1.84	1.84
18020123020103	Smithneck Creek-Alder Creek	GY	6.64	6.64	6.64	6.64	6.64	6.64	6.64	6,690.08	6	12	6	12	6	12	6	12	6	12	6	12	6	12	1,157.83	5.62	5.62	5.62	5.62	5.62	5.62	5.62
18020123020103	Smithneck Creek-Alder Creek	HY*	0.48	0.48	0.48	0.48	0.48	0.48	0.48	6,690.08	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,157.83	0.24	0.24	0.24	0.24	0.24	0.24	0.24
18020123020103	Smithneck Creek-Alder Creek	LY*	7.99	0.00	0.00	0.00	0.00	0.00	0.00	6,690.08	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1,157.83	1.84	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		32.84	32.84	32.84	32.84	32.84	32.84	32.84	6690.08	10	20	10	20	10	20	10	20	10	20	10	20	10	20	1157.83	11.79	11.79	11.79	11.79	11.79	11.79	11.79
	*** Value Per SqMi All =**		**3.14**	**3.14**	**3.14**	**3.14**	**3.14**	**3.14**	**3.14**	**10.45**	**1.0**	**1.9**	**1.0**	**1.9**	**1.0**	**1.9**	**1.0**	**1.9**	**1.0**	**1.9**	**1.0**	**1.9**	**1.0**	**1.9**	**1.81**	**6.52**	**6.52**	**6.52**	**6.52**	**6.52**	**6.52**	**6.52**
	*** Sum Open-Motorized, Native Surface Routes =**		26.20	18.21	18.21	18.21	19.15	18.21	18.21		4	8	4	6	4	6	4	6	4	6	4	6	4	6		6.17	4.33	4.33	4.33	4.59	4.33	4.33
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.51**	**1.74**	**1.74**	**1.74**	**1.83**	**1.74**	**1.74**	**10.45**	**0.4**	**0.8**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**1.81**	**3.41**	**2.39**	**2.39**	**2.39**	**2.54**	**2.39**	**2.39**
18020123020104	Upper Bear Valley Creek	AY	5.01	0.00	5.01	5.01	0.00	5.01	5.01	4821.29	1	7	0	0	1	7	1	7	0	0	1	7	1	7	899.27	4.04	0	4.04	4.04	0	4.04	4.04
18020123020104	Upper Bear Valley Creek	BS*	0.00	0.00	0.00	12.23	12.23	12.23	0.00	4821.29	0	0	0	0	0	0	3	11	3	11	3	11	0	0	899.27	0	0	0	2.96	2.96	2.96	0
18020123020104	Upper Bear Valley Creek	BY*	12.23	17.24	12.23	0.00	5.01	0.00	12.23	4821.29	3	11	4	18	3	11	0	0	1	7	0	0	3	11	899.27	2.96	7	2.96	0	4.04	0	2.96
18020123020104	Upper Bear Valley Creek	CS*	0.00	0.00	0.00	0.83	1.55	1.42	0.00	4821.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	899.27	0	0	0	0	0.05	0.05	0
18020123020104	Upper Bear Valley Creek	CY*	0.83	1.42	0.83	0.00	0.00	0.00	1.42	4821.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	899.27	0	0.05	0	0	0	0	0.05
18020123020104	Upper Bear Valley Creek	FY	0.00	4.81	5.40	5.40	4.67	4.81	4.81	4821.29	0	0	0	8	0	8	0	8	0	8	0	8	0	8	899.27	0	0.77	0.82	0.82	0.77	0.77	0.77
18020123020104	Upper Bear Valley Creek	GY	1.22	1.22	1.22	1.22	1.22	1.22	1.22	4821.29	0	4	0	4	0	4	0	4	0	4	0	4	0	4	899.27	0.08	0.08	0.08	0.08	0.08	0.08	0.08
18020123020104	Upper Bear Valley Creek	LY*	5.40	0.00	0.00	0.00	0.00	0.00	0.00	4821.29	0	8	0	0	0	0	0	0	0	0	0	0	0	0	899.27	0.82	0	0	0	0	0	0
	Sum All =		24.67	24.67	24.67	24.67	24.67	24.67	24.67	4821.29	4	30	4	30	4	30	4	30	4	30	4	30	4	30	899.27	7.90	7.90	7.90	7.90	7.90	7.90	7.90
	*** Value Per SqMi All =**		**3.28**	**3.28**	**3.28**	**3.28**	**3.28**	**3.28**	**3.28**	**7.53**	**0.5**	**4.0**	**0.5**	**4.0**	**0.5**	**4.0**	**0.5**	**4.0**	**0.5**	**4.0**	**0.5**	**4.0**	**0.5**	**4.0**	**1.41**	**5.62**	**5.62**	**5.62**	**5.62**	**5.62**	**5.62**	**5.62**
	*** Sum Open-Motorized, Native Surface Routes =**		18.45	18.65	13.05	13.05	18.79	13.64	13.64		3	19	4	18	3	11	3	11	4	18	3	11	3	11		3.78	7.05	2.96	2.96	7.05	3.01	3.01
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.45**	**2.48**	**1.73**	**1.73**	**2.49**	**1.81**	**1.81**	**7.53**	**0.4**	**2.5**	**0.5**	**2.4**	**0.4**	**1.5**	**0.4**	**1.5**	**0.5**	**2.4**	**0.4**	**1.5**	**0.4**	**1.5**	**1.41**	**2.69**	**5.02**	**2.11**	**2.11**	**5.02**	**2.14**	**2.14**
18020123020105	Lower Bear Valley Creek	AY	1.41	0.00	1.41	1.41	0.00	1.41	1.41	7,002.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,055.51	0.51	0.00	0.51	0.51	0.00	0.51	0.51
18020123020105	Lower Bear Valley Creek	BS*	0.18	0.18	0.18	19.65	19.65	19.65	0.18	7,002.61	0	1	0	1	0	1	3	17	3	17	3	17	0	1	1,055.51	0.07	0.07	0.07	6.84	6.84	6.84	0.07
18020123020105	Lower Bear Valley Creek	BY*	19.47	20.87	19.47	0.00	1.41	0.00	19.47	7,002.61	3	16	3	16	3	16	0	0	0	0	0	0	3	16	1,055.51	6.77	7.28	6.77	0.00	0.51	0.00	6.77
18020123020105	Lower Bear Valley Creek	CS*	0.00	0.00	0.00	1.12	1.12	1.12	0.00	7,002.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,055.51	0.00	0.00	0.00	0.03	0.03	0.03	0.00
18020123020105	Lower Bear Valley Creek	CY*	1.12	1.12	1.12	0.00	0.00	0.00	1.12	7,002.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,055.51	0.03	0.03	0.03	0.00	0.00	0.00	0.03
18020123020105	Lower Bear Valley Creek	FY	0.00	5.71	5.71	5.71	5.71	5.71	5.71	7,002.61	0	0	0	9	0	9	0	9	0	9	0	9	0	9	1,055.51	0.00	1.61	1.61	1.61	1.61	1.61	1.61
18020123020105	Lower Bear Valley Creek	GY	4.98	4.98	4.98	4.98	4.98	4.98	4.98	7,002.61	2	3	2	3	2	3	2	3	2	3	2	3	2	3	1,055.51	3.67	3.67	3.67	3.67	3.67	3.67	3.67
18020123020105	Lower Bear Valley Creek	HY*	4.01	4.01	4.01	4.01	4.01	4.01	4.01	7,002.61	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1,055.51	0.75	0.75	0.75	0.75	0.75	0.75	0.75
18020123020105	Lower Bear Valley Creek	LS*	1.86	0.00	0.00	0.00	0.00	0.00	0.00	7,002.61	0	5	0	0	0	0	0	0	0	0	0	0	0	0	1,055.51	1.05	0.00	0.00	0.00	0.00	0.00	0.00
18020123020105	Lower Bear Valley Creek	LY*	3.85	0.00	0.00	0.00	0.00	0.00	0.00	7,002.61	0	4	0	0	0	0	0	0	0	0	0	0	0	0	1,055.51	0.56	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		36.86	36.86	36.86	36.86	36.86	36.86	36.86	7002.61	7	30	7	30	7	30	7	30	7	30	7	30	7	30	1055.51	13.41	13.41	13.41	13.41	13.41	13.41	13.41
	*** Value Per SqMi All =**		**3.37**	**3.37**	**3.37**	**3.37**	**3.37**	**3.37**	**3.37**	**10.94**	**0.6**	**2.7**	**0.6**	**2.7**	**0.6**	**2.7**	**0.6**	**2.7**	**0.6**	**2.7**	**0.6**	**2.7**	**0.6**	**2.7**	**1.65**	**8.13**	**8.13**	**8.13**	**8.13**	**8.13**	**8.13**	**8.13**
	*** Sum Open-Motorized, Native Surface Routes =**		30.48	26.18	24.77	24.77	26.18	24.77	24.77		5	27	5	18	5	18	5	18	5	18	5	18	5	18		9.23	8.13	7.62	7.62	8.13	7.62	7.62
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.79**	**2.39**	**2.26**	**2.26**	**2.39**	**2.26**	**2.26**	**10.94**	**0.5**	**2.5**	**0.5**	**1.6**	**0.5**	**1.6**	**0.5**	**1.6**	**0.5**	**1.6**	**0.5**	**1.6**	**0.5**	**1.6**	**1.65**	**5.60**	**4.93**	**4.62**	**4.62**	**4.93**	**4.62**	**4.62**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary — **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020123020106	Lower Smithneck Creek	AY	0.06	0.00	0.06	0.06	0.00	0.06	0.06	4,802.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,158.41	0.03	0.00	0.03	0.03	0.00	0.03	0.03
18020123020106	Lower Smithneck Creek	BS*	0.23	0.23	0.23	0.23	0.23	0.23	0.23	4,802.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,158.41	0.12	0.12	0.12	0.12	0.12	0.12	0.12
18020123020106	Lower Smithneck Creek	BY*	0.00	0.06	0.00	0.00	0.06	0.00	0.00	4,802.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,158.41	0.00	0.03	0.00	0.00	0.03	0.00	0.00
18020123020106	Lower Smithneck Creek	FY	0.00	2.12	2.12	2.12	2.12	2.12	2.12	4,802.01	0	0	0	1	0	1	0	1	0	1	0	1	0	1	1,158.41	0.00	1.49	1.49	1.49	1.49	1.49	1.49
18020123020106	Lower Smithneck Creek	GY	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4,802.01	3	4	3	4	3	4	3	4	3	4	3	4	3	4	1,158.41	2.15	2.15	2.15	2.15	2.15	2.15	2.15
18020123020106	Lower Smithneck Creek	HY*	5.22	5.22	5.22	5.22	5.22	5.22	5.22	4,802.01	2	5	2	5	2	5	2	5	2	5	2	5	2	5	1,158.41	2.82	2.82	2.82	2.82	2.82	2.82	2.82
18020123020106	Lower Smithneck Creek	LS*	2.12	0.00	0.00	0.00	0.00	0.00	0.00	4,802.01	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1,158.41	1.49	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		11.78	11.78	11.78	11.78	11.78	11.78	11.78	4802.01	5	10	5	10	5	10	5	10	5	10	5	10	5	10	1158.41	6.61	6.61	6.61	6.61	6.61	6.61	6.61
	*** Value Per SqMi All =**		**1.57**	**1.57**	**1.57**	**1.57**	**1.57**	**1.57**	**1.57**	**7.50**	**0.7**	**1.3**	**0.7**	**1.3**	**0.7**	**1.3**	**0.7**	**1.3**	**0.7**	**1.3**	**0.7**	**1.3**	**0.7**	**1.3**	**1.81**	**3.65**	**3.65**	**3.65**	**3.65**	**3.65**	**3.65**	**3.65**
	*** Sum Open-Motorized, Native Surface Routes =**		7.56	5.50	5.45	5.45	5.50	5.45	5.45		2	6	2	5	2	5	2	5	2	5	2	5	2	5		4.43	2.97	2.94	2.94	2.97	2.94	2.94
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.01**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**0.73**	**7.50**	**0.3**	**0.8**	**0.3**	**0.7**	**0.3**	**0.7**	**0.3**	**0.7**	**0.3**	**0.7**	**0.3**	**0.7**	**0.3**	**0.7**	**1.81**	**2.45**	**1.64**	**1.62**	**1.62**	**1.64**	**1.62**	**1.62**
18020123020201	Campbell Hot Springs	AY	0.17	0.17	0.17	0.17	0.17	0.17	0.17	1,558.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	224.97	0.10	0.10	0.10	0.10	0.10	0.10	0.10
18020123020201	Campbell Hot Springs	BS*	0.00	0.00	0.00	7.13	7.13	7.13	0.00	1,558.74	0	0	0	0	0	0	0	14	0	14	0	14	0	0	224.97	0.00	0.00	0.00	2.42	2.42	2.42	0.00
18020123020201	Campbell Hot Springs	BY*	7.13	7.13	7.13	0.00	0.00	0.00	7.13	1,558.74	0	14	0	14	0	14	0	0	0	0	0	0	0	14	224.97	2.42	2.42	2.42	0.00	0.00	0.00	2.42
18020123020201	Campbell Hot Springs	CS*	0.00	0.00	0.00	0.79	0.79	0.79	0.00	1,558.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	224.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020123020201	Campbell Hot Springs	CY*	0.79	0.79	0.79	0.00	0.00	0.00	0.79	1,558.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	224.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020123020201	Campbell Hot Springs	FY	0.00	2.48	2.48	2.48	2.48	2.48	2.48	1,558.74	0	0	0	4	0	4	0	4	0	4	0	4	0	4	224.97	0.00	0.61	0.61	0.61	0.61	0.61	0.61
18020123020201	Campbell Hot Springs	HY*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,558.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	224.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020123020201	Campbell Hot Springs	LY*	2.48	0.00	0.00	0.00	0.00	0.00	0.00	1,558.74	0	4	0	0	0	0	0	0	0	0	0	0	0	0	224.97	0.61	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		10.56	10.56	10.56	10.56	10.56	10.56	10.56	1558.74	0	18	0	18	0	18	0	18	0	18	0	18	0	18	224.97	3.13	3.13	3.13	3.13	3.13	3.13	3.13
	*** Value Per SqMi All =**		**4.34**	**4.34**	**4.34**	**4.34**	**4.34**	**4.34**	**4.34**	**2.44**	**0.0**	**7.4**	**0.0**	**7.4**	**0.0**	**7.4**	**0.0**	**7.4**	**0.0**	**7.4**	**0.0**	**7.4**	**0.0**	**7.4**	**0.35**	**8.90**	**8.90**	**8.90**	**8.90**	**8.90**	**8.90**	**8.90**
	*** Sum Open-Motorized, Native Surface Routes =**		10.40	7.92	7.92	7.92	7.92	7.92	7.92		0	18	0	14	0	14	0	14	0	14	0	14	0	14		3.03	2.42	2.42	2.42	2.42	2.42	2.42
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.27**	**3.25**	**3.25**	**3.25**	**3.25**	**3.25**	**3.25**	**2.44**	**0.0**	**7.4**	**0.0**	**5.7**	**0.0**	**5.7**	**0.0**	**5.7**	**0.0**	**5.7**	**0.0**	**5.7**	**0.0**	**5.7**	**0.35**	**8.62**	**6.88**	**6.88**	**6.88**	**6.88**	**6.88**	**6.88**
18020123020202	Lemon Canyon	AY	0.06	0.00	0.06	0.06	0.00	0.06	0.06	6,549.99	1	7	0	0	1	7	1	7	0	0	1	7	1	7	1,075.43	0.03	0.00	0.03	0.03	0.00	0.03	0.03
18020123020202	Lemon Canyon	BS*	0.18	0.18	0.18	22.42	22.42	22.42	0.18	6,549.99	0	1	0	1	0	1	0	40	0	40	0	40	0	1	1,075.43	0.18	0.18	0.18	5.75	5.75	5.75	0.18
18020123020202	Lemon Canyon	BY*	22.24	22.31	22.24	0.00	0.06	0.00	22.24	6,549.99	0	39	1	46	0	39	0	0	1	7	0	0	0	39	1,075.43	5.57	5.60	5.57	0.00	0.03	0.00	5.57
18020123020202	Lemon Canyon	CS*	0.00	0.00	0.00	5.83	5.83	5.83	0.00	6,549.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,075.43	0.00	0.00	0.00	0.06	0.06	0.06	0.00
18020123020202	Lemon Canyon	CY*	5.83	5.83	5.83	0.00	0.00	0.00	5.83	6,549.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,075.43	0.06	0.06	0.06	0.00	0.00	0.00	0.06
18020123020202	Lemon Canyon	FY	0.00	4.53	4.53	4.53	4.53	4.53	4.53	6,549.99	0	0	0	8	0	8	0	8	0	8	0	8	0	8	1,075.43	0.00	0.76	0.76	0.76	0.76	0.76	0.76
18020123020202	Lemon Canyon	GY	5.42	5.42	5.42	5.42	5.42	5.42	5.42	6,549.99	0	5	0	5	0	5	0	5	0	5	0	5	0	5	1,075.43	4.10	4.10	4.10	4.10	4.10	4.10	4.10
18020123020202	Lemon Canyon	LS*	1.07	0.00	0.00	0.00	0.00	0.00	0.00	6,549.99	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1,075.43	0.18	0.00	0.00	0.00	0.00	0.00	0.00
18020123020202	Lemon Canyon	LY*	3.46	0.00	0.00	0.00	0.00	0.00	0.00	6,549.99	0	6	0	0	0	0	0	0	0	0	0	0	0	0	1,075.43	0.58	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		38.26	38.26	38.26	38.26	38.26	38.26	38.26	6549.99	1	60	1	60	1	60	1	60	1	60	1	60	1	60	1075.43	10.70	10.70	10.70	10.70	10.70	10.70	10.70
	*** Value Per SqMi All =**		**3.74**	**3.74**	**3.74**	**3.74**	**3.74**	**3.74**	**3.74**	**10.23**	**0.1**	**5.9**	**0.1**	**5.9**	**0.1**	**5.9**	**0.1**	**5.9**	**0.1**	**5.9**	**0.1**	**5.9**	**0.1**	**5.9**	**1.68**	**6.37**	**6.37**	**6.37**	**6.37**	**6.37**	**6.37**	**6.37**
	*** Sum Open-Motorized, Native Surface Routes =**		32.78	28.31	28.25	28.25	28.31	28.25	28.25		0	48	1	47	0	40	0	40	1	47	0	40	0	40		6.57	5.84	5.81	5.81	5.84	5.81	5.81
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.20**	**2.77**	**2.76**	**2.76**	**2.77**	**2.76**	**2.76**	**10.23**	**0.0**	**4.7**	**0.1**	**4.6**	**0.0**	**3.9**	**0.0**	**3.9**	**0.1**	**4.6**	**0.0**	**3.9**	**0.0**	**3.9**	**1.68**	**3.91**	**3.48**	**3.46**	**3.46**	**3.48**	**3.46**	**3.46**
18020123020203	Unnamed Trib. to Sierra Valley	BS*	0.08	0.08	0.08	0.08	0.08	0.08	0.08	967.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	209.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020123020203	Unnamed Trib. to Sierra Valley	FY	0.00	0.17	0.17	0.17	0.17	0.17	0.17	967.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	209.23	0.00	0.06	0.06	0.06	0.06	0.06	0.06
18020123020203	Unnamed Trib. to Sierra Valley	LS*	0.17	0.00	0.00	0.00	0.00	0.00	0.00	967.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	209.23	0.06	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		0.25	0.25	0.25	0.25	0.25	0.25	0.25	967.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	209.23	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	*** Value Per SqMi All =**		**0.17**	**0.17**	**0.17**	**0.17**	**0.17**	**0.17**	**0.17**	**1.51**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.33**	**0.18**	**0.18**	**0.18**	**0.18**	**0.18**	**0.18**	**0.18**
	*** Sum Open-Motorized, Native Surface Routes =**		0.25	0.08	0.08	0.08	0.08	0.08	0.08		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.06	0	0	0	0	0	0
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.17**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**0.05**	**1.51**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.33**	**0.18**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
18020123020204	Sierra Valley-Harding Point	BS*	5.73	5.73	5.73	5.73	5.73	5.73	5.73	2,464.36	0	12	0	12	0	12	0	12	0	12	0	12	0	12	432.77	3.65	3.65	3.65	3.65	3.65	3.65	3.65
18020123020204	Sierra Valley-Harding Point	FY	0.51	0.68	0.68	0.68	0.68	0.68	0.68	2,464.36	0	0	0	1	0	1	0	1	0	1	0	1	0	1	432.77	0.07	0.14	0.14	0.14	0.14	0.14	0.14
18020123020204	Sierra Valley-Harding Point	GY	0.03	0.03	0.03	0.03	0.03	0.03	0.03	2,464.36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	432.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020123020204	Sierra Valley-Harding Point	LS*	0.17	0.00	0.00	0.00	0.00	0.00	0.00	2,464.36	0	1	0	0	0	0	0	0	0	0	0	0	0	0	432.77	0.08	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		6.44	6.44	6.44	6.44	6.44	6.44	6.44	2464.36	0	13	0	13	0	13	0	13	0	13	0	13	0	13	432.77	3.80	3.79	3.79	3.79	3.79	3.79	3.79
	*** Value Per SqMi All =**		**1.67**	**1.67**	**1.67**	**1.67**	**1.67**	**1.67**	**1.67**	**3.85**	**0.0**	**3.4**	**0.0**	**3.4**	**0.0**	**3.4**	**0.0**	**3.4**	**0.0**	**3.4**	**0.0**	**3.4**	**0.0**	**3.4**	**0.68**	**5.62**	**5.60**	**5.60**	**5.60**	**5.60**	**5.60**	**5.60**
	*** Sum Open-Motorized, Native Surface Routes =**		5.90	5.73	5.73	5.73	5.73	5.73	5.73		0	13	0	12	0	12	0	12	0	12	0	12	0	12		3.73	3.65	3.65	3.65	3.65	3.65	3.65
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.53**	**1.49**	**1.49**	**1.49**	**1.49**	**1.49**	**1.49**	**3.85**	**0.0**	**3.4**	**0.0**	**3.1**	**0.0**	**3.1**	**0.0**	**3.1**	**0.0**	**3.1**	**0.0**	**3.1**	**0.0**	**3.1**	**0.68**	**5.52**	**5.40**	**5.40**	**5.40**	**5.40**	**5.40**	**5.40**
18020123020205	Sierra Valley-Mello Canyon	BS*	0.93	0.93	0.93	0.93	0.93	0.93	0.93	786.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150.02	0.06	0.06	0.06	0.06	0.06	0.06	0.06
18020123020205	Sierra Valley-Mello Canyon	FY	0.00	0.14	0.14	0.14	0.14	0.14	0.14	786.78	0	0	0	1	0	1	0	1	0	1	0	1	0	1	150.02	0.00	0.12	0.12	0.12	0.12	0.12	0.12
18020123020205	Sierra Valley-Mello Canyon	GY	0.92	0.92	0.92	0.92	0.92	0.92	0.92	786.78	0	1	0	1	0	1	0	1	0	1	0	1	0	1	150.02	0.12	0.12	0.12	0.12	0.12	0.12	0.12
18020123020205	Sierra Valley-Mello Canyon	LS*	0.14	0.00	0.00	0.00	0.00	0.00	0.00	786.78	0	1	0	0	0	0	0	0	0	0	0	0	0	0	150.02	0.12	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		1.98	1.98	1.98	1.98	1.98	1.98	1.98	786.78	0	2	0	2	0	2	0	2	0	2	0	2	0	2	150.02	0.30	0.30	0.30	0.30	0.30	0.30	0.30
	*** Value Per SqMi All =**		**1.61**	**1.61**	**1.61**	**1.61**	**1.61**	**1.61**	**1.61**	**1.23**	**0.0**	**1.6**	**0.0**	**1.6**	**0.0**	**1.6**	**0.0**	**1.6**	**0.0**	**1.6**	**0.0**	**1.6**	**0.0**	**1.6**	**0.23**	**1.28**	**1.28**	**1.28**	**1.28**	**1.28**	**1.28**	**1.28**
	*** Sum Open-Motorized, Native Surface Routes =**		1.06	0.93	0.93	0.93	0.93	0.93	0.93		0	1	0	0	0	0	0	0	0	0	0	0	0	0		0.18	0.06	0.06	0.06	0.06	0.06	0.06
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.87**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**0.75**	**1.23**	**0.0**	**0.8**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.23**	**0.77**	**0.26**	**0.26**	**0.26**	**0.26**	**0.26**	**0.26**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020123020206	Antelope Creek	BS*	0.64	0.64	0.64	0.79	0.79	0.79	0.64	7,138.64	0	1	0	1	0	1	0	6	0	6	0	6	0	1	1,396.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020123020206	Antelope Creek	BY*	0.14	0.14	0.14	0.00	0.00	0.00	0.14	7,138.64	0	5	0	5	0	5	0	0	0	0	0	0	0	5	1,396.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020123020206	Antelope Creek	FY	0.00	4.35	4.35	4.35	4.35	4.35	4.35	7,138.64	0	0	0	6	0	6	0	6	0	6	0	6	0	6	1,396.93	0.00	1.54	1.54	1.54	1.54	1.54	1.54
18020123020206	Antelope Creek	GY	4.68	4.68	4.68	4.68	4.68	4.68	4.68	7,138.64	1	8	1	8	1	8	1	8	1	8	1	8	1	8	1,396.93	2.60	2.60	2.60	2.60	2.60	2.60	2.60
18020123020206	Antelope Creek	HY*	9.21	9.21	9.21	9.21	9.21	9.21	9.21	7,138.64	3	16	3	16	3	16	3	16	3	16	3	16	3	16	1,396.93	4.30	4.30	4.30	4.30	4.30	4.30	4.30
18020123020206	Antelope Creek	LS*	4.35	0.00	0.00	0.00	0.00	0.00	0.00	7,138.64	0	6	0	0	0	0	0	0	0	0	0	0	0	0	1,396.93	1.54	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		19.02	19.02	19.02	19.02	19.02	19.02	19.02	7138.64	4	36	4	36	4	36	4	36	4	36	4	36	4	36	1396.93	8.44	8.44	8.44	8.44	8.44	8.44	8.44
	*** Value Per SqMi All =**		**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**11.15**	**0.4**	**3.2**	**0.4**	**3.2**	**0.4**	**3.2**	**0.4**	**3.2**	**0.4**	**3.2**	**0.4**	**3.2**	**0.4**	**3.2**	**2.18**	**3.87**	**3.87**	**3.87**	**3.87**	**3.87**	**3.87**	**3.87**
	*** Sum Open-Motorized, Native Surface Routes =**		14.35	10.00	10.00	10.00	10.00	10.00	10.00		3	28	3	22	3	22	3	22	3	22	3	22	3	22		5.84	4.3	4.3	4.3	4.3	4.3	4.3
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.29**	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	**11.15**	**0.3**	**2.5**	**0.3**	**2.0**	**0.3**	**2.0**	**0.3**	**2.0**	**0.3**	**2.0**	**0.3**	**2.0**	**0.3**	**2.0**	**2.18**	**2.68**	**1.97**	**1.97**	**1.97**	**1.97**	**1.97**	**1.97**
18020123020207	Sierra Valley-Lombardi Point	FY	0.00	1.28	1.28	1.28	1.28	1.28	1.28	569.33	0	0	0	2	0	2	0	2	0	2	0	2	0	2	136.12	0.00	1.02	1.02	1.02	1.02	1.02	1.02
18020123020207	Sierra Valley-Lombardi Point	HY*	0.13	0.13	0.13	0.13	0.13	0.13	0.13	569.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	136.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020123020207	Sierra Valley-Lombardi Point	LS*	1.28	0.00	0.00	0.00	0.00	0.00	0.00	569.33	0	2	0	0	0	0	0	0	0	0	0	0	0	0	136.12	1.02	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		1.41	1.41	1.41	1.41	1.41	1.41	1.41	569.33	0	2	0	2	0	2	0	2	0	2	0	2	0	2	136.12	1.02	1.02	1.02	1.02	1.02	1.02	1.02
	*** Value Per SqMi All =**		**1.59**	**1.59**	**1.59**	**1.59**	**1.59**	**1.59**	**1.59**	**0.89**	**0.0**	**2.2**	**0.0**	**2.2**	**0.0**	**2.2**	**0.0**	**2.2**	**0.0**	**2.2**	**0.0**	**2.2**	**0.0**	**2.2**	**0.21**	**4.80**	**4.80**	**4.80**	**4.80**	**4.80**	**4.80**	**4.80**
	*** Sum Open-Motorized, Native Surface Routes =**		1.41	0.13	0.13	0.13	0.13	0.13	0.13		0	2	0	0	0	0	0	0	0	0	0	0	0	0		1.02	0	0	0	0	0	0
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.59**	**0.15**	**0.15**	**0.15**	**0.15**	**0.15**	**0.15**	**0.89**	**0.0**	**2.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.21**	**4.80**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
18020123020301	Upper Cold Stream	AY	10.29	2.02	10.29	10.29	2.02	2.02	10.29	7136.94	4	6	0	0	4	6	4	6	0	0	0	0	4	6	1405.21	3.89	1.94	3.89	3.89	1.94	1.94	3.89
18020123020301	Upper Cold Stream	BS*	0.00	0.00	0.00	24.09	32.36	32.36	0.00	7136.94	0	0	0	0	0	0	3	14	7	20	7	20	0	0	1405.21	0	0	0	3.39	5.34	5.34	0
18020123020301	Upper Cold Stream	BY*	24.09	32.36	24.09	0.00	0.00	0.00	24.09	7136.94	3	14	7	20	3	14	0	0	0	0	0	0	3	14	1405.21	3.39	5.34	3.39	0	0	0	3.39
18020123020301	Upper Cold Stream	CS*	0.00	0.00	0.00	4.39	4.39	4.39	0.00	7136.94	0	0	0	0	0	0	0	3	0	3	0	3	0	0	1405.21	0	0	0	0.87	0.87	0.87	0
18020123020301	Upper Cold Stream	CY*	3.47	4.39	3.47	0.00	0.00	0.00	4.39	7136.94	0	3	0	3	0	3	0	0	0	0	0	0	0	3	1405.21	0.8	0.87	0.8	0	0	0	0.87
18020123020301	Upper Cold Stream	FY	0.00	10.13	11.06	10.13	10.13	10.13	10.13	7136.94	0	0	0	8	0	8	0	8	0	8	0	8	0	8	1405.21	0	2.22	2.29	2.22	2.22	2.22	2.22
18020123020301	Upper Cold Stream	GY	6.48	6.48	6.48	6.48	6.48	6.48	6.48	7136.94	1	6	1	6	1	6	1	6	1	6	1	6	1	6	1405.21	3.74	3.74	3.74	3.74	3.74	3.74	3.74
18020123020301	Upper Cold Stream	HY*	0.53	0.53	0.53	0.53	0.53	0.53	0.53	7136.94	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1405.21	0.53	0.53	0.53	0.53	0.53	0.53	0.53
18020123020301	Upper Cold Stream	IY	0.48	0.48	0.48	0.48	0.48	0.48	0.48	7136.94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1405.21	0	0	0	0	0	0	0
18020123020301	Upper Cold Stream	LY*	11.06	0.00	0.00	0.00	0.00	0.00	0.00	7136.94	0	8	0	0	0	0	0	0	0	0	0	0	0	0	1405.21	2.29	0	0	0	0	0	0
	Sum All =		56.39	56.39	56.39	56.39	56.39	56.39	56.39	7136.94	9	38	9	38	9	38	9	38	9	38	9	38	9	38	1405.21	14.64	14.64	14.64	14.64	14.64	14.64	14.64
	*** Value Per SqMi All =**		**5.06**	**5.06**	**5.06**	**5.06**	**5.06**	**5.06**	**5.06**	**11.15**	**0.8**	**3.4**	**0.8**	**3.4**	**0.8**	**3.4**	**0.8**	**3.4**	**0.8**	**3.4**	**0.8**	**3.4**	**0.8**	**3.4**	**2.20**	**6.67**	**6.67**	**6.67**	**6.67**	**6.67**	**6.67**	**6.67**
	*** Sum Open-Motorized, Native Surface Routes =**		38.61	36.75	27.56	28.48	36.75	36.75	28.48		3	25	7	23	3	17	3	17	7	23	7	23	3	17		6.48	6.21	4.19	4.26	6.21	6.21	4.26
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.46**	**3.30**	**2.47**	**2.55**	**3.30**	**3.30**	**2.55**	**11.15**	**0.3**	**2.2**	**0.6**	**2.1**	**0.3**	**1.5**	**0.3**	**1.5**	**0.6**	**2.1**	**0.6**	**2.1**	**0.3**	**1.5**	**2.20**	**2.95**	**2.83**	**1.91**	**1.94**	**2.83**	**2.83**	**1.94**
18020123020302	Cottonwood Creek	AY	0.39	0.39	0.39	0.39	0.39	0.39	0.39	4,414.69	0	1	0	1	0	1	0	1	0	1	0	1	0	1	822.72	0.35	0.35	0.35	0.35	0.35	0.35	0.35
18020123020302	Cottonwood Creek	BS*	0.00	0.00	0.00	13.95	13.95	13.95	0.00	4,414.69	0	0	0	0	0	0	0	16	0	16	0	16	0	0	822.72	0.00	0.00	0.00	1.69	1.69	1.69	0.00
18020123020302	Cottonwood Creek	BY*	13.95	13.95	13.95	0.00	0.00	0.00	13.95	4,414.69	0	16	0	16	0	16	0	0	0	0	0	0	0	16	822.72	1.69	1.69	1.69	0.00	0.00	0.00	1.69
18020123020302	Cottonwood Creek	CS*	0.00	0.00	0.00	10.51	10.51	10.51	0.00	4,414.69	0	0	0	0	0	0	0	6	0	6	0	6	0	0	822.72	0.00	0.00	0.00	0.99	0.99	0.99	0.00
18020123020302	Cottonwood Creek	CY*	10.51	10.51	10.51	0.00	0.00	0.00	10.51	4,414.69	0	6	0	6	0	6	0	0	0	0	0	0	0	6	822.72	0.99	0.99	0.99	0.00	0.00	0.00	0.99
18020123020302	Cottonwood Creek	FY	0.00	16.46	16.46	16.46	16.46	16.46	16.46	4,414.69	0	0	0	8	0	8	0	8	0	8	0	8	0	8	822.72	0.00	2.54	2.54	2.54	2.54	2.54	2.54
18020123020302	Cottonwood Creek	GY	2.76	2.76	2.76	2.76	2.76	2.76	2.76	4,414.69	2	8	2	8	2	8	2	8	2	8	2	8	2	8	822.72	0.95	0.95	0.95	0.95	0.95	0.95	0.95
18020123020302	Cottonwood Creek	IY	4.39	4.39	4.39	4.39	4.39	4.39	4.39	4,414.69	3	3	3	3	3	3	3	3	3	3	3	3	3	3	822.72	4.30	4.30	4.30	4.30	4.30	4.30	4.30
18020123020302	Cottonwood Creek	LY*	16.46	0.00	0.00	0.00	0.00	0.00	0.00	4,414.69	0	8	0	0	0	0	0	0	0	0	0	0	0	0	822.72	2.54	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		48.46	48.46	48.46	48.46	48.46	48.46	48.46	4414.69	5	42	5	42	5	42	5	42	5	42	5	42	5	42	822.72	10.82	10.82	10.82	10.82	10.82	10.82	10.82
	*** Value Per SqMi All =**		**7.03**	**7.03**	**7.03**	**7.03**	**7.03**	**7.03**	**7.03**	**6.90**	**0.7**	**6.1**	**0.7**	**6.1**	**0.7**	**6.1**	**0.7**	**6.1**	**0.7**	**6.1**	**0.7**	**6.1**	**0.7**	**6.1**	**1.29**	**8.42**	**8.42**	**8.42**	**8.42**	**8.42**	**8.42**	**8.42**
	*** Sum Open-Motorized, Native Surface Routes =**		40.93	24.47	24.47	24.47	24.47	24.47	24.47		0	30	0	22	0	22	0	22	0	22	0	22	0	22		5.22	2.68	2.68	2.68	2.68	2.68	2.68
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**5.93**	**3.55**	**3.55**	**3.55**	**3.55**	**3.55**	**3.55**	**6.90**	**0.0**	**4.3**	**0.0**	**3.2**	**0.0**	**3.2**	**0.0**	**3.2**	**0.0**	**3.2**	**0.0**	**3.2**	**0.0**	**3.2**	**1.29**	**4.06**	**2.08**	**2.08**	**2.08**	**2.08**	**2.08**	**2.08**
18020123020303	Bonta Creek	AY	11.78	0.00	11.78	11.78	0.00	7.96	11.78	8,297.35	8	7	0	0	8	7	8	7	0	0	4	2	8	7	1,464.22	2.73	0.00	2.73	2.73	0.00	2.42	2.73
18020123020303	Bonta Creek	BS*	0.00	0.00	0.00	32.96	36.77	36.77	0.00	8,297.35	0	0	0	0	0	0	6	14	10	19	10	19	0	0	1,464.22	0.00	0.00	0.00	7.02	7.33	7.33	0.00
18020123020303	Bonta Creek	BY*	32.96	44.73	32.96	0.00	7.96	0.00	32.96	8,297.35	6	14	14	21	6	14	0	0	4	2	0	0	6	14	1,464.22	7.02	9.75	7.02	0.00	2.42	0.00	7.02
18020123020303	Bonta Creek	CS*	0.00	0.00	0.00	0.00	0.51	0.00	0.00	8,297.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,464.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020123020303	Bonta Creek	FY	0.00	8.66	8.66	8.66	8.15	8.66	8.66	8,297.35	0	0	4	4	4	4	4	4	4	4	4	4	4	4	1,464.22	0.00	2.47	2.47	2.47	2.47	2.47	2.47
18020123020303	Bonta Creek	HY*	6.50	6.50	6.50	6.50	6.50	6.50	6.50	8,297.35	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,464.22	1.28	1.28	1.28	1.28	1.28	1.28	1.28
18020123020303	Bonta Creek	KY	0.17	0.17	0.17	0.17	0.17	0.17	0.17	8,297.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,464.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020123020303	Bonta Creek	LY*	8.66	0.00	0.00	0.00	0.00	0.00	0.00	8,297.35	4	4	0	0	0	0	0	0	0	0	0	0	0	0	1,464.22	2.47	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		60.06	60.06	60.06	60.06	60.06	60.06	60.06	8297.35	19	26	19	26	19	26	19	26	19	26	19	26	19	26	1464.22	13.50	13.50	13.50	13.50	13.50	13.50	13.50
	*** Value Per SqMi All =**		**4.63**	**4.63**	**4.63**	**4.63**	**4.63**	**4.63**	**4.63**	**12.96**	**1.5**	**2.0**	**1.5**	**2.0**	**1.5**	**2.0**	**1.5**	**2.0**	**1.5**	**2.0**	**1.5**	**2.0**	**1.5**	**2.0**	**2.29**	**5.90**	**5.90**	**5.90**	**5.90**	**5.90**	**5.90**	**5.90**
	*** Sum Open-Motorized, Native Surface Routes =**		48.12	51.23	39.45	39.45	51.74	43.27	39.45		11	19	15	22	7	15	7	15	15	22	11	20	7	15		10.77	11.03	8.3	8.3	11.03	8.61	8.3
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.71**	**3.95**	**3.04**	**3.04**	**3.99**	**3.34**	**3.04**	**12.96**	**0.8**	**1.5**	**1.2**	**1.7**	**0.5**	**1.2**	**0.5**	**1.2**	**1.2**	**1.7**	**0.8**	**1.5**	**0.5**	**1.2**	**2.29**	**4.71**	**4.82**	**3.63**	**3.63**	**4.82**	**3.76**	**3.63**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020123020304	Lower Cold Stream	AY	2.97	0.32	2.97	2.97	0.32	1.55	2.97	4009.29	7	7	0	0	7	7	7	7	0	0	3	2	7	7	710.35	1.24	0.07	1.24	1.24	0.07	1.04	1.24
18020123020304	Lower Cold Stream	BS*	0.00	0.00	0.00	12.07	13.49	13.49	0.00	4009.29	0	0	0	0	0	0	4	14	8	19	8	19	0	0	710.35	0	0	0	2.48	2.68	2.68	0
18020123020304	Lower Cold Stream	BY*	12.07	14.72	12.07	0.00	1.24	0.00	12.07	4009.29	4	14	11	21	4	14	0	0	3	2	0	0	4	14	710.35	2.48	3.64	2.48	0	0.96	0	2.48
18020123020304	Lower Cold Stream	CS*	0.00	0.00	0.00	0.53	0.53	0.53	0.00	4009.29	0	0	0	0	0	0	2	0	2	0	2	0	0	0	710.35	0	0	0	0.24	0.24	0.24	0
18020123020304	Lower Cold Stream	CY*	0.00	0.53	0.00	0.00	0.00	0.00	0.53	4009.29	0	0	2	0	0	0	0	0	0	0	0	0	2	0	710.35	0	0.24	0	0	0	0	0.24
18020123020304	Lower Cold Stream	FY	0.00	3.18	3.71	3.18	3.18	3.18	3.18	4009.29	0	0	0	3	2	3	0	3	0	3	0	3	0	3	710.35	0	0.4	0.64	0.4	0.4	0.4	0.4
18020123020304	Lower Cold Stream	GY	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4009.29	2	3	2	3	2	3	2	3	2	3	2	3	2	3	710.35	1.5	1.5	1.5	1.5	1.5	1.5	1.5
18020123020304	Lower Cold Stream	HY*	0.04	0.04	0.04	0.04	0.04	0.04	0.04	4009.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	710.35	0.04	0.04	0.04	0.04	0.04	0.04	0.04
18020123020304	Lower Cold Stream	LY*	3.71	0.00	0.00	0.00	0.00	0.00	0.00	4009.29	2	3	0	0	0	0	0	0	0	0	0	0	0	0	710.35	0.64	0	0	0	0	0	0
	Sum All =		23.46	23.46	23.46	23.46	23.46	23.46	23.46	4009.29	15	27	15	27	15	27	15	27	15	27	15	27	15	27	710.35	5.90	5.89	5.90	5.90	5.89	5.90	5.90
	*** Value Per SqMi All =**		**3.74**	**3.74**	**3.74**	**3.74**	**3.74**	**3.74**	**3.74**	**6.26**	**2.4**	**4.3**	**2.4**	**4.3**	**2.4**	**4.3**	**2.4**	**4.3**	**2.4**	**4.3**	**2.4**	**4.3**	**2.4**	**4.3**	**1.11**	**5.32**	**5.31**	**5.32**	**5.32**	**5.31**	**5.32**	**5.32**
	*** Sum Open-Motorized, Native Surface Routes =**		15.82	15.29	12.11	12.64	15.29	14.06	12.64		6	17	13	21	4	14	6	14	13	21	10	19	6	14		3.16	3.92	2.52	2.76	3.92	2.96	2.76
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.53**	**2.44**	**1.93**	**2.02**	**2.44**	**2.24**	**2.02**	**6.26**	**1.0**	**2.7**	**2.1**	**3.4**	**0.6**	**2.2**	**1.0**	**2.2**	**2.1**	**3.4**	**1.6**	**3.0**	**1.0**	**2.2**	**1.11**	**2.85**	**3.53**	**2.27**	**2.49**	**3.53**	**2.67**	**2.49**
18020123020401	Dark Canyon	BS*	0.00	0.00	0.00	13.31	13.31	13.31	0.00	2,648.70	0	0	0	0	0	0	3	13	3	13	3	13	0	0	538.28	0.00	0.00	0.00	1.88	1.88	1.88	0.00
18020123020401	Dark Canyon	BY*	13.31	13.31	13.31	0.00	0.00	0.00	13.31	2,648.70	3	13	3	13	3	13	0	0	0	0	0	0	3	13	538.28	1.88	1.88	1.88	0.00	0.00	0.00	1.88
18020123020401	Dark Canyon	FY	0.00	0.94	0.94	0.94	0.94	0.94	0.94	2,648.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	538.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020123020401	Dark Canyon	HY*	1.88	1.88	1.88	1.88	1.88	1.88	1.88	2,648.70	0	1	0	1	0	1	0	1	0	1	0	1	0	1	538.28	0.34	0.34	0.34	0.34	0.34	0.34	0.34
18020123020401	Dark Canyon	LY*	0.94	0.00	0.00	0.00	0.00	0.00	0.00	2,648.70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	538.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		16.13	16.13	16.13	16.13	16.13	16.13	16.13	2648.70	3	14	3	14	3	14	3	14	3	14	3	14	3	14	538.28	2.22	2.22	2.22	2.22	2.22	2.22	2.22
	*** Value Per SqMi All =**		**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**4.14**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.84**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**
	*** Sum Open-Motorized, Native Surface Routes =**		16.13	15.19	15.19	15.19	15.19	15.19	15.19		3	14	3	14	3	14	3	14	3	14	3	14	3	14		2.22	2.22	2.22	2.22	2.22	2.22	2.22
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.90**	**3.67**	**3.67**	**3.67**	**3.67**	**3.67**	**3.67**	**4.14**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.84**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**
18020123020402	Berry Creek	AY	3.55	0.00	3.55	3.55	0.00	3.55	3.55	4,686.13	0	2	0	0	0	2	0	2	0	0	0	2	0	2	948.37	0.51	0.00	0.51	0.51	0.00	0.51	0.51
18020123020402	Berry Creek	BS*	0.00	0.00	0.00	20.52	20.52	20.52	0.00	4,686.13	0	0	0	0	0	0	3	7	3	7	3	7	0	0	948.37	0.00	0.00	0.00	3.32	3.32	3.32	0.00
18020123020402	Berry Creek	BY*	20.52	24.07	20.52	0.00	3.55	0.00	20.52	4,686.13	3	7	3	9	3	7	0	0	0	2	0	0	3	7	948.37	3.32	3.83	3.32	0.00	0.51	0.00	3.32
18020123020402	Berry Creek	CS*	0.00	0.00	0.00	0.00	1.19	0.00	0.00	4,686.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	948.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020123020402	Berry Creek	FY	0.00	7.26	7.26	7.26	6.06	7.26	7.26	4,686.13	0	0	1	0	1	0	1	0	1	0	1	0	1	0	948.37	0.00	1.38	1.38	1.38	1.38	1.38	1.38
18020123020402	Berry Creek	HY*	6.22	6.22	6.22	6.22	6.22	6.22	6.22	4,686.13	1	0	1	0	1	0	1	0	1	0	1	0	1	0	948.37	0.70	0.70	0.70	0.70	0.70	0.70	0.70
18020123020402	Berry Creek	LY*	7.26	0.00	0.00	0.00	0.00	0.00	0.00	4,686.13	1	0	0	0	0	0	0	0	0	0	0	0	0	0	948.37	1.38	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		37.55	37.55	37.55	37.55	37.55	37.55	37.55	4686.13	5	9	5	9	5	9	5	9	5	9	5	9	5	9	948.37	5.91	5.91	5.91	5.91	5.91	5.91	5.91
	*** Value Per SqMi All =**		**5.13**	**5.13**	**5.13**	**5.13**	**5.13**	**5.13**	**5.13**	**7.32**	**0.7**	**1.2**	**0.7**	**1.2**	**0.7**	**1.2**	**0.7**	**1.2**	**0.7**	**1.2**	**0.7**	**1.2**	**0.7**	**1.2**	**1.48**	**3.99**	**3.99**	**3.99**	**3.99**	**3.99**	**3.99**	**3.99**
	*** Sum Open-Motorized, Native Surface Routes =**		34.00	30.30	26.75	26.75	31.49	26.75	26.75		5	7	4	9	4	7	4	7	4	9	4	7	4	7		5.4	4.53	4.02	4.02	4.53	4.02	4.02
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.64**	**4.14**	**3.65**	**3.65**	**4.30**	**3.65**	**3.65**	**7.32**	**0.7**	**1.0**	**0.5**	**1.2**	**0.5**	**1.0**	**0.5**	**1.0**	**0.5**	**1.2**	**0.5**	**1.0**	**0.5**	**1.0**	**1.48**	**3.64**	**3.06**	**2.71**	**2.71**	**3.06**	**2.71**	**2.71**
18020123020403	Turner Creek	AY	1.17	0.00	1.17	1.17	0.00	0.96	1.17	3,348.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	941.82	0.26	0.00	0.26	0.26	0.00	0.11	0.26
18020123020403	Turner Creek	BS*	0.00	0.00	0.00	9.38	9.38	9.38	0.00	3,348.37	0	0	0	0	0	0	1	9	1	9	1	9	0	0	941.82	0.00	0.00	0.00	1.38	1.38	1.38	0.00
18020123020403	Turner Creek	BY*	9.38	10.55	9.38	0.00	1.17	0.21	9.38	3,348.37	1	9	1	9	1	9	0	0	0	0	0	0	1	9	941.82	1.38	1.63	1.38	0.00	0.26	0.15	1.38
18020123020403	Turner Creek	FY	0.00	2.57	2.57	2.57	2.57	2.57	2.57	3,348.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	941.82	0.00	0.61	0.61	0.61	0.61	0.61	0.61
18020123020403	Turner Creek	GY	3.29	3.29	3.29	3.29	3.29	3.29	3.29	3,348.37	1	1	1	1	1	1	1	1	1	1	1	1	1	1	941.82	1.06	1.06	1.06	1.06	1.06	1.06	1.06
18020123020403	Turner Creek	LY*	2.57	0.00	0.00	0.00	0.00	0.00	0.00	3,348.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	941.82	0.61	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		16.40	16.40	16.40	16.40	16.40	16.40	16.40	3348.37	2	10	2	10	2	10	2	10	2	10	2	10	2	10	941.82	3.31	3.30	3.31	3.31	3.31	3.31	3.31
	*** Value Per SqMi All =**		**3.13**	**3.13**	**3.13**	**3.13**	**3.13**	**3.13**	**3.13**	**5.23**	**0.4**	**1.9**	**0.4**	**1.9**	**0.4**	**1.9**	**0.4**	**1.9**	**0.4**	**1.9**	**0.4**	**1.9**	**0.4**	**1.9**	**1.47**	**2.25**	**2.24**	**2.25**	**2.25**	**2.25**	**2.25**	**2.25**
	*** Sum Open-Motorized, Native Surface Routes =**		11.94	10.55	9.38	9.38	10.55	9.59	9.38		1	9	1	9	1	9	1	9	1	9	1	9	1	9		1.99	1.63	1.38	1.38	1.64	1.53	1.38
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.28**	**2.02**	**1.79**	**1.79**	**2.02**	**1.83**	**1.79**	**5.23**	**0.2**	**1.7**	**0.2**	**1.7**	**0.2**	**1.7**	**0.2**	**1.7**	**0.2**	**1.7**	**0.2**	**1.7**	**0.2**	**1.7**	**1.47**	**1.35**	**1.11**	**0.94**	**0.94**	**1.11**	**1.04**	**0.94**
18020123020404	Unnamed Trib. to Sierra Valley	AY	2.05	0.00	2.05	2.05	0.00	0.00	2.05	1,956.63	3	2	0	0	3	2	3	2	0	0	0	0	3	2	669.74	0.41	0.00	0.41	0.41	0.00	0.00	0.41
18020123020404	Unnamed Trib. to Sierra Valley	BS*	0.00	0.00	0.00	1.93	3.98	3.98	0.00	1,956.63	0	0	0	0	0	0	0	3	3	5	3	5	0	0	669.74	0.00	0.00	0.00	0.00	0.41	0.41	0.00
18020123020404	Unnamed Trib. to Sierra Valley	BY*	1.93	3.98	1.93	0.00	0.00	0.00	1.93	1,956.63	0	3	3	5	0	3	0	0	0	0	0	0	0	3	669.74	0.00	0.41	0.00	0.00	0.00	0.00	0.00
18020123020404	Unnamed Trib. to Sierra Valley	FY	0.00	3.76	3.76	3.76	3.76	3.76	3.76	1,956.63	0	0	1	3	1	3	1	3	1	3	1	3	1	3	669.74	0.00	1.15	1.15	1.15	1.15	1.15	1.15
18020123020404	Unnamed Trib. to Sierra Valley	GY	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1,956.63	0	5	0	5	0	5	0	5	0	5	0	5	0	5	669.74	0.41	0.41	0.41	0.41	0.41	0.41	0.41
18020123020404	Unnamed Trib. to Sierra Valley	HY*	3.40	3.40	3.40	3.40	3.40	3.40	3.40	1,956.63	1	0	1	0	1	0	1	0	1	0	1	0	1	0	669.74	0.81	0.81	0.81	0.81	0.81	0.81	0.81
18020123020404	Unnamed Trib. to Sierra Valley	LY*	3.76	0.00	0.00	0.00	0.00	0.00	0.00	1,956.63	1	3	0	0	0	0	0	0	0	0	0	0	0	0	669.74	1.15	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		12.79	12.79	12.79	12.79	12.79	12.79	12.79	1956.63	5	13	5	13	5	13	5	13	5	13	5	13	5	13	669.74	2.78	2.78	2.78	2.78	2.78	2.78	2.78
	*** Value Per SqMi All =**		**4.18**	**4.18**	**4.18**	**4.18**	**4.18**	**4.18**	**4.18**	**3.06**	**1.6**	**4.3**	**1.6**	**4.3**	**1.6**	**4.3**	**1.6**	**4.3**	**1.6**	**4.3**	**1.6**	**4.3**	**1.6**	**4.3**	**1.05**	**2.66**	**2.66**	**2.66**	**2.66**	**2.66**	**2.66**	**2.66**
	*** Sum Open-Motorized, Native Surface Routes =**		9.10	7.39	5.34	5.34	7.39	7.39	5.34		2	6	4	5	1	3	1	3	4	5	4	5	1	3		1.96	1.22	0.81	0.81	1.22	1.22	0.81
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.98**	**2.42**	**1.75**	**1.75**	**2.42**	**2.42**	**1.75**	**3.06**	**0.7**	**2.0**	**1.3**	**1.6**	**0.3**	**1.0**	**0.3**	**1.0**	**1.3**	**1.6**	**1.3**	**1.6**	**0.3**	**1.0**	**1.05**	**1.87**	**1.17**	**0.77**	**0.77**	**1.17**	**1.17**	**0.77**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020123020405	Fletcher Creek	AY	4.82	1.12	4.82	4.82	1.12	1.12	4.82	2876	3	4	0	2	3	4	3	4	0	2	0	2	3	4	1134.97	1.96	0.44	1.96	1.96	0.44	0.44	1.96
18020123020405	Fletcher Creek	BS*	0.00	0.00	0.00	9.92	13.63	13.63	0.00	2876	0	0	0	0	0	0	6	5	9	7	9	7	0	0	1134.97	0	0	0	2.3	3.83	3.83	0
18020123020405	Fletcher Creek	BY*	9.92	13.63	9.92	0.00	0.00	0.00	9.92	2876	6	5	9	7	6	5	0	0	0	0	0	0	6	5	1134.97	2.3	3.83	2.3	0	0	0	2.3
18020123020405	Fletcher Creek	CS*	0.00	0.00	0.00	0.00	0.50	0.00	0.00	2876	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1134.97	0	0	0	0	0.09	0	0
18020123020405	Fletcher Creek	CY*	0.00	0.50	0.00	1.00	0.00	0.00	0.00	2876	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1134.97	0	0.09	0	0	0	0	0
18020123020405	Fletcher Creek	FY	0.00	13.91	14.42	14.42	13.91	14.42	14.42	2876	0	0	3	15	3	15	3	15	3	15	3	15	3	15	1134.97	0	3.1	3.19	3.19	3.1	3.19	3.19
18020123020405	Fletcher Creek	GY	1.58	1.58	1.58	1.58	1.58	1.58	1.58	2876	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1134.97	0.47	0.47	0.47	0.47	0.47	0.47	0.47
18020123020405	Fletcher Creek	HY*	0.45	0.45	0.45	0.45	0.45	0.45	0.45	2876	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1134.97	0.36	0.36	0.36	0.36	0.36	0.36	0.36
18020123020405	Fletcher Creek	KY	0.33	0.33	0.33	0.33	0.33	0.33	0.33	2876	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1134.97	0.01	0.01	0.01	0.01	0.01	0.01	0.01
18020123020405	Fletcher Creek	LY*	14.42	0.00	0.00	0.00	0.00	0.00	0.00	2876	3	15	0	0	0	0	0	0	0	0	0	0	0	0	1134.97	3.19	0	0	0	0	0	0
	Sum All =		31.51	31.51	31.51	32.51	31.51	31.51	31.51	2876.00	13	26	13	26	13	26	13	26	13	26	13	26	13	26	1134.97	8.29	8.30	8.29	8.29	8.30	8.30	8.29
	*** Value Per SqMi All =**		**7.01**	**7.01**	**7.01**	**7.24**	**7.01**	**7.01**	**7.01**	**4.49**	**2.9**	**5.8**	**2.9**	**5.8**	**2.9**	**5.8**	**2.9**	**5.8**	**2.9**	**5.8**	**2.9**	**5.8**	**2.9**	**5.8**	**1.77**	**4.67**	**4.68**	**4.67**	**4.67**	**4.68**	**4.68**	**4.67**
	*** Sum Open-Motorized, Native Surface Routes =**		24.79	14.58	10.37	11.37	14.58	14.08	10.37		10	21	10	8	7	6	7	6	10	8	10	8	7	6		5.85	4.28	2.66	2.66	4.28	4.19	2.66
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**5.52**	**3.25**	**2.31**	**2.53**	**3.25**	**3.13**	**2.31**	**4.49**	**2.2**	**4.7**	**2.2**	**1.8**	**1.6**	**1.3**	**1.6**	**1.3**	**2.2**	**1.8**	**2.2**	**1.8**	**1.6**	**1.3**	**1.77**	**3.30**	**2.41**	**1.50**	**1.50**	**2.41**	**2.36**	**1.50**
18020123020501	West Fork Carman Creek	AY	5.26	0.00	5.26	5.26	0.00	0.00	5.26	4,831.87	0	4	0	0	0	4	0	4	0	0	0	0	0	4	782.86	2.50	0.00	2.50	2.50	0.00	0.00	2.50
18020123020501	West Fork Carman Creek	BS*	0.00	0.00	0.00	5.01	10.27	10.27	0.00	4,831.87	0	0	0	0	0	0	0	14	0	18	0	18	0	0	782.86	0.00	0.00	0.00	1.38	3.88	3.88	0.00
18020123020501	West Fork Carman Creek	BY*	5.01	10.27	5.01	0.00	0.00	0.00	5.01	4,831.87	0	14	0	18	0	14	0	0	0	0	0	0	0	14	782.86	1.38	3.88	1.38	0.00	0.00	0.00	1.38
18020123020501	West Fork Carman Creek	CS*	0.00	0.00	0.00	0.00	0.29	0.00	0.00	4,831.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	782.86	0.00	0.00	0.00	0.00	0.12	0.00	0.00
18020123020501	West Fork Carman Creek	FY	0.00	5.72	5.72	5.72	5.44	5.72	5.72	4,831.87	0	0	1	5	1	5	1	5	1	5	1	5	1	5	782.86	0.00	2.10	2.10	2.10	1.98	2.10	2.10
18020123020501	West Fork Carman Creek	KY	1.27	1.27	1.27	1.27	1.27	1.27	1.27	4,831.87	0	2	0	2	0	2	0	2	0	2	0	2	0	2	782.86	0.60	0.60	0.60	0.60	0.60	0.60	0.60
18020123020501	West Fork Carman Creek	LY*	5.72	0.00	0.00	0.00	0.00	0.00	0.00	4,831.87	1	5	0	0	0	0	0	0	0	0	0	0	0	0	782.86	2.10	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		17.27	17.27	17.27	17.27	17.27	17.27	17.27	4831.87	1	25	1	25	1	25	1	25	1	25	1	25	1	25	782.86	6.58	6.58	6.58	6.58	6.58	6.58	6.58
	*** Value Per SqMi All =**		**2.29**	**2.29**	**2.29**	**2.29**	**2.29**	**2.29**	**2.29**	**7.55**	**0.1**	**3.3**	**0.1**	**3.3**	**0.1**	**3.3**	**0.1**	**3.3**	**0.1**	**3.3**	**0.1**	**3.3**	**0.1**	**3.3**	**1.22**	**5.38**	**5.38**	**5.38**	**5.38**	**5.38**	**5.38**	**5.38**
	*** Sum Open-Motorized, Native Surface Routes =**		10.73	10.27	5.01	5.01	10.56	10.27	5.01		1	19	0	18	0	14	0	14	0	18	0	18	0	14		3.48	3.88	1.38	1.38	4	3.88	1.38
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.42**	**1.36**	**0.66**	**0.66**	**1.40**	**1.36**	**0.66**	**7.55**	**0.1**	**2.5**	**0.0**	**2.4**	**0.0**	**1.9**	**0.0**	**1.9**	**0.0**	**2.4**	**0.0**	**2.4**	**0.0**	**1.9**	**1.22**	**2.84**	**3.17**	**1.13**	**1.13**	**3.27**	**3.17**	**1.13**
18020123020502	Folchi Meadows	BS*	0.00	0.00	0.00	0.79	0.79	0.79	0.00	1,936.96	0	0	0	0	0	0	0	6	0	6	0	6	0	0	457.45	0.00	0.00	0.00	0.11	0.11	0.11	0.00
18020123020502	Folchi Meadows	BY*	0.79	0.79	0.79	0.00	0.00	0.00	0.79	1,936.96	0	6	0	6	0	6	0	0	0	0	0	0	0	6	457.45	0.11	0.11	0.11	0.00	0.00	0.00	0.11
18020123020502	Folchi Meadows	FY	0.00	1.01	1.01	1.01	1.01	1.01	1.01	1,936.96	0	0	1	1	1	1	1	1	1	1	1	1	1	1	457.45	0.00	0.30	0.30	0.30	0.30	0.30	0.30
18020123020502	Folchi Meadows	LY*	1.01	0.00	0.00	0.00	0.00	0.00	0.00	1,936.96	1	1	0	0	0	0	0	0	0	0	0	0	0	0	457.45	0.30	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		1.80	1.80	1.80	1.80	1.80	1.80	1.80	1936.96	1	7	1	7	1	7	1	7	1	7	1	7	1	7	457.45	0.41	0.41	0.41	0.41	0.41	0.41	0.41
	*** Value Per SqMi All =**		**0.60**	**0.60**	**0.60**	**0.60**	**0.60**	**0.60**	**0.60**	**3.03**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.71**	**0.57**	**0.57**	**0.57**	**0.57**	**0.57**	**0.57**	**0.57**
	*** Sum Open-Motorized, Native Surface Routes =**		1.80	0.79	0.79	0.79	0.79	0.79	0.79		1	7	0	6	0	6	0	6	0	6	0	6	0	6		0.41	0.11	0.11	0.11	0.11	0.11	0.11
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.60**	**0.26**	**0.26**	**0.26**	**0.26**	**0.26**	**0.26**	**3.03**	**0.3**	**2.3**	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**	**0.71**	**0.57**	**0.15**	**0.15**	**0.15**	**0.15**	**0.15**	**0.15**
18020123020503	East Fork Carman Creek	AY	3.02	0.67	3.02	3.02	0.67	0.67	3.02	4,730.54	0	7	0	1	0	7	0	7	0	1	0	1	0	7	942.15	1.87	0.07	1.87	1.87	0.07	0.07	1.87
18020123020503	East Fork Carman Creek	BS*	0.00	0.00	0.00	10.30	12.65	12.65	0.00	4,730.54	0	0	0	0	0	0	2	13	2	19	2	19	0	0	942.15	0.00	0.00	0.00	2.54	4.34	4.34	0.00
18020123020503	East Fork Carman Creek	BY*	10.30	12.65	10.30	0.00	0.00	0.00	10.30	4,730.54	2	13	2	19	2	13	0	0	0	0	0	0	2	13	942.15	2.54	4.34	2.54	0.00	0.00	0.00	2.54
18020123020503	East Fork Carman Creek	FY	0.00	3.36	3.36	3.36	3.36	3.36	3.36	4,730.54	0	0	4	0	4	0	4	0	4	0	4	0	4	0	942.15	0.00	1.09	1.09	1.09	1.09	1.09	1.09
18020123020503	East Fork Carman Creek	GY	1.12	1.12	1.12	1.12	1.12	1.12	1.12	4,730.54	0	2	0	2	0	2	0	2	0	2	0	2	0	2	942.15	0.06	0.06	0.06	0.06	0.06	0.06	0.06
18020123020503	East Fork Carman Creek	KY	1.78	1.78	1.78	1.78	1.78	1.78	1.78	4,730.54	0	3	0	3	0	3	0	3	0	3	0	3	0	3	942.15	0.36	0.36	0.36	0.36	0.36	0.36	0.36
18020123020503	East Fork Carman Creek	LY*	3.36	0.00	0.00	0.00	0.00	0.00	0.00	4,730.54	4	0	0	0	0	0	0	0	0	0	0	0	0	0	942.15	1.09	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		19.57	19.57	19.57	19.57	19.57	19.57	19.57	4730.54	6	25	6	25	6	25	6	25	6	25	6	25	6	25	942.15	5.92	5.92	5.92	5.92	5.92	5.92	5.92
	*** Value Per SqMi All =**		**2.65**	**2.65**	**2.65**	**2.65**	**2.65**	**2.65**	**2.65**	**7.39**	**0.8**	**3.4**	**0.8**	**3.4**	**0.8**	**3.4**	**0.8**	**3.4**	**0.8**	**3.4**	**0.8**	**3.4**	**0.8**	**3.4**	**1.47**	**4.02**	**4.02**	**4.02**	**4.02**	**4.02**	**4.02**	**4.02**
	*** Sum Open-Motorized, Native Surface Routes =**		13.65	12.65	10.30	10.30	12.65	12.65	10.30		6	13	2	19	2	13	2	13	2	19	2	19	2	13		3.63	4.34	2.54	2.54	4.34	4.34	2.54
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.85**	**1.71**	**1.39**	**1.39**	**1.71**	**1.71**	**1.39**	**7.39**	**0.8**	**1.8**	**0.3**	**2.6**	**0.3**	**1.8**	**0.3**	**1.8**	**0.3**	**2.6**	**0.3**	**2.6**	**0.3**	**1.8**	**1.47**	**2.47**	**2.95**	**1.73**	**1.73**	**2.95**	**2.95**	**1.73**
180201230206	Sierra Valley	BS*	0.00	0.00	0.00	2.51	2.51	2.51	0.00	1,203.78	0	0	0	0	0	0	1	8	1	8	1	8	0	0	0.00	0.00	0.00	0.00	0.07	0.07	0.07	0.00
180201230206	Sierra Valley	BY*	2.51	2.51	2.51	0.00	0.00	0.00	2.51	1,203.78	1	8	1	8	1	8	0	0	0	0	0	0	1	8	0.00	0.07	0.07	0.07	0.00	0.00	0.00	0.07
180201230206	Sierra Valley	FY	0.00	1.43	1.43	1.43	1.43	1.43	1.43	1,203.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.23	0.23	0.23	0.23	0.23	0.23
180201230206	Sierra Valley	GY	0.36	0.36	0.36	0.36	0.36	0.36	0.36	1,203.78	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0.00	0.07	0.07	0.07	0.07	0.07	0.07	0.07
180201230206	Sierra Valley	HY*	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1,203.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.76	0.76	0.76	0.76	0.76	0.76	0.76
180201230206	Sierra Valley	LY*	1.43	0.00	0.00	0.00	0.00	0.00	0.00	1,203.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		5.38	5.38	5.38	5.38	5.38	5.38	5.38	1203.78	1	9	1	9	1	9	1	9	1	9	1	9	1	9	0.00	1.13	1.13	1.13	1.13	1.13	1.13	1.13
	*** Value Per SqMi All =**		**2.86**	**2.86**	**2.86**	**2.86**	**2.86**	**2.86**	**2.86**	**1.88**	**0.5**	**4.8**	**0.5**	**4.8**	**0.5**	**4.8**	**0.5**	**4.8**	**0.5**	**4.8**	**0.5**	**4.8**	**0.5**	**4.8**	**0.00**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
	*** Sum Open-Motorized, Native Surface Routes =**		5.02	3.59	3.59	3.59	3.59	3.59	3.59	4815.12	1.00	8.00	1.00	8.00	1.00	8.00	1.00	8.00	1.00	8.00	1.00	8.00	1.00	8.00		1.06	0.83	0.83	0.83	0.83	0.83	0.83
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.67**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.88**	**0.5**	**4.3**	**0.5**	**4.3**	**0.5**	**4.3**	**0.5**	**4.3**	**0.5**	**4.3**	**0.5**	**4.3**	**0.5**	**4.3**	**0.00**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
180201230206a	Correca Canyon	BS*	0.00	0.00	0.00	2.32	2.32	2.32	0.00	1,355.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	219.56	0.00	0.00	0.00	1.07	1.07	1.07	0.00
180201230206a	Correca Canyon	BY*	2.32	2.32	2.32	0.00	0.00	0.00	2.32	1,355.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	219.56	1.07	1.07	1.07	0.00	0.00	0.00	1.07
180201230206a	Correca Canyon	FY	0.00	0.20	0.20	0.20	0.20	0.20	0.20	1,355.30	0	0	2	0	2	0	2	0	2	0	2	0	2	0	219.56	0.00	0.18	0.18	0.18	0.18	0.18	0.18
180201230206a	Correca Canyon	GY	0.48	0.48	0.48	0.48	0.48	0.48	0.48	1,355.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	219.56	0.46	0.46	0.46	0.46	0.46	0.46	0.46
180201230206a	Correca Canyon	HY*	0.02	0.02	0.02	0.02	0.02	0.02	0.02	1,355.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	219.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180201230206a	Correca Canyon	LY*	0.20	0.00	0.00	0.00	0.00	0.00	0.00	1,355.30	2	0	0	0	0	0	0	0	0	0	0	0	0	0	219.56	0.18	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		3.02	3.02	3.02	3.02	3.02	3.02	3.02	8131.80	2	0	2	0	2	0	2	0	2	0	2	0	2	0	219.56	1.71	1.71	1.71	1.71	1.71	1.71	1.71
	*** Value Per SqMi All =**		**1.43**	**1.43**	**1.43**	**1.43**	**1.43**	**1.43**	**1.43**	**2.12**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.34**	**4.98**	**4.98**	**4.98**	**4.98**	**4.98**	**4.98**	**4.98**
	*** Sum Open-Motorized, Native Surface Routes =**		2.54	2.34	2.34	2.34	2.34	2.34	2.34		2	0	0	0	0	0	0	0	0	0	0	0	0	0		1.25	1.07	1.07	1.07	1.07	1.07	1.07
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.20**	**0.18**	**0.18**	**0.18**	**0.18**	**0.18**	**0.18**	**12.71**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.34**	**3.64**	**3.12**	**3.12**	**3.12**	**3.12**	**3.12**	**3.12**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
180201230206b	Unnamed Trib. to Sierra Valley	HY*	0.75	0.75	0.75	0.75	0.75	0.75	0.75	937.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	157.70	0.52	0.52	0.52	0.52	0.52	0.52	0.52
180201230206c	Unnamed Trib. to Sierra Valley	BS*	0.00	0.00	0.00	1.02	1.02	1.02	0.00	1178.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	362.73	0	0	0	0.66	0.66	0.66	0
180201230206c	Unnamed Trib. to Sierra Valley	BY*	1.02	1.02	1.02	0.00	0.00	0.00	1.02	1178.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	362.73	0.66	0.66	0.66	0	0	0	0.66
180201230206c	Unnamed Trib. to Sierra Valley	CS*	0.00	0.91	0.00	0.91	0.91	0.91	0.91	1178.31	0	0	0	2	0	0	0	2	0	2	0	2	0	2	362.73	0	0.31	0	0.31	0.31	0.31	0.31
180201230206c	Unnamed Trib. to Sierra Valley	FY	0.00	0.93	1.84	0.93	0.93	0.93	0.93	1178.31	0	0	0	0	0	2	0	0	0	0	0	0	0	0	362.73	0	0.09	0.41	0.09	0.09	0.09	0.09
180201230206c	Unnamed Trib. to Sierra Valley	GY	0.07	0.07	0.07	0.07	0.07	0.07	0.07	1178.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	362.73	0.07	0.07	0.07	0.07	0.07	0.07	0.07
180201230206c	Unnamed Trib. to Sierra Valley	LS*	1.23	0.00	0.00	0.00	0.00	0.00	0.00	1178.31	0	2	0	0	0	0	0	0	0	0	0	0	0	0	362.73	0.31	0	0	0	0	0	0
180201230206c	Unnamed Trib. to Sierra Valley	LY*	0.61	0.00	0.00	0.00	0.00	0.00	0.00	1178.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	362.73	0.09	0	0	0	0	0	0
	Sum All =		2.93	2.93	2.93	2.93	2.93	2.93	2.93	1178.31	0	2	0	2	0	2	0	2	0	2	0	2	0	2	362.73	1.13	1.13	1.14	1.13	1.13	1.13	1.13
	*** Value Per SqMi All =**		**1.59**	**1.59**	**1.59**	**1.59**	**1.59**	**1.59**	**1.59**	**1.84**	**0.0**	**1.1**	**0.0**	**1.1**	**0.0**	**1.1**	**0.0**	**1.1**	**0.0**	**1.1**	**0.0**	**1.1**	**0.0**	**1.1**	**0.57**	**1.99**	**1.99**	**2.01**	**1.99**	**1.99**	**1.99**	**1.99**
	*** Sum Open-Motorized, Native Surface Routes =**		2.86	1.93	1.02	1.93	1.93	1.93	1.93		0	2	0	2	0	0	0	2	0	2	0	2	0	2		1.06	0.97	0.66	0.97	0.97	0.97	0.97
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.55**	**1.05**	**0.55**	**1.05**	**1.05**	**1.05**	**1.05**	**1.84**	**0.0**	**1.1**	**0.0**	**1.1**	**0.0**	**0.0**	**0.0**	**1.1**	**0.0**	**1.1**	**0.0**	**1.1**	**0.0**	**1.1**	**0.57**	**1.87**	**1.71**	**1.16**	**1.71**	**1.71**	**1.71**	**1.71**
180201230206d	Unnamed Trib. to Sierra Valley	BS*	0.00	0.00	0.00	0.36	0.36	0.36	0.00	1,468.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	247.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180201230206d	Unnamed Trib. to Sierra Valley	BY*	0.36	0.36	0.36	0.00	0.00	0.00	0.36	1,468.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	247.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180201230206d	Unnamed Trib. to Sierra Valley	FY	0.00	0.03	0.03	0.03	0.03	0.03	0.03	1,468.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	247.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00
180201230206d	Unnamed Trib. to Sierra Valley	HY*	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1,468.90	0	2	0	2	0	2	0	2	0	2	0	2	0	2	247.86	0.45	0.45	0.45	0.45	0.45	0.45	0.45
180201230206d	Unnamed Trib. to Sierra Valley	LY*	0.03	0.00	0.00	0.00	0.00	0.00	0.00	1,468.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	247.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		2.00	2.00	2.00	2.00	2.00	2.00	2.00	1468.90	0	2	0	2	0	2	0	2	0	2	0	2	0	2	247.86	0.45	0.45	0.45	0.45	0.45	0.45	0.45
	*** Value Per SqMi All =**		**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**2.30**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.39**	**1.16**	**1.16**	**1.16**	**1.16**	**1.16**	**1.16**	**1.16**
	*** Sum Open-Motorized, Native Surface Routes =**		2.00	1.96	1.96	1.96	1.96	1.96	1.96		0	2	0	2	0	2	0	2	0	2	0	2	0	2		0.45	0.45	0.45	0.45	0.45	0.45	0.45
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.87**	**0.86**	**0.86**	**0.86**	**0.86**	**0.86**	**0.86**	**2.30**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.39**	**1.16**	**1.16**	**1.16**	**1.16**	**1.16**	**1.16**	**1.16**
180201230206e	Coyote Canyon	GY	0.35	0.35	0.35	0.35	0.35	0.35	0.35	85.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		0.35	0.35	0.35	0.35	0.35	0.35	0.35	85.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi All =**		**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**2.60**	**0.13**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	*** Sum Open-Motorized, Native Surface Routes =**		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.13**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.00**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
18020125010101	Upper Haypress Creek	AY	11.95	0.00	11.95	11.95	0.00	8.05	11.95	8213.1	5	4	0	0	5	4	5	4	0	0	4	0	5	4	1795.09	2.7	0	2.7	2.7	0	1.68	2.7
18020125010101	Upper Haypress Creek	BS*	0.00	0.00	0.00	27.28	31.18	31.18	0.00	8213.1	0	0	0	0	0	0	5	2	6	6	6	6	0	0	1795.09	0	0	0	4.08	5.1	5.1	0
18020125010101	Upper Haypress Creek	BY*	27.28	39.23	27.28	0.00	8.05	0.00	27.28	8213.1	5	2	10	6	5	2	0	0	4	0	0	0	5	2	1795.09	4.08	6.79	4.08	0	1.68	0	4.08
18020125010101	Upper Haypress Creek	CS*	0.00	0.00	0.00	0.00	0.83	0.41	0.00	8213.1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1795.09	0	0	0	0	0	0.39	0
18020125010101	Upper Haypress Creek	CY*	0.00	0.41	0.00	0.00	0.00	0.00	0.41	8213.1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1795.09	0	0.39	0	0	0	0	0.39
18020125010101	Upper Haypress Creek	FY	0.00	9.25	9.66	9.66	8.84	9.25	9.25	8213.1	0	0	1	0	2	0	2	0	1	0	1	0	1	0	1795.09	0	1.3	1.69	1.69	1.3	1.3	1.3
18020125010101	Upper Haypress Creek	GY	0.92	0.92	0.92	0.92	0.92	0.92	0.92	8213.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1795.09	0.03	0.03	0.03	0.03	0.03	0.03	0.03
18020125010101	Upper Haypress Creek	HY*	10.79	10.79	10.79	10.79	10.79	10.79	10.79	8213.1	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1795.09	3.35	3.35	3.35	3.35	3.35	3.35	3.35
18020125010101	Upper Haypress Creek	IY	0.89	0.89	0.89	0.89	0.89	0.89	0.89	8213.1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1795.09	0.83	0.83	0.83	0.83	0.83	0.83	0.83
18020125010101	Upper Haypress Creek	LY*	9.66	0.00	0.00	0.00	0.00	0.00	0.00	8213.1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1795.09	1.69	0	0	0	0	0	0
	Sum All =		61.48	61.48	61.48	61.48	61.48	61.48	61.48	8213.10	14	10	14	10	14	10	14	10	14	10	14	10	14	10	1795.09	12.68	12.69	12.68	12.68	12.68	12.68	12.68
	*** Value Per SqMi All =**		**4.79**	**4.79**	**4.79**	**4.79**	**4.79**	**4.79**	**4.79**	**12.83**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**2.80**	**4.52**	**4.52**	**4.52**	**4.52**	**4.52**	**4.52**	**4.52**
	*** Sum Open-Motorized, Native Surface Routes =**		47.73	50.42	38.07	38.07	50.84	42.37	38.48		8	6	12	10	6	6	6	6	12	10	8	10	7	6		9.12	10.53	7.43	7.43	10.52	8.84	7.82
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.72**	**3.93**	**2.97**	**2.97**	**3.96**	**3.30**	**3.00**	**12.83**	**0.6**	**0.5**	**0.9**	**0.8**	**0.5**	**0.5**	**0.5**	**0.5**	**0.9**	**0.8**	**0.6**	**0.8**	**0.5**	**0.5**	**2.80**	**3.25**	**3.75**	**2.65**	**2.65**	**3.75**	**3.15**	**2.79**
18020125010102	Middle Haypress Creek	AY	8.62	0.00	8.62	8.62	0.00	0.00	8.62	6,436.30	2	1	0	0	2	1	2	1	0	0	0	0	2	1	1,609.84	2.72	0.00	2.72	2.72	0.00	0.00	2.72
18020125010102	Middle Haypress Creek	BS*	0.00	0.00	0.00	18.59	27.21	27.21	0.00	6,436.30	0	0	0	0	0	0	4	4	6	5	6	5	0	0	1,609.84	0.00	0.00	0.00	5.60	8.32	8.32	0.00
18020125010102	Middle Haypress Creek	BY*	18.59	27.21	18.59	0.00	0.00	0.00	18.59	6,436.30	4	4	6	5	4	4	0	0	0	0	0	0	4	4	1,609.84	5.60	8.32	5.60	0.00	0.00	0.00	5.60
18020125010102	Middle Haypress Creek	FY	0.00	3.53	3.53	3.53	3.53	3.53	3.53	6,436.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,609.84	0.00	0.23	0.23	0.23	0.23	0.23	0.23
18020125010102	Middle Haypress Creek	HY*	4.59	4.59	4.59	4.59	4.59	4.59	4.59	6,436.30	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,609.84	0.32	0.32	0.32	0.32	0.32	0.32	0.32
18020125010102	Middle Haypress Creek	IY	4.13	4.13	4.13	4.13	4.13	4.13	4.13	6,436.30	5	0	5	0	5	0	5	0	5	0	5	0	5	0	1,609.84	1.81	1.81	1.81	1.81	1.81	1.81	1.81
18020125010102	Middle Haypress Creek	LY*	3.53	0.00	0.00	0.00	0.00	0.00	0.00	6,436.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,609.84	0.23	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		39.46	39.46	39.46	39.46	39.46	39.46	39.46	6436.30	12	5	12	5	12	5	12	5	12	5	12	5	12	5	1609.84	10.68	10.68	10.68	10.68	10.68	10.68	10.68
	*** Value Per SqMi All =**		**3.92**	**3.92**	**3.92**	**3.92**	**3.92**	**3.92**	**3.92**	**10.06**	**1.2**	**0.5**	**1.2**	**0.5**	**1.2**	**0.5**	**1.2**	**0.5**	**1.2**	**0.5**	**1.2**	**0.5**	**1.2**	**0.5**	**2.52**	**4.25**	**4.25**	**4.25**	**4.25**	**4.25**	**4.25**	**4.25**
	*** Sum Open-Motorized, Native Surface Routes =**		26.71	31.80	23.18	23.18	31.80	31.80	23.18		5	4	7	5	5	4	5	4	7	5	7	5	5	4		6.15	8.64	5.92	5.92	8.64	8.64	5.92
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.66**	**3.16**	**2.30**	**2.30**	**3.16**	**3.16**	**2.30**	**10.06**	**0.5**	**0.4**	**0.7**	**0.5**	**0.5**	**0.4**	**0.5**	**0.4**	**0.7**	**0.5**	**0.7**	**0.5**	**0.5**	**0.4**	**2.52**	**2.44**	**3.43**	**2.35**	**2.35**	**3.43**	**3.43**	**2.35**
18020125010103	Lower Haypress Creek	AY	5.60	1.32	5.60	5.60	1.32	1.32	5.60	5,988.40	1	4	1	0	1	4	1	4	1	0	1	0	1	4	1,049.65	1.66	0.68	1.66	1.66	0.68	0.68	1.66
18020125010103	Lower Haypress Creek	BS*	0.00	0.00	0.00	6.06	10.35	10.35	0.00	5,988.40	0	0	0	0	0	0	1	7	1	11	1	11	0	0	1,049.65	0.00	0.00	0.00	1.82	2.80	2.80	0.00
18020125010103	Lower Haypress Creek	BY*	6.06	10.35	6.06	0.00	0.00	0.00	6.06	5,988.40	1	7	1	11	1	7	0	0	0	0	0	0	1	7	1,049.65	1.82	2.80	1.82	0.00	0.00	0.00	1.82
18020125010103	Lower Haypress Creek	CS*	0.00	0.00	0.00	0.00	0.57	0.00	0.00	5,988.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,049.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010103	Lower Haypress Creek	FY	0.00	8.23	8.23	8.23	7.66	8.23	8.23	5,988.40	0	0	2	6	2	6	2	6	2	6	2	6	2	6	1,049.65	0.00	1.80	1.80	1.80	1.80	1.80	1.80
18020125010103	Lower Haypress Creek	GY	0.65	0.65	0.65	0.65	0.65	0.65	0.65	5,988.40	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,049.65	0.45	0.45	0.45	0.45	0.45	0.45	0.45
18020125010103	Lower Haypress Creek	HY*	0.32	0.32	0.32	0.32	0.32	0.32	0.32	5,988.40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,049.65	0.09	0.09	0.09	0.09	0.09	0.09	0.09
18020125010103	Lower Haypress Creek	IY	2.06	2.06	2.06	2.06	2.06	2.06	2.06	5,988.40	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,049.65	0.96	0.96	0.96	0.96	0.96	0.96	0.96
18020125010103	Lower Haypress Creek	JY	6.32	6.32	6.32	6.32	6.32	6.32	6.32	5,988.40	5	4	5	4	5	4	5	4	5	4	5	4	5	4	1,049.65	3.08	3.08	3.08	3.08	3.08	3.08	3.08
18020125010103	Lower Haypress Creek	LY*	8.23	0.00	0.00	0.00	0.00	0.00	0.00	5,988.40	2	6	0	0	0	0	0	0	0	0	0	0	0	0	1,049.65	1.80	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		29.26	29.26	29.26	29.26	29.26	29.26	29.26	5988.40	12	21	12	21	12	21	12	21	12	21	12	21	12	21	1049.65	9.86	9.86	9.86	9.86	9.86	9.86	9.86
	*** Value Per SqMi All =**		**3.13**	**3.13**	**3.13**	**3.13**	**3.13**	**3.13**	**3.13**	**9.36**	**1.3**	**2.2**	**1.3**	**2.2**	**1.3**	**2.2**	**1.3**	**2.2**	**1.3**	**2.2**	**1.3**	**2.2**	**1.3**	**2.2**	**1.64**	**6.01**	**6.01**	**6.01**	**6.01**	**6.01**	**6.01**	**6.01**
	*** Sum Open-Motorized, Native Surface Routes =**		14.62	10.67	6.39	6.39	11.24	10.67	6.39		3	13	1	11	1	7	1	7	1	11	1	11	1	7		3.71	2.89	1.91	1.91	2.89	2.89	1.91
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.56**	**1.14**	**0.68**	**0.68**	**1.20**	**1.14**	**0.68**	**9.36**	**0.3**	**1.4**	**0.1**	**1.2**	**0.1**	**0.7**	**0.1**	**0.7**	**0.1**	**1.2**	**0.1**	**1.2**	**0.1**	**0.7**	**1.64**	**2.26**	**1.76**	**1.16**	**1.16**	**1.76**	**1.76**	**1.16**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125010201	Headwaters North Yuba River	AY	2.51	0.00	2.51	2.51	0.00	2.46	2.51	4,859.29	2	1	0	0	2	1	2	1	0	0	2	1	2	1	1,746.94	0.27	0.00	0.27	0.27	0.00	0.24	0.27
18020125010201	Headwaters North Yuba River	BS*	0.00	0.00	0.00	8.61	8.61	8.61	0.00	4,859.29	0	0	0	0	0	0	2	2	2	2	2	2	0	0	1,746.94	0.00	0.00	0.00	2.79	2.79	2.79	0.00
18020125010201	Headwaters North Yuba River	BY*	8.61	11.12	8.61	0.00	2.51	0.06	8.61	4,859.29	2	2	4	3	2	2	0	0	2	1	0	0	2	2	1,746.94	2.79	3.06	2.79	0.00	0.27	0.03	2.79
18020125010201	Headwaters North Yuba River	FY	0.00	6.63	6.63	6.63	6.63	6.63	6.63	4,859.29	0	0	4	2	4	2	4	2	4	2	4	2	4	2	1,746.94	0.00	3.24	3.24	3.24	3.24	3.24	3.24
18020125010201	Headwaters North Yuba River	GY	1.94	1.94	1.94	1.94	1.94	1.94	1.94	4,859.29	7	3	7	3	7	3	7	3	7	3	7	3	7	3	1,746.94	1.67	1.67	1.67	1.67	1.67	1.67	1.67
18020125010201	Headwaters North Yuba River	HY*	7.94	7.94	7.94	7.94	7.94	7.94	7.94	4,859.29	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1,746.94	3.01	3.01	3.01	3.01	3.01	3.01	3.01
18020125010201	Headwaters North Yuba River	LY*	6.63	0.00	0.00	0.00	0.00	0.00	0.00	4,859.29	4	2	0	0	0	0	0	0	0	0	0	0	0	0	1,746.94	3.24	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		27.64	27.64	27.64	27.64	27.64	27.64	27.64	4859.29	17	9	17	9	17	9	17	9	17	9	17	9	17	9	1746.94	10.98	10.98	10.98	10.98	10.98	10.98	10.98
	*** Value Per SqMi All =**		**3.64**	**3.64**	**3.64**	**3.64**	**3.64**	**3.64**	**3.64**	**7.59**	**2.2**	**1.2**	**2.2**	**1.2**	**2.2**	**1.2**	**2.2**	**1.2**	**2.2**	**1.2**	**2.2**	**1.2**	**2.2**	**1.2**	**2.73**	**4.02**	**4.02**	**4.02**	**4.02**	**4.02**	**4.02**	**4.02**
	*** Sum Open-Motorized, Native Surface Routes =**		23.19	19.06	16.55	16.55	19.06	16.61	16.55		8	5	6	4	4	3	4	3	6	4	4	3	4	3		9.04	6.07	5.8	5.8	6.07	5.83	5.8
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.05**	**2.51**	**2.18**	**2.18**	**2.51**	**2.19**	**2.18**	**7.59**	**1.1**	**0.7**	**0.8**	**0.5**	**0.5**	**0.4**	**0.5**	**0.4**	**0.8**	**0.5**	**0.5**	**0.4**	**0.5**	**0.4**	**2.73**	**3.31**	**2.22**	**2.12**	**2.12**	**2.22**	**2.14**	**2.12**
18020125010202	North Yuba River-Haskell Creek	AY	11.08	0.92	11.08	11.08	0.92	8.89	11.08	8,736.60	12	3	1	0	12	3	12	3	1	0	8	3	12	3	2,022.57	3.75	0.54	3.75	3.75	0.54	2.45	3.75
18020125010202	North Yuba River-Haskell Creek	BS*	0.00	0.00	0.00	12.50	13.01	13.01	0.00	8,736.60	0	0	0	0	0	0	6	4	8	4	8	4	0	0	2,022.57	0.00	0.00	0.00	2.89	3.10	3.10	0.00
18020125010202	North Yuba River-Haskell Creek	BY*	12.50	22.67	12.50	0.00	9.66	1.69	12.50	8,736.60	6	4	17	7	6	4	0	0	9	3	2	0	6	4	2,022.57	2.89	6.10	2.89	0.00	3.00	1.10	2.89
18020125010202	North Yuba River-Haskell Creek	CS*	0.00	0.00	0.00	0.02	0.02	0.02	0.00	8,736.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,022.57	0.00	0.00	0.00	0.02	0.02	0.02	0.00
18020125010202	North Yuba River-Haskell Creek	CY*	0.00	0.02	0.00	0.00	0.00	0.00	0.00	8,736.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,022.57	0.00	0.02	0.00	0.00	0.00	0.00	0.00
18020125010202	North Yuba River-Haskell Creek	FY	0.00	13.89	13.91	13.89	13.89	13.89	13.91	8,736.60	0	0	4	3	4	3	4	3	4	3	4	3	4	3	2,022.57	0.00	1.93	1.95	1.93	1.93	1.93	1.95
18020125010202	North Yuba River-Haskell Creek	GY	4.79	4.79	4.79	4.79	4.79	4.79	4.79	8,736.60	7	2	7	2	7	2	7	2	7	2	7	2	7	2	2,022.57	4.22	4.22	4.22	4.22	4.22	4.22	4.22
18020125010202	North Yuba River-Haskell Creek	HY*	2.63	2.63	2.63	2.63	2.63	2.63	2.63	8,736.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,022.57	0.35	0.35	0.35	0.35	0.35	0.35	0.35
18020125010202	North Yuba River-Haskell Creek	IY	3.64	3.64	3.64	3.64	3.64	3.64	3.64	8,736.60	4	1	4	1	4	1	4	1	4	1	4	1	4	1	2,022.57	2.10	2.10	2.10	2.10	2.10	2.10	2.10
18020125010202	North Yuba River-Haskell Creek	KY	0.53	0.53	0.53	0.53	0.53	0.53	0.53	8,736.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,022.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010202	North Yuba River-Haskell Creek	LY*	13.91	0.00	0.00	0.00	0.00	0.00	0.00	8,736.60	4	3	0	0	0	0	0	0	0	0	0	0	0	0	2,022.57	1.95	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		49.08	49.08	49.08	49.08	49.08	49.08	49.08	8736.60	33	13	33	13	33	13	33	13	33	13	33	13	33	13	2022.57	15.26	15.26	15.26	15.26	15.26	15.27	15.26
	*** Value Per SqMi All =**		**3.60**	**3.60**	**3.60**	**3.60**	**3.60**	**3.60**	**3.60**	**13.65**	**2.4**	**1.0**	**2.4**	**1.0**	**2.4**	**1.0**	**2.4**	**1.0**	**2.4**	**1.0**	**2.4**	**1.0**	**2.4**	**1.0**	**3.16**	**4.83**	**4.83**	**4.83**	**4.83**	**4.83**	**4.83**	**4.83**
	*** Sum Open-Motorized, Native Surface Routes =**		29.04	25.31	15.13	15.15	25.31	17.34	15.13		10	7	17	7	6	4	6	4	17	7	10	4	6	4		5.19	6.47	3.24	3.24	3.26	6.47	4.57	3.24
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.13**	**1.85**	**1.11**	**1.11**	**1.85**	**1.27**	**1.11**	**13.65**	**0.7**	**0.5**	**1.2**	**0.5**	**0.4**	**0.3**	**0.4**	**0.3**	**1.2**	**0.5**	**0.7**	**0.3**	**0.4**	**0.3**	**3.16**	**1.64**	**2.05**	**1.03**	**1.03**	**2.05**	**1.45**	**1.03**
18020125010203	Deer Creek	AY	6.95	0.00	6.95	6.95	0.00	0.00	6.95	3,875.58	1	0	0	0	1	0	1	0	0	0	0	0	1	0	768.38	1.37	0.00	1.37	1.37	0.00	0.00	1.37
18020125010203	Deer Creek	BS*	0.00	0.00	0.00	4.18	11.13	11.13	0.00	3,875.58	0	0	0	0	0	0	1	0	2	0	2	0	0	0	768.38	0.00	0.00	0.00	0.80	2.17	2.17	0.00
18020125010203	Deer Creek	BY*	4.18	11.13	4.18	0.00	0.00	0.00	4.18	3,875.58	1	0	2	0	1	0	0	0	0	0	0	0	1	0	768.38	0.80	2.17	0.80	0.00	0.00	0.00	0.80
18020125010203	Deer Creek	CS*	0.00	0.00	0.00	0.00	0.47	0.00	0.00	3,875.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	768.38	0.00	0.00	0.00	0.00	0.12	0.00	0.00
18020125010203	Deer Creek	FY	0.00	7.82	7.82	7.82	7.36	7.82	7.82	3,875.58	0	0	9	1	9	1	9	1	9	1	9	1	9	1	768.38	0.00	2.55	2.55	2.55	2.43	2.55	2.55
18020125010203	Deer Creek	HY*	6.22	6.22	6.22	6.22	6.22	6.22	6.22	3,875.58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	768.38	0.90	0.90	0.90	0.90	0.90	0.90	0.90
18020125010203	Deer Creek	LY*	7.82	0.00	0.00	0.00	0.00	0.00	0.00	3,875.58	9	1	0	0	0	0	0	0	0	0	0	0	0	0	768.38	2.55	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		25.17	25.17	25.17	25.17	25.17	25.17	25.17	3875.58	11	1	11	1	11	1	11	1	11	1	11	1	11	1	768.38	5.62	5.62	5.62	5.62	5.62	5.62	5.62
	*** Value Per SqMi All =**		**4.16**	**4.16**	**4.16**	**4.16**	**4.16**	**4.16**	**4.16**	**6.06**	**1.8**	**0.2**	**1.8**	**0.2**	**1.8**	**0.2**	**1.8**	**0.2**	**1.8**	**0.2**	**1.8**	**0.2**	**1.8**	**0.2**	**1.20**	**4.68**	**4.68**	**4.68**	**4.68**	**4.68**	**4.68**	**4.68**
	*** Sum Open-Motorized, Native Surface Routes =**		18.22	17.35	10.40	10.40	17.81	17.35	10.40		10	1	2	0	1	0	1	0	2	0	2	0	1	0		4.25	3.07	1.7	1.7	3.19	3.07	1.7
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.01**	**2.86**	**1.72**	**1.72**	**2.94**	**2.86**	**1.72**	**6.06**	**1.7**	**0.2**	**0.3**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.3**	**0.0**	**0.3**	**0.0**	**0.2**	**0.0**	**1.20**	**3.54**	**2.56**	**1.42**	**1.42**	**2.66**	**2.56**	**1.42**
18020125010204	Upper Salmon Creek	AY	3.72	0.00	3.72	3.72	0.00	1.26	3.72	5,468.64	0	2	0	0	0	2	0	2	0	0	0	2	0	2	1,565.13	0.26	0.00	0.26	0.26	0.00	0.13	0.26
18020125010204	Upper Salmon Creek	BS*	0.00	0.00	0.00	4.66	7.12	7.12	0.00	5,468.64	0	0	0	0	0	0	3	0	3	0	3	0	0	0	1,565.13	0.00	0.00	0.00	2.07	2.20	2.20	0.00
18020125010204	Upper Salmon Creek	BY*	4.66	8.38	4.66	0.00	1.26	0.00	4.66	5,468.64	3	0	3	2	3	0	0	0	0	2	0	0	3	0	1,565.13	2.07	2.33	2.07	0.00	0.13	0.00	2.07
18020125010204	Upper Salmon Creek	CS*	0.00	0.00	0.00	0.55	0.55	0.55	0.00	5,468.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,565.13	0.00	0.00	0.00	0.13	0.13	0.13	0.00
18020125010204	Upper Salmon Creek	CY*	0.53	0.55	0.53	0.00	0.00	0.00	0.53	5,468.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,565.13	0.11	0.13	0.11	0.00	0.00	0.00	0.11
18020125010204	Upper Salmon Creek	FY	0.00	10.28	10.30	10.28	10.28	10.28	10.30	5,468.64	0	0	1	4	1	4	1	4	1	4	1	4	1	4	1,565.13	0.00	2.27	2.29	2.27	2.27	2.27	2.29
18020125010204	Upper Salmon Creek	GY	6.94	6.94	6.94	6.94	6.94	6.94	6.94	5,468.64	4	2	4	2	4	2	4	2	4	2	4	2	4	2	1,565.13	3.47	3.47	3.47	3.47	3.47	3.47	3.47
18020125010204	Upper Salmon Creek	HY*	1.06	1.06	1.06	1.06	1.06	1.06	1.06	5,468.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,565.13	0.79	0.79	0.79	0.79	0.79	0.79	0.79
18020125010204	Upper Salmon Creek	IY	1.88	1.88	1.88	1.88	1.88	1.88	1.88	5,468.64	4	1	4	1	4	1	4	1	4	1	4	1	4	1	1,565.13	1.22	1.22	1.22	1.22	1.22	1.22	1.22
18020125010204	Upper Salmon Creek	JY	1.22	1.22	1.22	1.22	1.22	1.22	1.22	5,468.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,565.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010204	Upper Salmon Creek	KY	0.47	0.47	0.47	0.47	0.47	0.47	0.47	5,468.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,565.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010204	Upper Salmon Creek	LY*	10.30	0.00	0.00	0.00	0.00	0.00	0.00	5,468.64	1	4	0	0	0	0	0	0	0	0	0	0	0	0	1,565.13	2.29	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		30.77	30.77	30.77	30.77	30.77	30.77	30.77	5468.64	12	9	12	9	12	9	12	9	12	9	12	9	12	9	1565.13	10.21	10.21	10.21	10.21	10.21	10.21	10.21
	*** Value Per SqMi All =**		**3.60**	**3.60**	**3.60**	**3.60**	**3.60**	**3.60**	**3.60**	**8.54**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**2.45**	**4.17**	**4.17**	**4.17**	**4.17**	**4.17**	**4.17**	**4.17**
	*** Sum Open-Motorized, Native Surface Routes =**		16.55	9.99	6.25	6.27	9.99	8.73	6.25		4	4	3	2	3	0	3	0	3	2	3	0	3	0		5.26	3.25	2.97	2.99	3.25	3.12	2.97
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.94**	**1.17**	**0.73**	**0.73**	**1.17**	**1.02**	**0.73**	**8.54**	**0.5**	**0.5**	**0.4**	**0.2**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.2**	**0.4**	**0.0**	**0.4**	**0.0**	**2.45**	**2.15**	**1.33**	**1.21**	**1.22**	**1.33**	**1.28**	**1.21**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125010205	Lower Salmon Creek	AY	4.40	4.40	4.40	4.40	4.40	4.40	4.40	5438.06	3	1	3	1	3	1	3	1	3	1	3	1	3	1	1254.44	1.87	1.87	1.87	1.87	1.87	1.87	1.87
18020125010205	Lower Salmon Creek	BS*	0.00	0.00	0.00	0.68	0.68	0.68	0.00	5438.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1254.44	0	0	0	0	0	0	0
18020125010205	Lower Salmon Creek	BY*	0.68	0.68	0.68	0.00	0.00	0.00	0.68	5438.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1254.44	0	0	0	0	0	0	0
18020125010205	Lower Salmon Creek	CS*	0.00	0.00	0.00	1.56	1.77	1.56	0.00	5438.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1254.44	0	0	0	0.23	0.23	0.23	0
18020125010205	Lower Salmon Creek	CY*	1.34	1.77	1.34	0.00	0.00	0.00	1.34	5438.06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1254.44	0.11	0.23	0.11	0	0	0	0.11
18020125010205	Lower Salmon Creek	FY	0.00	2.74	3.18	2.95	2.74	2.95	3.18	5438.06	0	0	1	0	1	0	1	0	1	0	1	0	1	0	1254.44	0	1.12	1.24	1.12	1.12	1.12	1.24
18020125010205	Lower Salmon Creek	GY	6.99	6.99	6.99	6.99	6.99	6.99	6.99	5438.06	5	3	5	3	5	3	5	3	5	3	5	3	5	3	1254.44	2.63	2.63	2.63	2.63	2.63	2.63	2.63
18020125010205	Lower Salmon Creek	HY*	1.55	1.55	1.55	1.55	1.55	1.55	1.55	5438.06	0	2	0	2	0	2	0	2	0	2	0	2	0	2	1254.44	0.29	0.29	0.29	0.29	0.29	0.29	0.29
18020125010205	Lower Salmon Creek	IY	8.16	8.16	8.16	8.16	8.16	8.16	8.16	5438.06	7	2	7	2	7	2	7	2	7	2	7	2	7	2	1254.44	2.31	2.31	2.31	2.31	2.31	2.31	2.31
18020125010205	Lower Salmon Creek	JY	1.85	1.85	1.85	1.85	1.85	1.85	1.85	5438.06	0	3	0	3	0	3	0	3	0	3	0	3	0	3	1254.44	0	0	0	0	0	0	0
18020125010205	Lower Salmon Creek	LY*	3.18	0.00	0.00	0.00	0.00	0.00	0.00	5438.06	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1254.44	1.24	0	0	0	0	0	0
	Sum All =		28.16	28.16	28.16	28.16	28.16	28.16	28.16	5438.06	16	11	16	11	16	11	16	11	16	11	16	11	16	11	1254.44	8.45	8.45	8.45	8.45	8.45	8.45	8.45
	*** Value Per SqMi All =**		**3.31**	**3.31**	**3.31**	**3.31**	**3.31**	**3.31**	**3.31**	**8.50**	**1.9**	**1.3**	**1.9**	**1.3**	**1.9**	**1.3**	**1.9**	**1.3**	**1.9**	**1.3**	**1.9**	**1.3**	**1.9**	**1.3**	**1.96**	**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**4.31**
	*** Sum Open-Motorized, Native Surface Routes =**		6.75	4.01	3.57	3.80	4.01	3.80	3.57		1	2	0	2	0	2	0	2	0	2	0	2	0	2		1.64	0.52	0.4	0.52	0.52	0.52	0.4
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.79**	**0.47**	**0.42**	**0.45**	**0.47**	**0.45**	**0.42**	**8.50**	**0.1**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**1.96**	**0.84**	**0.27**	**0.20**	**0.27**	**0.27**	**0.27**	**0.20**
18020125010206	North Yuba River-Howard Creek	AY	5.01	0.04	5.01	5.01	0.04	3.93	5.01	7,024.92	7	5	0	1	7	5	7	5	0	1	6	5	7	5	1,405.99	0.48	0.04	0.48	0.48	0.04	0.48	0.48
18020125010206	North Yuba River-Howard Creek	BS*	0.00	0.00	0.00	11.05	12.13	12.13	0.00	7,024.92	0	0	0	0	0	0	1	6	2	6	2	6	0	0	1,405.99	0.00	0.00	0.00	3.48	3.48	3.48	0.00
18020125010206	North Yuba River-Howard Creek	BY*	11.05	16.02	11.05	0.00	3.89	0.00	11.05	7,024.92	1	6	8	10	1	6	0	0	6	4	0	0	1	6	1,405.99	3.48	3.91	3.48	0.00	0.44	0.00	3.48
18020125010206	North Yuba River-Howard Creek	CS*	0.00	0.00	0.00	0.06	1.57	0.06	0.00	7,024.92	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1,405.99	0.00	0.00	0.00	0.00	0.53	0.00	0.00
18020125010206	North Yuba River-Howard Creek	CY*	0.00	0.06	0.00	0.00	0.00	0.00	0.00	7,024.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,405.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010206	North Yuba River-Howard Creek	FY	0.00	11.87	11.93	11.87	10.44	11.87	11.93	7,024.92	0	0	5	3	5	3	5	3	5	2	5	3	5	3	1,405.99	0.00	2.31	2.31	2.31	1.87	2.31	2.31
18020125010206	North Yuba River-Howard Creek	GY	4.34	4.34	4.34	4.34	4.34	4.34	4.34	7,024.92	5	1	5	1	5	1	5	1	5	1	5	1	5	1	1,405.99	2.64	2.64	2.64	2.64	2.64	2.64	2.64
18020125010206	North Yuba River-Howard Creek	HY*	5.14	5.14	5.14	5.14	5.05	5.14	5.14	7,024.92	4	2	4	2	4	2	4	2	3	2	4	2	4	2	1,405.99	1.43	1.43	1.43	1.43	1.35	1.43	1.43
18020125010206	North Yuba River-Howard Creek	JY	4.71	4.71	4.71	4.71	4.71	4.71	4.71	7,024.92	3	2	3	2	3	2	3	2	3	2	3	2	3	2	1,405.99	0.71	0.71	0.71	0.71	0.71	0.71	0.71
18020125010206	North Yuba River-Howard Creek	KY	2.25	2.25	2.25	2.25	2.25	2.25	2.25	7,024.92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,405.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18020125010206	North Yuba River-Howard Creek	LY*	11.93	0.00	0.00	0.00	0.00	0.00	0.00	7,024.92	5	3	0	0	0	0	0	0	0	0	0	0	0	0	1,405.99	2.31	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		44.44	44.44	44.44	44.44	44.44	44.44	44.44	7024.92	25	19	25	19	25	19	25	19	25	19	25	19	25	19	1405.99	12.05	12.04	12.05	12.05	12.06	12.05	12.05
	*** Value Per SqMi All =**		**4.05**	**4.05**	**4.05**	**4.05**	**4.05**	**4.05**	**4.05**	**10.98**	**2.3**	**1.7**	**2.3**	**1.7**	**2.3**	**1.7**	**2.3**	**1.7**	**2.3**	**1.7**	**2.3**	**1.7**	**2.3**	**1.7**	**2.20**	**5.49**	**5.48**	**5.49**	**5.49**	**5.49**	**5.49**	**5.49**
	*** Sum Open-Motorized, Native Surface Routes =**		28.12	21.22	16.19	16.25	22.65	17.33	16.19		10	11	12	12	5	8	5	8	12	13	6	8	5	8		7.22	5.34	4.91	4.91	5.8	4.91	4.91
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.56**	**1.93**	**1.48**	**1.48**	**2.06**	**1.58**	**1.48**	**10.98**	**0.9**	**1.0**	**1.1**	**1.1**	**0.5**	**0.7**	**0.5**	**0.7**	**1.1**	**1.2**	**0.5**	**0.7**	**0.5**	**0.7**	**2.20**	**3.29**	**2.43**	**2.24**	**2.24**	**2.64**	**2.24**	**2.24**
18020125010301	North Yuba River-Big Avalanche Ravine	AY	0.44	0.44	0.44	0.44	0.44	0.44	0.44	5,256.78	0	1	0	1	0	1	0	1	0	1	0	1	0	1	955.50	0.13	0.13	0.13	0.13	0.13	0.13	0.13
18020125010301	North Yuba River-Big Avalanche Ravine	BS*	0.00	0.00	0.00	2.64	2.64	2.64	0.00	5,256.78	0	0	0	0	0	0	0	1	0	1	0	1	0	0	955.50	0.00	0.00	0.00	0.11	0.11	0.11	0.00
18020125010301	North Yuba River-Big Avalanche Ravine	BY*	2.64	2.64	2.64	0.00	0.00	0.00	2.64	5,256.78	0	1	0	1	0	1	0	0	0	0	0	0	0	1	955.50	0.11	0.11	0.11	0.00	0.00	0.00	0.11
18020125010301	North Yuba River-Big Avalanche Ravine	FY	0.00	4.73	4.73	4.73	4.73	4.73	4.73	5,256.78	0	0	1	0	1	0	1	0	1	0	1	0	1	0	955.50	0.00	0.56	0.56	0.56	0.56	0.56	0.56
18020125010301	North Yuba River-Big Avalanche Ravine	GY	5.57	5.57	5.57	5.57	5.57	5.57	5.57	5,256.78	0	5	0	5	0	5	0	5	0	5	0	5	0	5	955.50	1.49	1.49	1.49	1.49	1.49	1.49	1.49
18020125010301	North Yuba River-Big Avalanche Ravine	HY*	8.07	8.07	8.07	8.07	8.07	8.07	8.07	5,256.78	0	1	0	1	0	1	0	1	0	1	0	1	0	1	955.50	0.54	0.54	0.54	0.54	0.54	0.54	0.54
18020125010301	North Yuba River-Big Avalanche Ravine	JY	2.12	2.12	2.12	2.12	2.12	2.12	2.12	5,256.78	0	3	0	3	0	3	0	3	0	3	0	3	0	3	955.50	0.13	0.13	0.13	0.13	0.13	0.13	0.13
18020125010301	North Yuba River-Big Avalanche Ravine	LY*	4.73	0.00	0.00	0.00	0.00	0.00	0.00	5,256.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	955.50	0.56	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		23.57	23.57	23.57	23.57	23.57	23.57	23.57	5256.78	1	11	1	11	1	11	1	11	1	11	1	11	1	11	955.50	2.96	2.96	2.96	2.96	2.96	2.96	2.96
	*** Value Per SqMi All =**		**2.87**	**2.87**	**2.87**	**2.87**	**2.87**	**2.87**	**2.87**	**8.21**	**0.1**	**1.3**	**0.1**	**1.3**	**0.1**	**1.3**	**0.1**	**1.3**	**0.1**	**1.3**	**0.1**	**1.3**	**0.1**	**1.3**	**1.49**	**1.98**	**1.98**	**1.98**	**1.98**	**1.98**	**1.98**	**1.98**
	*** Sum Open-Motorized, Native Surface Routes =**		15.44	10.71	10.71	10.71	10.71	10.71	10.71		1	2	0	2	0	2	0	2	0	2	0	2	0	2		1.21	0.65	0.65	0.65	0.65	0.65	0.65
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.88**	**1.30**	**1.30**	**1.30**	**1.30**	**1.30**	**1.30**	**8.21**	**0.1**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**1.49**	**0.81**	**0.44**	**0.44**	**0.44**	**0.44**	**0.44**	**0.44**
18020125010302	North Yuba River-Keystone Ravine	BS*	0.00	0.00	0.00	2.26	2.26	2.26	0.00	4544.37	0	0	0	0	0	0	0	3	0	3	0	3	0	0	866.36	0	0	0	0.29	0.29	0.29	0
18020125010302	North Yuba River-Keystone Ravine	BY*	2.26	2.26	2.26	0.00	0.00	0.00	2.26	4544.37	0	3	0	3	0	3	0	0	0	0	0	0	0	3	866.36	0.29	0.29	0.29	0	0	0	0.29
18020125010302	North Yuba River-Keystone Ravine	CS*	0.00	0.00	0.00	0.00	1.96	1.96	0.00	4544.37	0	0	0	0	0	0	0	0	0	1	0	1	0	0	866.36	0	0	0	0	0.17	0.17	0
18020125010302	North Yuba River-Keystone Ravine	CY*	0.00	1.96	0.00	0.00	0.00	0.00	1.96	4544.37	0	0	0	1	0	0	0	0	0	0	0	0	0	1	866.36	0	0.17	0	0	0	0	0.17
18020125010302	North Yuba River-Keystone Ravine	FY	0.00	4.28	6.24	6.24	4.28	4.28	4.28	4544.37	0	0	2	2	2	3	2	3	2	2	2	2	2	2	866.36	0	0.89	1.06	1.06	0.89	0.89	0.89
18020125010302	North Yuba River-Keystone Ravine	GY	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4544.37	1	6	1	6	1	6	1	6	1	6	1	6	1	6	866.36	1.7	1.7	1.7	1.7	1.7	1.7	1.7
18020125010302	North Yuba River-Keystone Ravine	HY*	1.08	1.08	1.08	1.08	1.08	1.08	1.08	4544.37	0	1	0	1	0	1	0	1	0	1	0	1	0	1	866.36	0.67	0.67	0.67	0.67	0.67	0.67	0.67
18020125010302	North Yuba River-Keystone Ravine	IY	0.01	0.01	0.01	0.01	0.01	0.01	0.01	4544.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	866.36	0	0	0	0	0	0	0
18020125010302	North Yuba River-Keystone Ravine	JY	1.47	1.47	1.47	1.47	1.47	1.47	1.47	4544.37	0	3	0	3	0	3	0	3	0	3	0	3	0	3	866.36	0.06	0.06	0.06	0.06	0.06	0.06	0.06
18020125010302	North Yuba River-Keystone Ravine	LY*	6.24	0.00	0.00	0.00	0.00	0.00	0.00	4544.37	2	3	0	0	0	0	0	0	0	0	0	0	0	0	866.36	1.06	0	0	0	0	0	0
	Sum All =		15.57	15.57	15.57	15.57	15.57	15.57	15.57	4544.37	3	16	3	16	3	16	3	16	3	16	3	16	3	16	866.36	3.78	3.78	3.78	3.78	3.78	3.78	3.78
	*** Value Per SqMi All =**		**2.19**	**2.19**	**2.19**	**2.19**	**2.19**	**2.19**	**2.19**	**7.10**	**0.4**	**2.3**	**0.4**	**2.3**	**0.4**	**2.3**	**0.4**	**2.3**	**0.4**	**2.3**	**0.4**	**2.3**	**0.4**	**2.3**	**1.35**	**2.79**	**2.79**	**2.79**	**2.79**	**2.79**	**2.79**	**2.79**
	*** Sum Open-Motorized, Native Surface Routes =**		9.58	5.31	3.34	3.34	5.31	5.31	5.31		2	7	0	5	0	4	0	4	0	5	0	5	0	5		2.02	1.13	0.96	0.96	1.13	1.13	1.13
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.35**	**0.75**	**0.47**	**0.47**	**0.75**	**0.75**	**0.75**	**7.10**	**0.3**	**1.0**	**0.0**	**0.7**	**0.0**	**0.6**	**0.0**	**0.6**	**0.0**	**0.7**	**0.0**	**0.7**	**0.0**	**0.7**	**1.35**	**1.49**	**0.83**	**0.71**	**0.71**	**0.83**	**0.83**	**0.83**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125010303	Negro Canyon	AY	4.21	0.00	4.21	4.21	0.00	4.21	4.21	4,397.83	3	0	0	0	3	0	3	0	0	0	3	0	3	0	775.64	0.41	0.00	0.41	0.41	0.00	0.41	0.41
18020125010303	Negro Canyon	BS*	0.00	0.00	0.00	9.27	9.27	9.27	0.00	4,397.83	0	0	0	0	0	0	2	2	2	2	2	2	0	0	775.64	0.00	0.00	0.00	1.12	1.12	1.12	0.00
18020125010303	Negro Canyon	BY*	9.27	13.48	9.27	0.00	4.21	0.00	9.27	4,397.83	2	2	5	2	2	2	0	0	3	0	0	0	2	2	775.64	1.12	1.53	1.12	0.00	0.41	0.00	1.12
18020125010303	Negro Canyon	CS*	0.00	0.00	0.00	0.02	0.02	0.02	0.00	4,397.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	775.64	0.00	0.00	0.00	0.02	0.02	0.02	0.00
18020125010303	Negro Canyon	CY*	0.00	0.02	0.00	0.00	0.00	0.00	0.00	4,397.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	775.64	0.00	0.02	0.00	0.00	0.00	0.00	0.00
18020125010303	Negro Canyon	FY	0.00	7.08	7.10	7.08	7.08	7.08	7.10	4,397.83	0	0	0	1	0	1	0	1	0	1	0	1	0	1	775.64	0.00	1.48	1.50	1.48	1.48	1.48	1.50
18020125010303	Negro Canyon	GY	4.32	4.32	4.32	4.32	4.32	4.32	4.32	4,397.83	0	1	0	1	0	1	0	1	0	1	0	1	0	1	775.64	0.18	0.18	0.18	0.18	0.18	0.18	0.18
18020125010303	Negro Canyon	HY*	2.91	2.91	2.91	2.91	2.91	2.91	2.91	4,397.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	775.64	1.30	1.30	1.30	1.30	1.30	1.30	1.30
18020125010303	Negro Canyon	LY*	7.10	0.00	0.00	0.00	0.00	0.00	0.00	4,397.83	0	1	0	0	0	0	0	0	0	0	0	0	0	0	775.64	1.50	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		27.81	27.81	27.81	27.81	27.81	27.81	27.81	4397.83	5	4	5	4	5	4	5	4	5	4	5	4	5	4	775.64	4.51	4.51	4.51	4.51	4.51	4.51	4.51
	*** Value Per SqMi All =**		**4.05**	**4.05**	**4.05**	**4.05**	**4.05**	**4.05**	**4.05**	**6.87**	**0.7**	**0.6**	**0.7**	**0.6**	**0.7**	**0.6**	**0.7**	**0.6**	**0.7**	**0.6**	**0.7**	**0.6**	**0.7**	**0.6**	**1.21**	**3.72**	**3.72**	**3.72**	**3.72**	**3.72**	**3.72**	**3.72**
	*** Sum Open-Motorized, Native Surface Routes =**		19.28	16.41	12.18	12.20	16.41	12.20	12.18		2	3	5	2	2	2	2	2	5	2	2	2	2	2		3.92	2.85	2.42	2.44	2.85	2.44	2.42
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.81**	**2.39**	**1.77**	**1.78**	**2.39**	**1.78**	**1.77**	**6.87**	**0.3**	**0.4**	**0.7**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**0.7**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**	**1.21**	**3.23**	**2.35**	**2.00**	**2.01**	**2.35**	**2.01**	**2.00**
18020125010304	North Yuba River-Ladies Canyon	AY	9.76	0.43	9.76	9.76	0.43	7.75	9.76	7194.35	2	0	0	0	2	0	2	0	0	0	2	0	2	0	1638.17	0.89	0	0.89	0.89	0	0.69	0.89
18020125010304	North Yuba River-Ladies Canyon	BS*	0.00	0.00	0.00	5.66	6.00	5.66	0.00	7194.35	0	0	0	0	0	0	2	5	2	5	2	5	0	0	1638.17	0	0	0	0.86	0.86	0.86	0
18020125010304	North Yuba River-Ladies Canyon	BY*	5.66	14.99	5.66	0.00	9.33	2.02	5.66	7194.35	2	5	4	5	2	5	0	0	2	0	0	0	2	5	1638.17	0.86	1.75	0.86	0	0.89	0.21	0.86
18020125010304	North Yuba River-Ladies Canyon	CS*	0.00	0.00	0.00	0.35	1.62	1.62	0.00	7194.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1638.17	0	0	0	0.04	0.16	0.16	0
18020125010304	North Yuba River-Ladies Canyon	CY*	0.35	1.62	0.35	0.00	0.00	0.00	1.62	7194.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1638.17	0.04	0.16	0.04	0	0	0	0.16
18020125010304	North Yuba River-Ladies Canyon	FY	0.00	8.73	10.01	10.01	8.39	8.73	8.73	7194.35	0	0	9	6	9	6	9	6	9	6	9	6	9	6	1638.17	0	3.51	3.62	3.62	3.51	3.51	3.51
18020125010304	North Yuba River-Ladies Canyon	GY	2.72	2.72	2.72	2.72	2.72	2.72	2.72	7194.35	4	2	4	2	4	2	4	2	4	2	4	2	4	2	1638.17	2.56	2.56	2.56	2.56	2.56	2.56	2.56
18020125010304	North Yuba River-Ladies Canyon	HY*	10.07	10.07	10.07	10.07	10.07	10.07	10.07	7194.35	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1638.17	3.03	3.03	3.03	3.03	3.03	3.03	3.03
18020125010304	North Yuba River-Ladies Canyon	IY	1.24	1.24	1.24	1.24	1.24	1.24	1.24	7194.35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1638.17	0	0	0	0	0	0	0
18020125010304	North Yuba River-Ladies Canyon	JY	1.52	1.52	1.52	1.52	1.52	1.52	1.52	7194.35	0	3	0	3	0	3	0	3	0	3	0	3	0	3	1638.17	0.16	0.16	0.16	0.16	0.16	0.16	0.16
18020125010304	North Yuba River-Ladies Canyon	LY*	10.01	0.00	0.00	0.00	0.00	0.00	0.00	7194.35	9	6	0	0	0	0	0	0	0	0	0	0	0	0	1638.17	3.62	0	0	0	0	0	0
	Sum All =		41.32	41.32	41.32	41.32	41.32	41.32	41.32	7194.35	19	17	19	17	19	17	19	17	19	17	19	17	19	17	1638.17	11.16	11.17	11.16	11.16	11.17	11.18	11.17
	*** Value Per SqMi All =**		**3.68**	**3.68**	**3.68**	**3.68**	**3.68**	**3.68**	**3.68**	**11.24**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**2.56**	**4.36**	**4.36**	**4.36**	**4.36**	**4.36**	**4.37**	**4.36**
	*** Sum Open-Motorized, Native Surface Routes =**		26.08	26.69	16.08	16.08	27.03	19.37	17.35		13	12	6	6	4	6	4	6	6	6	4	6	4	6		7.55	4.94	3.93	3.93	4.94	4.26	4.05
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.32**	**2.37**	**1.43**	**1.43**	**2.40**	**1.72**	**1.54**	**11.24**	**1.2**	**1.1**	**0.5**	**0.5**	**0.4**	**0.5**	**0.4**	**0.5**	**0.5**	**0.5**	**0.4**	**0.5**	**0.4**	**0.5**	**2.56**	**2.95**	**1.93**	**1.54**	**1.54**	**1.93**	**1.66**	**1.58**
18020125010305	Jim Crow Creek	AY	3.57	0.00	3.57	3.57	0.00	3.57	3.57	6,658.51	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1,346.59	0.50	0.00	0.50	0.50	0.00	0.50	0.50
18020125010305	Jim Crow Creek	BS*	0.00	0.00	0.00	7.60	7.60	7.60	0.00	6,658.51	0	0	0	0	0	0	2	0	2	0	2	0	0	0	1,346.59	0.00	0.00	0.00	0.28	0.28	0.28	0.00
18020125010305	Jim Crow Creek	BY*	7.60	11.17	7.60	0.00	3.57	0.00	7.60	6,658.51	2	0	3	1	2	0	0	0	1	1	0	0	2	0	1,346.59	0.28	0.77	0.28	0.00	0.50	0.00	0.28
18020125010305	Jim Crow Creek	CS*	0.00	0.00	0.00	0.00	0.96	0.00	0.00	6,658.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,346.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010305	Jim Crow Creek	FY	0.00	13.69	13.69	13.69	12.73	13.69	13.69	6,658.51	0	0	6	3	6	3	6	3	6	3	6	3	6	3	1,346.59	0.00	2.35	2.35	2.35	2.35	2.35	2.35
18020125010305	Jim Crow Creek	GY	2.18	2.18	2.18	2.18	2.18	2.18	2.18	6,658.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,346.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010305	Jim Crow Creek	HY*	4.59	4.59	4.59	4.59	4.59	4.59	4.59	6,658.51	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,346.59	1.12	1.12	1.12	1.12	1.12	1.12	1.12
18020125010305	Jim Crow Creek	LY*	13.69	0.00	0.00	0.00	0.00	0.00	0.00	6,658.51	6	3	0	0	0	0	0	0	0	0	0	0	0	0	1,346.59	2.35	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		31.64	31.64	31.64	31.64	31.64	31.64	31.64	6658.51	11	4	11	4	11	4	11	4	11	4	11	4	11	4	1346.59	4.25	4.24	4.25	4.25	4.25	4.25	4.25
	*** Value Per SqMi All =**		**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**10.40**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**2.10**	**2.02**	**2.02**	**2.02**	**2.02**	**2.02**	**2.02**	**2.02**
	*** Sum Open-Motorized, Native Surface Routes =**		25.88	15.76	12.19	12.19	16.72	12.19	12.19		10	3	5	1	4	0	4	0	5	1	4	0	4	0		3.75	1.89	1.4	1.4	1.9	1.4	1.4
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.49**	**1.51**	**1.17**	**1.17**	**1.61**	**1.17**	**1.17**	**10.40**	**1.0**	**0.3**	**0.5**	**0.1**	**0.4**	**0.0**	**0.4**	**0.0**	**0.5**	**0.1**	**0.4**	**0.0**	**0.4**	**0.0**	**2.10**	**1.78**	**0.90**	**0.67**	**0.67**	**0.90**	**0.67**	**0.67**
18020125010306	North Yuba River-New York Ravine	AY	0.03	0.00	0.03	0.03	0.00	0.03	0.03	6,378.03	2	0	0	0	2	0	2	0	0	0	2	0	2	0	1,418.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010306	North Yuba River-New York Ravine	BS*	0.00	0.00	0.00	5.85	5.85	5.85	0.00	6,378.03	0	0	0	0	0	0	2	0	2	0	2	0	0	0	1,418.26	0.00	0.00	0.00	0.36	0.36	0.36	0.00
18020125010306	North Yuba River-New York Ravine	BY*	5.85	5.88	5.85	0.00	0.03	0.00	5.85	6,378.03	2	0	4	0	2	0	0	0	2	0	0	0	2	0	1,418.26	0.36	0.36	0.36	0.00	0.00	0.00	0.36
18020125010306	North Yuba River-New York Ravine	FY	0.00	9.62	9.62	9.62	9.62	9.62	9.62	6,378.03	0	0	5	0	5	0	5	0	5	0	5	0	5	0	1,418.26	0.00	2.24	2.24	2.24	2.24	2.24	2.24
18020125010306	North Yuba River-New York Ravine	GY	7.98	7.98	7.98	7.98	7.98	7.98	7.98	6,378.03	7	0	7	0	7	0	7	0	7	0	7	0	7	0	1,418.26	4.64	4.64	4.64	4.64	4.64	4.64	4.64
18020125010306	North Yuba River-New York Ravine	HY*	5.39	5.39	5.39	5.39	5.39	5.39	5.39	6,378.03	4	0	4	0	4	0	4	0	4	0	4	0	4	0	1,418.26	1.41	1.41	1.41	1.41	1.41	1.41	1.41
18020125010306	North Yuba River-New York Ravine	LY*	9.62	0.00	0.00	0.00	0.00	0.00	0.00	6,378.03	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1,418.26	2.24	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		28.87	28.87	28.87	28.87	28.87	28.87	28.87	6378.03	20	0	20	0	20	0	20	0	20	0	20	0	20	0	1418.26	8.65	8.65	8.65	8.65	8.65	8.65	8.65
	*** Value Per SqMi All =**		**2.90**	**2.90**	**2.90**	**2.90**	**2.90**	**2.90**	**2.90**	**9.97**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.0**	**0.0**	**2.22**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**
	*** Sum Open-Motorized, Native Surface Routes =**		20.86	11.27	11.24	11.24	11.27	11.24	11.24		11	0	8	0	6	0	6	0	8	0	6	0	6	0		4.01	1.77	1.77	1.77	1.77	1.77	1.77
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.09**	**1.13**	**1.13**	**1.13**	**1.13**	**1.13**	**1.13**	**9.97**	**1.1**	**0.0**	**0.8**	**0.0**	**0.6**	**0.0**	**0.6**	**0.0**	**0.8**	**0.0**	**0.6**	**0.0**	**0.6**	**0.0**	**2.22**	**1.81**	**0.80**	**0.80**	**0.80**	**0.80**	**0.80**	**0.80**
18020125010401	Headwaters Lavezolla Creek	BS*	0.00	0.00	0.00	2.74	2.74	2.74	0.00	7501.65	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1882.01	0	0	0	0.51	0.51	0.51	0
18020125010401	Headwaters Lavezolla Creek	BY*	2.74	2.74	2.74	0.00	0.00	0.00	2.74	7501.65	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1882.01	0.51	0.51	0.51	0	0	0	0.51
18020125010401	Headwaters Lavezolla Creek	CS*	0.00	0.00	0.00	10.57	11.08	10.98	0.00	7501.65	0	0	0	0	0	0	5	4	5	4	5	4	0	0	1882.01	0	0	0	4.51	4.64	4.64	0
18020125010401	Headwaters Lavezolla Creek	CY*	10.57	10.98	10.57	0.00	0.00	0.00	10.81	7501.65	5	4	5	4	5	4	0	0	0	0	0	0	5	4	1882.01	4.51	4.64	4.51	0	0	0	4.51
18020125010401	Headwaters Lavezolla Creek	FY	0.00	4.82	5.23	5.23	4.72	4.82	4.99	7501.65	0	0	6	2	6	2	6	2	6	2	6	2	6	2	1882.01	0	3.29	3.42	3.42	3.29	3.29	3.42
18020125010401	Headwaters Lavezolla Creek	IY	0.94	0.94	0.94	0.94	0.94	0.94	0.94	7501.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1882.01	0	0	0	0	0	0	0
18020125010401	Headwaters Lavezolla Creek	JY	3.57	3.57	3.57	3.57	3.57	3.57	3.57	7501.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1882.01	0.1	0.1	0.1	0.1	0.1	0.1	0.1
18020125010401	Headwaters Lavezolla Creek	LY*	5.23	0.00	0.00	0.00	0.00	0.00	0.00	7501.65	6	2	0	0	0	0	0	0	0	0	0	0	0	0	1882.01	3.42	0	0	0	0	0	0
	Sum All =		23.05	23.05	23.05	23.05	23.05	23.05	23.05	7501.65	11	7	11	7	11	7	11	7	11	7	11	7	11	7	1882.01	8.54	8.54	8.54	8.54	8.54	8.54	8.54
	*** Value Per SqMi All =**		**1.97**	**1.97**	**1.97**	**1.97**	**1.97**	**1.97**	**1.97**	**11.72**	**0.9**	**0.6**	**0.9**	**0.6**	**0.9**	**0.6**	**0.9**	**0.6**	**0.9**	**0.6**	**0.9**	**0.6**	**0.9**	**0.6**	**2.94**	**2.90**	**2.90**	**2.90**	**2.90**	**2.90**	**2.90**	**2.90**
	*** Sum Open-Motorized, Native Surface Routes =**		18.54	13.72	13.31	13.31	13.82	13.72	13.55		11	7	5	5	5	5	5	5	5	5	5	5	5	5		8.44	5.15	5.02	5.02	5.15	5.15	5.02
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.58**	**1.17**	**1.14**	**1.14**	**1.18**	**1.17**	**1.16**	**11.72**	**0.9**	**0.6**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**2.94**	**2.87**	**1.75**	**1.71**	**1.71**	**1.75**	**1.75**	**1.71**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125010402	Lower Lavezolla Creek	BS*	0.00	0.00	0.00	4.67	4.67	4.67	0.00	5616.62	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1252.77	0	0	0	0.92	0.92	0.92	0
18020125010402	Lower Lavezolla Creek	BY*	4.67	4.67	4.67	0.00	0.00	0.00	4.67	5616.62	1	0	1	0	1	0	0	0	0	0	0	0	1	0	1252.77	0.92	0.92	0.92	0	0	0	0.92
18020125010402	Lower Lavezolla Creek	CS*	0.00	0.00	0.00	2.89	4.49	3.11	0.00	5616.62	0	0	0	0	0	0	4	4	4	4	4	4	0	0	1252.77	0	0	0	0.76	0.89	0.8	0
18020125010402	Lower Lavezolla Creek	CY*	2.89	3.11	2.89	0.00	0.00	0.00	3.05	5616.62	4	4	4	4	4	4	0	0	0	0	0	0	4	4	1252.77	0.76	0.8	0.76	0	0	0	0.76
18020125010402	Lower Lavezolla Creek	ES*	0.00	0.00	0.00	5.74	5.74	5.74	0.00	5616.62	0	0	0	0	0	0	2	2	2	2	2	2	0	0	1252.77	0	0	0	2.37	2.37	2.37	0
18020125010402	Lower Lavezolla Creek	EY*	5.74	5.74	5.74	0.00	0.00	0.00	5.74	5616.62	2	2	2	2	2	2	0	0	0	0	0	0	2	2	1252.77	2.37	2.37	2.37	0	0	0	2.37
18020125010402	Lower Lavezolla Creek	FY	0.00	2.08	2.31	2.31	0.70	2.08	2.15	5616.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1252.77	0	0.23	0.28	0.28	0.15	0.23	0.28
18020125010402	Lower Lavezolla Creek	GY	1.93	1.93	1.93	1.93	1.93	1.93	1.93	5616.62	3	0	3	0	3	0	3	0	3	0	3	0	3	0	1252.77	1.51	1.51	1.51	1.51	1.51	1.51	1.51
18020125010402	Lower Lavezolla Creek	HY*	0.09	0.09	0.09	0.09	0.09	0.09	0.09	5616.62	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1252.77	0	0	0	0	0	0	0
18020125010402	Lower Lavezolla Creek	LY*	2.31	0.00	0.00	0.00	0.00	0.00	0.00	5616.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1252.77	0.28	0	0	0	0	0	0
	Sum All =		17.62	17.62	17.62	17.62	17.62	17.62	17.62	5616.62	10	7	10	7	10	7	10	7	10	7	10	7	10	7	1252.77	5.84	5.83	5.84	5.84	5.84	5.83	5.84
	*** Value Per SqMi All =**		**2.01**	**2.01**	**2.01**	**2.01**	**2.01**	**2.01**	**2.01**	**8.78**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.96**	**2.98**	**2.98**	**2.98**	**2.98**	**2.98**	**2.98**	**2.98**
	*** Sum Open-Motorized, Native Surface Routes =**		15.69	13.61	13.39	13.39	14.99	13.61	13.54		7	7	7	7	7	7	7	7	7	7	7	7	7	7		4.33	4.09	4.05	4.05	4.18	4.09	4.05
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.79**	**1.55**	**1.53**	**1.53**	**1.71**	**1.55**	**1.54**	**8.78**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**0.8**	**1.96**	**2.21**	**2.09**	**2.07**	**2.07**	**2.14**	**2.09**	**2.07**
18020125010403	Empire Creek	BS*	0.00	0.00	0.00	4.92	4.92	4.92	0.00	5,133.54	0	0	0	0	0	0	4	0	4	0	4	0	0	0	1,124.70	0.00	0.00	0.00	1.94	1.94	1.94	0.00
18020125010403	Empire Creek	BY*	4.92	4.92	4.92	0.00	0.00	0.00	4.92	5,133.54	4	0	4	0	4	0	0	0	0	0	0	0	4	0	1,124.70	1.94	1.94	1.94	0.00	0.00	0.00	1.94
18020125010403	Empire Creek	CS*	0.00	0.00	0.00	9.57	9.71	9.71	0.00	5,133.54	0	0	0	0	0	0	3	1	4	1	4	1	0	0	1,124.70	0.00	0.00	0.00	3.48	3.62	3.62	0.00
18020125010403	Empire Creek	CY*	9.57	9.71	9.57	0.00	0.00	0.00	9.57	5,133.54	3	1	4	1	3	1	0	0	0	0	0	0	3	1	1,124.70	3.48	3.62	3.48	0.00	0.00	0.00	3.48
18020125010403	Empire Creek	ES*	0.00	0.00	0.00	2.38	2.38	2.38	0.00	5,133.54	0	0	0	0	0	0	2	0	2	0	2	0	0	0	1,124.70	0.00	0.00	0.00	0.12	0.12	0.12	0.00
18020125010403	Empire Creek	EY*	2.38	2.38	2.38	0.00	0.00	0.00	2.38	5,133.54	2	0	2	0	2	0	0	0	0	0	0	0	2	0	1,124.70	0.12	0.12	0.12	0.00	0.00	0.00	0.12
18020125010403	Empire Creek	FY	0.00	2.36	2.51	2.51	2.36	2.36	2.51	5,133.54	0	0	1	0	2	0	2	0	1	0	1	0	2	0	1,124.70	0.00	0.35	0.49	0.49	0.35	0.35	0.49
18020125010403	Empire Creek	GY	0.70	0.70	0.70	0.70	0.70	0.70	0.70	5,133.54	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,124.70	0.49	0.49	0.49	0.49	0.49	0.49	0.49
18020125010403	Empire Creek	HY*	0.26	0.26	0.26	0.26	0.26	0.26	0.26	5,133.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,124.70	0.11	0.11	0.11	0.11	0.11	0.11	0.11
18020125010403	Empire Creek	LY*	2.51	0.00	0.00	0.00	0.00	0.00	0.00	5,133.54	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1,124.70	0.49	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		20.35	20.35	20.35	20.35	20.35	20.35	20.35	5133.54	12	1	12	1	12	1	12	1	12	1	12	1	12	1	1124.70	6.63	6.63	6.63	6.63	6.63	6.63	6.63
	*** Value Per SqMi All =**		**2.54**	**2.54**	**2.54**	**2.54**	**2.54**	**2.54**	**2.54**	**8.02**	**1.5**	**0.1**	**1.5**	**0.1**	**1.5**	**0.1**	**1.5**	**0.1**	**1.5**	**0.1**	**1.5**	**0.1**	**1.5**	**0.1**	**1.76**	**3.77**	**3.77**	**3.77**	**3.77**	**3.77**	**3.77**	**3.77**
	*** Sum Open-Motorized, Native Surface Routes =**		19.64	17.28	17.14	17.14	17.28	17.28	17.14		11	1	10	1	9	1	9	1	10	1	10	1	9	1		6.14	5.79	5.65	5.65	5.79	5.79	5.65
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.45**	**2.15**	**2.14**	**2.14**	**2.15**	**2.15**	**2.14**	**8.02**	**1.4**	**0.1**	**1.2**	**0.1**	**1.1**	**0.1**	**1.1**	**0.1**	**1.2**	**0.1**	**1.2**	**0.1**	**1.1**	**0.1**	**1.76**	**3.49**	**3.29**	**3.22**	**3.22**	**3.29**	**3.29**	**3.22**
18020125010404	Upper Pauley Creek	AY	0.57	0.00	0.57	0.57	0.00	0.00	0.57	5078.03	3	1	0	0	3	1	3	1	0	0	0	0	3	1	1132.8	0	0	0	0	0	0	0
18020125010404	Upper Pauley Creek	BS*	0.00	0.00	0.00	2.01	2.01	2.01	0.00	5078.03	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1132.8	0	0	0	0.59	0.59	0.59	0
18020125010404	Upper Pauley Creek	BY*	2.01	2.58	2.01	0.00	0.57	0.57	2.01	5078.03	1	0	4	1	1	0	0	0	3	1	3	1	1	0	1132.8	0.59	0.59	0.59	0	0	0	0.59
18020125010404	Upper Pauley Creek	CS*	0.00	0.00	0.00	15.00	16.17	15.68	0.00	5078.03	0	0	0	0	0	0	8	0	8	0	8	0	0	0	1132.8	0	0	0	6.84	7.18	7.18	0
18020125010404	Upper Pauley Creek	CY*	14.92	16.17	14.92	0.00	0.00	0.00	15.18	5078.03	8	0	8	0	8	0	0	0	0	0	0	0	8	0	1132.8	6.77	7.18	6.77	0	0	0	6.89
18020125010404	Upper Pauley Creek	ES*	0.00	0.00	0.00	0.36	0.36	0.36	0.00	5078.03	0	0	0	0	0	0	3	0	3	0	3	0	0	0	1132.8	0	0	0	0.29	0.29	0.29	0
18020125010404	Upper Pauley Creek	EY*	0.36	0.36	0.36	0.00	0.00	0.00	0.36	5078.03	3	0	3	0	3	0	0	0	0	0	0	0	3	0	1132.8	0.29	0.29	0.29	0	0	0	0.29
18020125010404	Upper Pauley Creek	FY	0.00	3.58	4.84	4.75	3.58	4.08	4.58	5078.03	0	0	3	0	3	0	3	0	3	0	3	0	3	0	1132.8	0	1.29	1.7	1.63	1.29	1.29	1.58
18020125010404	Upper Pauley Creek	HY*	0.40	0.40	0.40	0.40	0.40	0.40	0.40	5078.03	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1132.8	0.13	0.13	0.13	0.13	0.13	0.13	0.13
18020125010404	Upper Pauley Creek	JY	2.76	2.76	2.76	2.76	2.76	2.76	2.76	5078.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1132.8	0	0	0	0	0	0	0
18020125010404	Upper Pauley Creek	KY	2.94	2.94	2.94	2.94	2.94	2.94	2.94	5078.03	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1132.8	0.58	0.58	0.58	0.58	0.58	0.58	0.58
18020125010404	Upper Pauley Creek	LY*	4.84	0.00	0.00	0.00	0.00	0.00	0.00	5078.03	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1132.8	1.7	0	0	0	0	0	0
	Sum All =		28.79	28.79	28.79	28.79	28.79	28.79	28.79	5078.03	20	1	20	1	20	1	20	1	20	1	20	1	20	1	1132.80	10.06	10.06	10.06	10.06	10.06	10.06	10.06
	*** Value Per SqMi All =**		**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**3.63**	**7.93**	**2.5**	**0.1**	**2.5**	**0.1**	**2.5**	**0.1**	**2.5**	**0.1**	**2.5**	**0.1**	**2.5**	**0.1**	**2.5**	**0.1**	**1.77**	**5.68**	**5.68**	**5.68**	**5.68**	**5.68**	**5.68**	**5.68**
	*** Sum Open-Motorized, Native Surface Routes =**		22.53	19.51	17.69	17.77	19.51	19.01	17.94		16	0	16	1	13	0	13	0	16	1	16	1	13	0		9.48	8.19	7.78	7.85	8.19	8.19	7.9
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.84**	**2.46**	**2.23**	**2.24**	**2.46**	**2.40**	**2.26**	**7.93**	**2.0**	**0.0**	**2.0**	**0.1**	**1.6**	**0.0**	**1.6**	**0.0**	**2.0**	**0.1**	**2.0**	**0.1**	**1.6**	**0.0**	**1.77**	**5.36**	**4.63**	**4.40**	**4.44**	**4.63**	**4.63**	**4.46**
18020125010405	Middle Pauley Creek	AY	4.79	0.30	4.79	4.79	0.30	1.41	4.79	5415.96	3	1	0	0	3	1	3	1	0	0	0	0	3	1	1170.3	1.31	0	1.31	1.31	0	0	1.31
18020125010405	Middle Pauley Creek	BS*	0.00	0.00	0.00	1.35	1.35	1.35	0.00	5415.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1170.3	0	0	0	0.14	0.14	0.14	0
18020125010405	Middle Pauley Creek	BY*	1.35	5.83	1.35	0.00	4.49	3.38	1.35	5415.96	0	0	3	1	0	0	0	0	3	1	3	1	0	0	1170.3	0.14	1.45	0.14	0	1.31	1.31	0.14
18020125010405	Middle Pauley Creek	CS*	0.00	0.00	0.00	2.62	4.49	3.76	0.00	5415.96	0	0	0	0	0	0	3	0	4	0	4	0	0	0	1170.3	0	0	0	1.53	1.93	1.78	0
18020125010405	Middle Pauley Creek	CY*	2.62	4.02	2.62	0.00	0.00	0.00	3.06	5415.96	3	0	4	0	3	0	0	0	0	0	0	0	3	0	1170.3	1.53	1.78	1.53	0	0	0	1.53
18020125010405	Middle Pauley Creek	ES*	0.00	0.00	0.00	7.65	7.65	7.65	0.00	5415.96	0	0	0	0	0	0	6	1	6	1	6	1	0	0	1170.3	0	0	0	5.68	5.68	5.68	0
18020125010405	Middle Pauley Creek	EY*	7.65	7.65	7.65	0.00	0.00	0.00	7.65	5415.96	6	1	6	1	6	1	0	0	0	0	0	0	6	1	1170.3	5.68	5.68	5.68	0	0	0	5.68
18020125010405	Middle Pauley Creek	FY	0.00	5.85	7.26	7.26	5.38	6.11	6.82	5415.96	0	0	3	0	4	0	4	0	3	0	3	0	4	0	1170.3	0	1.35	1.6	1.6	1.2	1.35	1.6
18020125010405	Middle Pauley Creek	HY*	3.55	3.55	3.55	3.55	3.55	3.55	3.55	5415.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1170.3	0.95	0.95	0.95	0.95	0.95	0.95	0.95
18020125010405	Middle Pauley Creek	JY	1.05	1.05	1.05	1.05	1.05	1.05	1.05	5415.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1170.3	0	0	0	0	0	0	0
18020125010405	Middle Pauley Creek	LY*	7.26	0.00	0.00	0.00	0.00	0.00	0.00	5415.96	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1170.3	1.6	0	0	0	0	0	0
	Sum All =		28.26	28.26	28.26	28.26	28.26	28.26	28.26	5415.96	16	2	16	2	16	2	16	2	16	2	16	2	16	2	1170.30	11.21	11.21	11.21	11.21	11.21	11.21	11.21
	*** Value Per SqMi All =**		**3.34**	**3.34**	**3.34**	**3.34**	**3.34**	**3.34**	**3.34**	**8.46**	**1.9**	**0.2**	**1.9**	**0.2**	**1.9**	**0.2**	**1.9**	**0.2**	**1.9**	**0.2**	**1.9**	**0.2**	**1.9**	**0.2**	**1.83**	**6.13**	**6.13**	**6.13**	**6.13**	**6.13**	**6.13**	**6.13**
	*** Sum Open-Motorized, Native Surface Routes =**		22.42	21.06	15.16	15.16	21.52	19.68	15.60		13	1	13	2	9	1	9	1	13	2	13	2	9	1		9.9	9.86	8.3	8.3	10.01	9.86	8.30
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.65**	**2.49**	**1.79**	**1.79**	**2.54**	**2.33**	**1.84**	**8.46**	**1.5**	**0.1**	**1.5**	**0.2**	**1.1**	**0.1**	**1.1**	**0.1**	**1.5**	**0.2**	**1.5**	**0.2**	**1.1**	**0.1**	**1.83**	**5.41**	**5.39**	**4.54**	**4.54**	**5.47**	**5.39**	**4.54**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125010406	Lower Pauley Creek	AY	6.34	0.00	6.34	6.34	0.00	6.34	6.34	5,743.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,478.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010406	Lower Pauley Creek	BS*	0.00	0.00	0.00	2.35	2.35	2.35	0.00	5,743.07	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1,478.88	0.00	0.00	0.00	0.42	0.42	0.42	0.00
18020125010406	Lower Pauley Creek	BY*	2.35	8.69	2.35	0.00	6.34	0.00	2.35	5,743.07	1	0	1	0	1	0	0	0	0	0	0	0	1	0	1,478.88	0.42	0.42	0.42	0.00	0.00	0.00	0.42
18020125010406	Lower Pauley Creek	ES*	0.00	0.00	0.00	4.95	4.95	4.95	0.00	5,743.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,478.88	0.00	0.00	0.00	4.78	4.78	4.78	0.00
18020125010406	Lower Pauley Creek	EY*	4.95	4.95	4.95	0.00	0.00	0.00	4.95	5,743.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,478.88	4.78	4.78	4.78	0.00	0.00	0.00	4.78
18020125010406	Lower Pauley Creek	FY	0.00	6.36	6.36	6.36	6.36	6.36	6.36	5,743.07	0	0	0	1	0	1	0	1	0	1	0	1	0	1	1,478.88	0.00	1.06	1.06	1.06	1.06	1.06	1.06
18020125010406	Lower Pauley Creek	GY	1.08	1.08	1.08	1.08	1.08	1.08	1.08	5,743.07	4	0	4	0	4	0	4	0	4	0	4	0	4	0	1,478.88	0.85	0.85	0.85	0.85	0.85	0.85	0.85
18020125010406	Lower Pauley Creek	HY*	2.45	2.45	2.45	2.45	2.45	2.45	2.45	5,743.07	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,478.88	0.95	0.95	0.95	0.95	0.95	0.95	0.95
18020125010406	Lower Pauley Creek	LY*	6.36	0.00	0.00	0.00	0.00	0.00	0.00	5,743.07	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1,478.88	1.06	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		23.53	23.53	23.53	23.53	23.53	23.53	23.53	5743.07	6	1	6	1	6	1	6	1	6	1	6	1	6	1	1478.88	8.06	8.06	8.06	8.06	8.06	8.06	8.06
	*** Value Per SqMi All =**		**2.62**	**2.62**	**2.62**	**2.62**	**2.62**	**2.62**	**2.62**	**8.97**	**0.7**	**0.1**	**0.7**	**0.1**	**0.7**	**0.1**	**0.7**	**0.1**	**0.7**	**0.1**	**0.7**	**0.1**	**0.7**	**0.1**	**2.31**	**3.49**	**3.49**	**3.49**	**3.49**	**3.49**	**3.49**	**3.49**
	*** Sum Open-Motorized, Native Surface Routes =**		16.12	16.09	9.76	9.76	16.09	9.76	9.76		2	1	2	0	2	0	2	0	2	0	2	0	2	0		7.21	6.15	6.15	6.15	6.15	6.15	6.15
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.80**	**1.79**	**1.09**	**1.09**	**1.79**	**1.09**	**1.09**	**8.97**	**0.2**	**0.1**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**2.31**	**3.12**	**2.66**	**2.66**	**2.66**	**2.66**	**2.66**	**2.66**
18020125010407	Headwaters Downie River	BS*	0.00	0.00	0.00	6.75	6.75	6.75	0.00	7466.52	0	0	0	0	0	0	2	1	2	1	2	1	0	0	1666.87	0	0	0	0.89	0.89	0.89	0
18020125010407	Headwaters Downie River	BY*	6.75	6.75	6.75	0.00	0.00	0.00	6.75	7466.52	2	1	2	1	2	1	0	0	0	0	0	0	2	1	1666.87	0.89	0.89	0.89	0	0	0	0.89
18020125010407	Headwaters Downie River	CS*	0.00	0.00	0.00	0.47	0.47	0.47	0.00	7466.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1666.87	0	0	0	0	0	0	0
18020125010407	Headwaters Downie River	CY*	0.47	0.47	0.47	0.00	0.00	0.00	0.47	7466.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1666.87	0	0	0	0	0	0	0
18020125010407	Headwaters Downie River	ES*	0.00	0.00	0.00	4.75	8.09	7.40	0.00	7466.52	0	0	0	0	0	0	8	1	11	1	10	1	0	0	1666.87	0	0	0	2.77	3.61	3.11	0
18020125010407	Headwaters Downie River	EY*	4.75	8.09	4.75	0.00	0.00	0.00	7.40	7466.52	8	1	11	1	8	1	0	0	0	0	0	0	10	1	1666.87	2.77	3.61	2.77	0	0	0	3.11
18020125010407	Headwaters Downie River	FY	0.00	1.63	4.70	4.70	1.63	2.31	2.31	7466.52	0	0	5	0	7	0	7	0	5	0	6	0	6	0	1666.87	0	0.61	1.3	1.3	0.61	1.11	1.11
18020125010407	Headwaters Downie River	HY*	0.26	0.00	0.26	0.26	0.00	0.00	0.00	7466.52	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1666.87	0.15	0	0.15	0.15	0	0	0
18020125010407	Headwaters Downie River	LY*	4.70	0.00	0.00	0.00	0.00	0.00	0.00	7466.52	7	0	0	0	0	0	0	0	0	0	0	0	0	0	1666.87	1.3	0	0	0	0	0	0
	Sum All =		16.94	16.94	16.94	16.94	16.94	16.94	16.94	7466.52	18	2	18	2	18	2	18	2	18	2	18	2	18	2	1666.87	5.11	5.11	5.11	5.11	5.11	5.11	5.11
	*** Value Per SqMi All =**		**1.45**	**1.45**	**1.45**	**1.45**	**1.45**	**1.45**	**1.45**	**11.67**	**1.5**	**0.2**	**1.5**	**0.2**	**1.5**	**0.2**	**1.5**	**0.2**	**1.5**	**0.2**	**1.5**	**0.2**	**1.5**	**0.2**	**2.60**	**1.96**	**1.96**	**1.96**	**1.96**	**1.96**	**1.96**	**1.96**
	*** Sum Open-Motorized, Native Surface Routes =**		16.94	15.31	12.23	12.23	15.31	14.62	14.62		18	2	13	2	11	2	11	2	13	2	12	2	12	2		5.11	4.5	3.81	3.81	4.5	4	4.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.45**	**1.31**	**1.05**	**1.05**	**1.31**	**1.25**	**1.25**	**11.67**	**1.5**	**0.2**	**1.1**	**0.2**	**0.9**	**0.2**	**0.9**	**0.2**	**1.1**	**0.2**	**1.0**	**0.2**	**1.0**	**0.2**	**2.60**	**1.96**	**1.73**	**1.46**	**1.46**	**1.73**	**1.54**	**1.54**
18020125010408	Lower Downie River	BS*	0.00	0.00	0.00	4.29	4.29	4.29	0.00	4449.31	0	0	0	0	0	0	3	1	3	1	3	1	0	0	1183.08	0	0	0	0.57	0.57	0.57	0
18020125010408	Lower Downie River	BY*	4.29	4.29	4.29	0.00	0.00	0.00	4.29	4449.31	3	1	3	1	3	1	0	0	0	0	0	0	3	1	1183.08	0.57	0.57	0.57	0	0	0	0.57
18020125010408	Lower Downie River	CS*	0.00	0.00	0.00	3.66	4.00	4.00	0.00	4449.31	0	0	0	0	0	0	4	1	4	1	4	1	0	0	1183.08	0	0	0	1.06	1.07	1.07	0
18020125010408	Lower Downie River	CY*	3.66	4.00	3.66	0.00	0.00	0.00	3.66	4449.31	4	1	4	1	4	1	0	0	0	0	0	0	4	1	1183.08	1.06	1.07	1.06	0	0	0	1.06
18020125010408	Lower Downie River	ES*	0.00	0.00	0.00	1.72	1.72	1.72	0.00	4449.31	0	0	0	0	0	0	6	1	6	1	6	1	0	0	1183.08	0	0	0	1.63	1.63	1.63	0
18020125010408	Lower Downie River	EY*	1.72	1.72	1.72	0.00	0.00	0.00	1.72	4449.31	6	1	6	1	6	1	0	0	0	0	0	0	6	1	1183.08	1.63	1.63	1.63	0	0	0	1.63
18020125010408	Lower Downie River	FY	0.00	2.78	3.12	3.12	2.78	2.78	3.12	4449.31	0	0	0	1	0	1	0	1	0	1	0	1	0	1	1183.08	0	0.25	0.26	0.26	0.25	0.25	0.26
18020125010408	Lower Downie River	GY	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4449.31	11	0	11	0	11	0	11	0	11	0	11	0	11	0	1183.08	3.27	3.27	3.27	3.27	3.27	3.27	3.27
18020125010408	Lower Downie River	HY*	1.57	1.57	1.57	1.57	1.57	1.57	1.57	4449.31	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1183.08	0.72	0.72	0.72	0.72	0.72	0.72	0.72
18020125010408	Lower Downie River	LY*	3.12	0.00	0.00	0.00	0.00	0.00	0.00	4449.31	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1183.08	0.26	0	0	0	0	0	0
	Sum All =		18.35	18.35	18.35	18.35	18.35	18.35	18.35	4449.31	25	5	25	5	25	5	25	5	25	5	25	5	25	5	1183.08	7.51	7.51	7.51	7.51	7.51	7.51	7.51
	*** Value Per SqMi All =**		**2.64**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**	**6.95**	**3.6**	**0.7**	**3.6**	**0.7**	**3.6**	**0.7**	**3.6**	**0.7**	**3.6**	**0.7**	**3.6**	**0.7**	**3.6**	**0.7**	**1.85**	**4.06**	**4.06**	**4.06**	**4.06**	**4.06**	**4.06**	**4.06**
	*** Sum Open-Motorized, Native Surface Routes =**		14.36	11.57	11.24	11.24	11.57	11.57	11.24		14	5	14	4	14	4	14	4	14	4	14	4	14	4		4.24	3.99	3.98	3.98	3.99	3.99	3.98
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.07**	**1.66**	**1.62**	**1.62**	**1.66**	**1.66**	**1.62**	**6.95**	**2.0**	**0.7**	**2.0**	**0.6**	**2.0**	**0.6**	**2.0**	**0.6**	**2.0**	**0.6**	**2.0**	**0.6**	**2.0**	**0.6**	**1.85**	**2.29**	**2.16**	**2.15**	**2.15**	**2.16**	**2.16**	**2.15**
18020125010501	North Yuba River-Slug Canyon	AY	2.76	2.76	2.76	2.76	2.76	2.76	2.76	4720.65	3	2	3	2	3	2	3	2	3	2	3	2	3	2	1124.64	2.41	2.41	2.41	2.41	2.41	2.41	2.41
18020125010501	North Yuba River-Slug Canyon	BS*	0.00	0.00	0.00	4.59	4.59	4.59	0.00	4720.65	0	0	0	0	0	0	3	0	3	0	3	0	0	0	1124.64	0	0	0	0.61	0.61	0.61	0
18020125010501	North Yuba River-Slug Canyon	BY*	4.59	4.59	4.59	0.00	0.00	0.00	4.59	4720.65	3	0	3	0	3	0	0	0	0	0	0	0	3	0	1124.64	0.61	0.61	0.61	0	0	0	0.61
18020125010501	North Yuba River-Slug Canyon	CS*	0.00	0.00	0.00	0.00	0.21	0.21	0.00	4720.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1124.64	0	0	0	0	0	0	0
18020125010501	North Yuba River-Slug Canyon	CY*	0.00	0.21	0.00	0.00	0.00	0.00	0.00	4720.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1124.64	0	0	0	0	0	0	0
18020125010501	North Yuba River-Slug Canyon	DS*	0.00	0.00	0.00	0.90	0.90	0.90	0.00	4720.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1124.64	0	0	0	0.9	0.9	0.9	0
18020125010501	North Yuba River-Slug Canyon	DY*	0.90	0.90	0.90	0.00	0.00	0.00	0.90	4720.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1124.64	0.9	0.9	0.9	0	0	0	0.9
18020125010501	North Yuba River-Slug Canyon	FY	0.00	8.73	8.94	8.94	8.73	8.73	8.94	4720.65	0	0	5	0	5	0	5	0	5	0	5	0	5	0	1124.64	0	1.73	1.73	1.73	1.73	1.73	1.73
18020125010501	North Yuba River-Slug Canyon	GY	7.77	7.77	7.77	7.77	7.77	7.77	7.77	4720.65	9	3	9	3	9	3	9	3	9	3	9	3	9	3	1124.64	5.09	5.09	5.09	5.09	5.09	5.09	5.09
18020125010501	North Yuba River-Slug Canyon	HY*	3.40	3.40	3.40	3.40	3.40	3.40	3.40	4720.65	3	1	3	1	3	1	3	1	3	1	3	1	3	1	1124.64	0.63	0.63	0.63	0.63	0.63	0.63	0.63
18020125010501	North Yuba River-Slug Canyon	IY	0.59	0.59	0.59	0.59	0.59	0.59	0.59	4720.65	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1124.64	0.29	0.29	0.29	0.29	0.29	0.29	0.29
18020125010501	North Yuba River-Slug Canyon	LY*	8.94	0.00	0.00	0.00	0.00	0.00	0.00	4720.65	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1124.64	1.73	0	0	0	0	0	0
	Sum All =		28.94	28.94	28.94	28.94	28.94	28.94	28.94	4720.65	24	6	24	6	24	6	24	6	24	6	24	6	24	6	1124.64	11.66	11.66	11.66	11.66	11.66	11.66	11.66
	*** Value Per SqMi All =**		**3.92**	**3.92**	**3.92**	**3.92**	**3.92**	**3.92**	**3.92**	**7.38**	**3.3**	**0.8**	**3.3**	**0.8**	**3.3**	**0.8**	**3.3**	**0.8**	**3.3**	**0.8**	**3.3**	**0.8**	**3.3**	**0.8**	**1.76**	**6.64**	**6.64**	**6.64**	**6.64**	**6.64**	**6.64**	**6.64**
	*** Sum Open-Motorized, Native Surface Routes =**		17.82	9.10	8.89	8.89	9.10	9.10	8.89		11	1	6	1	6	1	6	1	6	1	6	1	6	1		3.87	2.14	2.14	2.14	2.14	2.14	2.14
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.42**	**1.23**	**1.20**	**1.20**	**1.23**	**1.23**	**1.20**	**7.38**	**1.5**	**0.1**	**0.8**	**0.1**	**0.8**	**0.1**	**0.8**	**0.1**	**0.8**	**0.1**	**0.8**	**0.1**	**0.8**	**0.1**	**1.76**	**2.20**	**1.22**	**1.22**	**1.22**	**1.22**	**1.22**	**1.22**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125010502	Goodyears Creek	AY	4.17	0.00	4.17	4.17	0.00	4.17	4.17	8,296.89	7	5	0	0	7	5	7	5	0	0	7	5	7	5	1,779.20	0.77	0.00	0.77	0.77	0.00	0.77	0.77
18020125010502	Goodyears Creek	BS*	0.00	0.00	0.00	13.07	13.07	13.07	0.00	8,296.89	0	0	0	0	0	0	6	6	6	6	6	6	0	0	1,779.20	0.00	0.00	0.00	2.44	2.44	2.44	0.00
18020125010502	Goodyears Creek	BY*	13.07	17.24	13.07	0.00	4.17	0.00	13.07	8,296.89	6	6	13	11	6	6	0	0	7	5	0	0	6	6	1,779.20	2.44	3.20	2.44	0.00	0.77	0.00	2.44
18020125010502	Goodyears Creek	CS*	0.00	0.00	0.00	2.07	7.73	2.07	0.00	8,296.89	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1,779.20	0.00	0.00	0.00	0.00	1.53	0.00	0.00
18020125010502	Goodyears Creek	CY*	2.07	2.07	2.07	0.00	0.00	0.00	2.07	8,296.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,779.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010502	Goodyears Creek	FY	0.00	12.81	12.81	12.81	7.14	12.81	12.81	8,296.89	0	0	2	6	2	6	2	6	2	3	2	6	2	6	1,779.20	0.00	2.50	2.50	2.50	0.97	2.50	2.50
18020125010502	Goodyears Creek	GY	7.21	7.21	7.21	7.21	7.21	7.21	7.21	8,296.89	13	13	13	13	13	13	13	13	13	13	13	13	13	13	1,779.20	3.41	3.41	3.41	3.41	3.41	3.41	3.41
18020125010502	Goodyears Creek	HY*	1.47	1.47	1.47	1.47	1.47	1.47	1.47	8,296.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,779.20	0.42	0.42	0.42	0.42	0.42	0.42	0.42
18020125010502	Goodyears Creek	KY	4.77	4.77	4.77	4.77	4.77	4.77	4.77	8,296.89	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,779.20	0.95	0.95	0.95	0.95	0.95	0.95	0.95
18020125010502	Goodyears Creek	LY*	12.81	0.00	0.00	0.00	0.00	0.00	0.00	8,296.89	2	6	0	0	0	0	0	0	0	0	0	0	0	0	1,779.20	2.50	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		45.57	45.57	45.57	45.57	45.57	45.57	45.57	8296.89	29	31	29	31	29	31	29	31	29	31	29	31	29	31	1779.20	10.49	10.48	10.49	10.49	10.49	10.49	10.49
	*** Value Per SqMi All =**		**3.51**	**3.51**	**3.51**	**3.51**	**3.51**	**3.51**	**3.51**	**12.96**	**2.2**	**2.4**	**2.2**	**2.4**	**2.2**	**2.4**	**2.2**	**2.4**	**2.2**	**2.4**	**2.2**	**2.4**	**2.2**	**2.4**	**2.78**	**3.77**	**3.77**	**3.77**	**3.77**	**3.77**	**3.77**	**3.77**
	*** Sum Open-Motorized, Native Surface Routes =**		29.42	20.78	16.61	16.61	26.45	16.61	16.61		8	12	13	11	6	6	6	6	13	14	6	6	6	6		5.36	3.62	2.86	2.86	5.16	2.86	2.86
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.27**	**1.60**	**1.28**	**1.28**	**2.04**	**1.28**	**1.28**	**12.96**	**0.6**	**0.9**	**1.0**	**0.8**	**0.5**	**0.5**	**0.5**	**0.5**	**1.0**	**1.1**	**0.5**	**0.5**	**0.5**	**0.5**	**2.78**	**1.93**	**1.30**	**1.03**	**1.03**	**1.86**	**1.03**	**1.03**
18020125010503	Rock Creek-North Yuba River	AY	4.20	4.20	4.20	4.20	4.20	4.20	4.20	5,752.79	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,215.67	0.23	0.23	0.23	0.23	0.23	0.23	0.23
18020125010503	Rock Creek-North Yuba River	BS*	0.00	0.00	0.00	7.13	7.13	7.13	0.00	5,752.79	0	0	0	0	0	0	2	0	2	0	2	0	0	0	1,215.67	0.00	0.00	0.00	1.90	1.90	1.90	0.00
18020125010503	Rock Creek-North Yuba River	BY*	7.13	7.13	7.13	0.00	0.00	0.00	7.13	5,752.79	2	0	2	0	2	0	0	0	0	0	0	0	2	0	1,215.67	1.90	1.90	1.90	0.00	0.00	0.00	1.90
18020125010503	Rock Creek-North Yuba River	CS*	0.00	0.00	0.00	0.04	0.04	0.04	0.00	5,752.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,215.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010503	Rock Creek-North Yuba River	CY*	0.00	0.04	0.00	0.00	0.00	0.00	0.00	5,752.79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,215.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010503	Rock Creek-North Yuba River	FY	0.00	14.40	14.43	14.40	14.40	14.40	14.43	5,752.79	0	0	7	0	7	0	7	0	7	0	7	0	7	0	1,215.67	0.00	2.62	2.62	2.62	2.62	2.62	2.62
18020125010503	Rock Creek-North Yuba River	GY	7.24	7.24	7.24	7.24	7.24	7.24	7.24	5,752.79	9	6	9	6	9	6	9	6	9	6	9	6	9	6	1,215.67	1.87	1.87	1.87	1.87	1.87	1.87	1.87
18020125010503	Rock Creek-North Yuba River	HY*	2.72	2.72	2.72	2.72	2.72	2.72	2.72	5,752.79	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,215.67	0.19	0.19	0.19	0.19	0.19	0.19	0.19
18020125010503	Rock Creek-North Yuba River	IY	0.13	0.13	0.13	0.13	0.13	0.13	0.13	5,752.79	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,215.67	0.13	0.13	0.13	0.13	0.13	0.13	0.13
18020125010503	Rock Creek-North Yuba River	KY	1.23	1.23	1.23	1.23	1.23	1.23	1.23	5,752.79	3	1	3	1	3	1	3	1	3	1	3	1	3	1	1,215.67	1.23	1.23	1.23	1.23	1.23	1.23	1.23
18020125010503	Rock Creek-North Yuba River	LY*	14.43	0.00	0.00	0.00	0.00	0.00	0.00	5,752.79	7	0	0	0	0	0	0	0	0	0	0	0	0	0	1,215.67	2.62	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		37.08	37.08	37.08	37.08	37.08	37.08	37.08	5752.79	25	8	25	8	25	8	25	8	25	8	25	8	25	8	1215.67	8.17	8.17	8.17	8.17	8.17	8.17	8.17
	*** Value Per SqMi All =**		**4.13**	**4.13**	**4.13**	**4.13**	**4.13**	**4.13**	**4.13**	**8.99**	**2.8**	**0.9**	**2.8**	**0.9**	**2.8**	**0.9**	**2.8**	**0.9**	**2.8**	**0.9**	**2.8**	**0.9**	**2.8**	**0.9**	**1.90**	**4.30**	**4.30**	**4.30**	**4.30**	**4.30**	**4.30**	**4.30**
	*** Sum Open-Motorized, Native Surface Routes =**		24.28	9.88	9.85	9.88	9.88	9.88	9.85		11	0	4	0	4	0	4	0	4	0	4	0	4	0		4.71	2.09	2.09	2.09	2.09	2.09	2.09
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.70**	**1.10**	**1.10**	**1.10**	**1.10**	**1.10**	**1.10**	**8.99**	**1.2**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**1.90**	**2.48**	**1.10**	**1.10**	**1.10**	**1.10**	**1.10**	**1.10**
18020125010504	North Yuba River-Humbug Creek	AY	5.86	0.98	5.86	5.86	0.98	5.86	5.86	8,680.25	9	6	1	1	9	6	9	6	1	1	9	6	9	6	2,232.00	2.19	0.72	2.19	2.19	0.72	2.19	2.19
18020125010504	North Yuba River-Humbug Creek	BS*	0.00	0.00	0.00	14.04	14.04	14.04	0.00	8,680.25	0	0	0	0	0	0	7	1	7	1	7	1	0	0	2,232.00	0.00	0.00	0.00	1.96	1.96	1.96	0.00
18020125010504	North Yuba River-Humbug Creek	BY*	14.04	18.92	14.04	0.00	4.87	0.00	14.04	8,680.25	7	1	15	6	7	1	0	0	8	5	0	0	7	1	2,232.00	1.96	3.43	1.96	0.00	1.47	0.00	1.96
18020125010504	North Yuba River-Humbug Creek	CS*	0.00	0.00	0.00	0.07	1.70	0.07	0.00	8,680.25	0	0	0	0	0	0	0	1	0	1	0	1	0	0	2,232.00	0.00	0.00	0.00	0.06	0.08	0.06	0.00
18020125010504	North Yuba River-Humbug Creek	CY*	0.00	0.07	0.00	0.00	0.00	0.00	0.00	8,680.25	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2,232.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00
18020125010504	North Yuba River-Humbug Creek	ES*	0.00	0.00	0.00	3.59	3.59	3.59	0.00	8,680.25	0	0	0	0	0	0	0	2	0	2	0	2	0	0	2,232.00	0.00	0.00	0.00	0.19	0.19	0.19	0.00
18020125010504	North Yuba River-Humbug Creek	EY*	3.59	3.59	3.59	0.00	0.00	0.00	3.59	8,680.25	0	2	0	2	0	2	0	0	0	0	0	0	0	2	2,232.00	0.19	0.19	0.19	0.00	0.00	0.00	0.19
18020125010504	North Yuba River-Humbug Creek	FY	0.00	8.84	8.92	8.84	7.22	8.84	8.92	8,680.25	0	0	1	2	1	3	1	2	1	2	1	2	1	3	2,232.00	0.00	0.65	0.71	0.65	0.62	0.65	0.71
18020125010504	North Yuba River-Humbug Creek	GY	9.05	9.05	9.05	9.05	9.05	9.05	9.05	8,680.25	7	13	7	13	7	13	7	13	7	13	7	13	7	13	2,232.00	6.43	6.43	6.43	6.43	6.43	6.43	6.43
18020125010504	North Yuba River-Humbug Creek	HY*	3.67	3.67	3.67	3.67	3.67	3.67	3.67	8,680.25	0	1	0	1	0	1	0	1	0	1	0	1	0	1	2,232.00	0.54	0.54	0.54	0.54	0.54	0.54	0.54
18020125010504	North Yuba River-Humbug Creek	IY	6.37	6.37	6.37	6.37	6.37	6.37	6.37	8,680.25	5	6	5	6	5	6	5	6	5	6	5	6	5	6	2,232.00	6.30	6.30	6.30	6.30	6.30	6.30	6.30
18020125010504	North Yuba River-Humbug Creek	KY	1.05	1.05	1.05	1.05	1.05	1.05	1.05	8,680.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,232.00	0.20	0.20	0.20	0.20	0.20	0.20	0.20
18020125010504	North Yuba River-Humbug Creek	LY*	8.92	0.00	0.00	0.00	0.00	0.00	0.00	8,680.25	1	3	0	0	0	0	0	0	0	0	0	0	0	0	2,232.00	0.71	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		52.54	52.54	52.54	52.54	52.54	52.54	52.54	8680.25	29	32	29	32	29	32	29	32	29	32	29	32	29	32	2232.00	18.52	18.52	18.52	18.52	18.51	18.52	18.52
	*** Value Per SqMi All =**		**3.87**	**3.87**	**3.87**	**3.87**	**3.87**	**3.87**	**3.87**	**13.56**	**2.1**	**2.4**	**2.1**	**2.4**	**2.1**	**2.4**	**2.1**	**2.4**	**2.1**	**2.4**	**2.1**	**2.4**	**2.1**	**2.4**	**3.49**	**5.31**	**5.31**	**5.31**	**5.31**	**5.31**	**5.31**	**5.31**
	*** Sum Open-Motorized, Native Surface Routes =**		30.22	26.25	21.30	21.38	27.88	21.38	21.30		8	7	15	10	7	4	7	5	15	10	7	5	7	4		3.4	4.22	2.69	2.75	4.24	2.75	2.69
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.23**	**1.94**	**1.57**	**1.58**	**2.06**	**1.58**	**1.57**	**13.56**	**0.6**	**0.5**	**1.1**	**0.7**	**0.5**	**0.3**	**0.5**	**0.4**	**1.1**	**0.7**	**0.5**	**0.4**	**0.5**	**0.3**	**3.49**	**0.97**	**1.21**	**0.77**	**0.79**	**1.22**	**0.79**	**0.77**
18020125010505	Fiddle Creek	AY	11.51	6.41	11.51	11.51	6.41	11.51	11.51	7,814.19	7	5	2	3	7	5	7	5	2	3	7	5	7	5	2,026.63	2.18	0.28	2.18	2.18	0.28	2.18	2.18
18020125010505	Fiddle Creek	BS*	0.00	0.00	0.00	21.30	21.30	21.30	0.00	7,814.19	0	0	0	0	0	0	4	6	4	6	4	6	0	0	2,026.63	0.00	0.00	0.00	3.48	3.48	3.48	0.00
18020125010505	Fiddle Creek	BY*	21.30	26.39	21.30	0.00	5.09	0.00	21.30	7,814.19	4	6	9	8	4	6	0	0	5	2	0	0	4	6	2,026.63	3.48	5.38	3.48	0.00	1.90	0.00	3.48
18020125010505	Fiddle Creek	CS*	0.00	0.00	0.00	0.00	23.15	0.00	0.00	7,814.19	0	0	0	0	0	0	0	0	5	15	0	0	0	0	2,026.63	0.00	0.00	0.00	0.00	4.55	0.00	0.00
18020125010505	Fiddle Creek	DS*	0.00	0.00	0.00	0.00	0.77	0.77	0.00	7,814.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,026.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125010505	Fiddle Creek	ES*	0.00	0.00	0.00	6.49	6.49	6.49	0.00	7,814.19	0	0	0	0	0	0	2	3	2	3	2	3	0	0	2,026.63	0.00	0.00	0.00	0.94	0.94	0.94	0.00
18020125010505	Fiddle Creek	EY*	6.49	6.49	6.49	0.00	0.00	0.00	6.49	7,814.19	2	3	2	3	2	3	0	0	0	0	0	0	2	3	2,026.63	0.94	0.94	0.94	0.00	0.00	0.00	0.94
18020125010505	Fiddle Creek	FY	0.00	28.85	28.85	28.85	4.93	28.08	28.85	7,814.19	0	0	5	16	5	16	5	16	0	1	5	16	5	16	2,026.63	0.00	4.88	4.88	4.88	0.33	4.88	4.88
18020125010505	Fiddle Creek	GY	2.49	2.49	2.49	2.49	2.49	2.49	2.49	7,814.19	4	6	4	6	4	6	4	6	4	6	4	6	4	6	2,026.63	0.95	0.95	0.95	0.95	0.95	0.95	0.95
18020125010505	Fiddle Creek	HY*	0.44	0.44	0.44	0.44	0.44	0.44	0.44	7,814.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,026.63	0.03	0.03	0.03	0.03	0.03	0.03	0.03
18020125010505	Fiddle Creek	KY	3.21	3.21	3.21	3.21	3.21	3.21	3.21	7,814.19	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2,026.63	0.31	0.31	0.31	0.31	0.31	0.31	0.31
18020125010505	Fiddle Creek	LY*	28.85	0.00	0.00	0.00	0.00	0.00	0.00	7,814.19	5	16	0	0	0	0	0	0	0	0	0	0	0	0	2,026.63	4.88	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		74.29	74.29	74.29	74.29	74.29	74.29	74.29	7814.19	23	36	23	36	23	36	23	36	23	36	23	36	23	36	2026.63	12.77	12.77	12.77	12.77	12.77	12.77	12.77
	*** Value Per SqMi All =**		**6.08**	**6.08**	**6.08**	**6.08**	**6.08**	**6.08**	**6.08**	**12.21**	**1.9**	**2.9**	**1.9**	**2.9**	**1.9**	**2.9**	**1.9**	**2.9**	**1.9**	**2.9**	**1.9**	**2.9**	**1.9**	**2.9**	**3.17**	**4.03**	**4.03**	**4.03**	**4.03**	**4.03**	**4.03**	**4.03**
	*** Sum Open-Motorized, Native Surface Routes =**		57.08	33.32	28.23	28.23	57.24	29.00	28.23		11	25	11	11	6	9	6	9	16	26	6	9	6	9		9.33	6.35	4.45	4.45	10.9	4.45	4.45
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.68**	**2.73**	**2.31**	**2.31**	**4.69**	**2.38**	**2.31**	**12.21**	**0.9**	**2.0**	**0.9**	**0.9**	**0.5**	**0.7**	**0.5**	**0.7**	**1.3**	**2.1**	**0.5**	**0.7**	**0.5**	**0.7**	**3.17**	**2.95**	**2.01**	**1.41**	**1.41**	**3.44**	**1.41**	**1.41**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125010506	Cherokee Creek	AY	5.20	3.56	5.20	5.20	3.56	3.56	5.20	4572.33	9	11	9	8	9	11	9	11	9	8	9	8	9	11	1065.36	1.51	1.36	1.51	1.51	1.36	1.36	1.51
18020125010506	Cherokee Creek	BS*	0.00	0.00	0.00	4.42	6.06	6.06	0.00	4572.33	0	0	0	0	0	0	0	4	0	7	0	7	0	0	1065.36	0	0	0	0.54	0.69	0.69	0
18020125010506	Cherokee Creek	BY*	4.42	6.06	4.42	0.00	0.00	0.00	4.42	4572.33	0	4	0	7	0	4	0	0	0	0	0	0	0	4	1065.36	0.54	0.69	0.54	0	0	0	0.54
18020125010506	Cherokee Creek	CS*	0.00	0.00	0.00	0.29	16.37	0.55	0.00	4572.33	0	0	0	0	0	0	0	0	2	8	0	0	0	0	1065.36	0	0	0	0.29	3.86	0.35	0
18020125010506	Cherokee Creek	CY*	0.08	0.55	0.08	0.00	0.00	0.00	0.08	4572.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1065.36	0.08	0.35	0.08	0	0	0	0.08
18020125010506	Cherokee Creek	DS*	0.00	0.00	0.00	0.00	7.97	7.97	0.00	4572.33	0	0	0	0	0	0	0	0	1	3	1	3	0	0	1065.36	0	0	0	0	2.36	2.36	0
18020125010506	Cherokee Creek	ES*	0.00	0.00	0.00	0.15	0.15	0.15	0.00	4572.33	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1065.36	0	0	0	0.13	0.13	0.13	0
18020125010506	Cherokee Creek	EY*	0.15	0.15	0.15	0.00	0.00	0.00	0.15	4572.33	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1065.36	0.13	0.13	0.13	0	0	0	0.13
18020125010506	Cherokee Creek	FY	0.00	29.43	29.90	29.69	5.63	21.46	29.90	4572.33	0	0	7	12	7	12	7	12	4	1	6	9	7	12	1065.36	0	7.84	8.11	7.89	1.96	5.48	8.11
18020125010506	Cherokee Creek	GY	2.76	2.76	2.76	2.76	2.76	2.76	2.76	4572.33	3	5	3	5	3	5	3	5	3	5	3	5	3	5	1065.36	1.3	1.3	1.3	1.3	1.3	1.3	1.3
18020125010506	Cherokee Creek	IY	0.81	0.81	0.81	0.81	0.81	0.81	0.81	4572.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1065.36	0.67	0.67	0.67	0.67	0.67	0.67	0.67
18020125010506	Cherokee Creek	KY	3.05	3.05	3.05	3.05	3.05	3.05	3.05	4572.33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1065.36	0.1	0.1	0.1	0.1	0.1	0.1	0.1
18020125010506	Cherokee Creek	LY*	29.90	0.00	0.00	0.00	0.00	0.00	0.00	4572.33	7	12	0	0	0	0	0	0	0	0	0	0	0	0	1065.36	8.11	0	0	0	0	0	0
	Sum All =		46.37	46.37	46.37	46.37	46.37	46.37	46.37	4572.33	20	33	20	33	20	33	20	33	20	33	20	33	20	33	1065.36	12.44	12.44	12.44	12.43	12.43	12.44	12.44
	*** Value Per SqMi All =**		**6.49**	**6.49**	**6.49**	**6.49**	**6.49**	**6.49**	**6.49**	**7.14**	**2.8**	**4.6**	**2.8**	**4.6**	**2.8**	**4.6**	**2.8**	**4.6**	**2.8**	**4.6**	**2.8**	**4.6**	**2.8**	**4.6**	**1.66**	**7.47**	**7.47**	**7.47**	**7.47**	**7.47**	**7.47**	**7.47**
	*** Sum Open-Motorized, Native Surface Routes =**		34.55	6.76	4.65	4.86	30.56	14.73	4.65		8	17	1	8	1	5	1	5	4	19	2	11	1	5		8.86	1.17	0.75	0.96	7.04	3.53	0.75
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.84**	**0.95**	**0.65**	**0.68**	**4.28**	**2.06**	**0.65**	**7.14**	**1.1**	**2.4**	**0.1**	**1.1**	**0.1**	**0.7**	**0.1**	**0.7**	**0.6**	**2.7**	**0.3**	**1.5**	**0.1**	**0.7**	**1.66**	**5.32**	**0.70**	**0.45**	**0.58**	**4.23**	**2.12**	**0.45**
18020125010507	North Yuba River-Indian Creek	AY	7.13	1.44	7.13	7.13	1.44	7.13	7.13	6651.14	6	10	0	3	6	10	6	10	0	3	6	10	6	10	1318.62	1.92	0.45	1.92	1.92	0.45	1.92	1.92
18020125010507	North Yuba River-Indian Creek	BS*	0.00	0.00	0.00	15.02	15.02	15.02	0.00	6651.14	0	0	0	0	0	0	3	8	3	8	3	8	0	0	1318.62	0	0	0	2.53	2.53	2.53	0
18020125010507	North Yuba River-Indian Creek	BY*	15.02	20.71	15.02	0.00	5.69	0.00	15.02	6651.14	3	8	9	15	3	8	0	0	6	7	0	0	3	8	1318.62	2.53	4	2.53	0	1.47	0	2.53
18020125010507	North Yuba River-Indian Creek	CS*	0.00	0.00	0.00	2.17	4.67	2.53	0.00	6651.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1318.62	0	0	0	2.17	2.2	2.2	0
18020125010507	North Yuba River-Indian Creek	CY*	2.17	2.53	2.17	0.00	0.00	0.00	2.17	6651.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1318.62	2.17	2.2	2.17	0	0	0	2.17
18020125010507	North Yuba River-Indian Creek	ES*	0.00	0.00	0.00	2.26	2.26	2.26	0.00	6651.14	0	0	0	0	0	0	1	2	1	2	1	2	0	0	1318.62	0	0	0	0.47	0.47	0.47	0
18020125010507	North Yuba River-Indian Creek	EY*	2.26	2.26	2.26	0.00	0.00	0.00	2.26	6651.14	1	2	1	2	1	2	0	0	0	0	0	0	1	2	1318.62	0.47	0.47	0.47	0	0	0	0.47
18020125010507	North Yuba River-Indian Creek	FY	0.00	12.87	13.23	13.23	10.81	12.87	13.23	6651.14	0	0	1	4	1	4	1	4	1	4	1	4	1	4	1318.62	0	1.35	1.39	1.39	1.35	1.35	1.39
18020125010507	North Yuba River-Indian Creek	GY	8.13	8.13	8.13	8.13	8.13	8.13	8.13	6651.14	6	16	6	16	6	16	6	16	6	16	6	16	6	16	1318.62	2.65	2.65	2.65	2.65	2.65	2.65	2.65
18020125010507	North Yuba River-Indian Creek	HY*	1.77	1.77	1.77	1.77	1.69	1.77	1.77	6651.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1318.62	0.53	0.53	0.53	0.53	0.53	0.53	0.53
18020125010507	North Yuba River-Indian Creek	KY	0.23	0.23	0.23	0.23	0.23	0.23	0.23	6651.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1318.62	0	0	0	0	0	0	0
18020125010507	North Yuba River-Indian Creek	LY*	13.23	0.00	0.00	0.00	0.00	0.00	0.00	6651.14	1	4	0	0	0	0	0	0	0	0	0	0	0	0	1318.62	1.39	0	0	0	0	0	0
	Sum All =		49.94	49.94	49.94	49.94	49.94	49.94	49.94	6651.14	17	40	17	40	17	40	17	40	17	40	17	40	17	40	1318.62	11.66	11.65	11.66	11.66	11.65	11.65	11.66
	*** Value Per SqMi All =**		**4.81**	**4.81**	**4.81**	**4.81**	**4.81**	**4.81**	**4.81**	**10.39**	**1.6**	**3.8**	**1.6**	**3.8**	**1.6**	**3.8**	**1.6**	**3.8**	**1.6**	**3.8**	**1.6**	**3.8**	**1.6**	**3.8**	**2.06**	**5.66**	**5.65**	**5.66**	**5.66**	**5.65**	**5.65**	**5.66**
	*** Sum Open-Motorized, Native Surface Routes =**		34.45	27.27	21.22	21.22	29.33	21.59	21.22		5	14	10	17	4	10	4	10	10	17	4	10	4	10		7.09	7.2	5.7	5.7	7.2	5.73	5.70
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.32**	**2.62**	**2.04**	**2.04**	**2.82**	**2.08**	**2.04**	**10.39**	**0.5**	**1.3**	**1.0**	**1.6**	**0.4**	**1.0**	**0.4**	**1.0**	**1.0**	**1.6**	**0.4**	**1.0**	**0.4**	**1.0**	**2.06**	**3.44**	**3.49**	**2.77**	**2.77**	**3.49**	**2.78**	**2.77**
18020125020101	Headwaters Canyon Creek	CS*	0.00	0.00	0.00	3.48	3.48	3.48	0.00	3,271.54	0	0	0	0	0	0	1	0	1	0	1	0	0	0	721.59	0.00	0.00	0.00	1.02	1.02	1.02	0.00
18020125020101	Headwaters Canyon Creek	CY*	3.48	3.48	3.48	0.00	0.00	0.00	3.48	3,271.54	1	0	1	0	1	0	0	0	0	0	0	0	1	0	721.59	1.02	1.02	1.02	0.00	0.00	0.00	1.02
18020125020101	Headwaters Canyon Creek	ES*	0.00	0.00	0.00	2.40	2.40	2.40	0.00	3,271.54	0	0	0	0	0	0	3	1	3	1	3	1	0	0	721.59	0.00	0.00	0.00	1.54	1.54	1.54	0.00
18020125020101	Headwaters Canyon Creek	EY*	2.40	2.40	2.40	0.00	0.00	0.00	2.40	3,271.54	3	1	3	1	3	1	0	0	0	0	0	0	3	1	721.59	1.54	1.54	1.54	0.00	0.00	0.00	1.54
18020125020101	Headwaters Canyon Creek	FY	0.00	0.75	0.75	0.75	0.75	0.75	0.75	3,271.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	721.59	0.00	0.12	0.12	0.12	0.12	0.12	0.12
18020125020101	Headwaters Canyon Creek	LY*	0.75	0.00	0.00	0.00	0.00	0.00	0.00	3,271.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	721.59	0.12	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		6.63	6.63	6.63	6.63	6.63	6.63	6.63	3271.54	4	1	4	1	4	1	4	1	4	1	4	1	4	1	721.59	2.68	2.68	2.68	2.68	2.68	2.68	2.68
	*** Value Per SqMi All =**		**1.30**	**1.30**	**1.30**	**1.30**	**1.30**	**1.30**	**1.30**	**5.11**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**1.13**	**2.38**	**2.38**	**2.38**	**2.38**	**2.38**	**2.38**	**2.38**
	*** Sum Open-Motorized, Native Surface Routes =**		6.63	5.88	5.88	5.88	5.88	5.88	5.88		4	1	4	1	4	1	4	1	4	1	4	1	4	1		2.68	2.56	2.56	2.56	2.56	2.56	2.56
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.30**	**1.15**	**1.15**	**1.15**	**1.15**	**1.15**	**1.15**	**5.11**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**0.8**	**0.2**	**1.13**	**2.38**	**2.27**	**2.27**	**2.27**	**2.27**	**2.27**	**2.27**
18020125020102	Canyon Creek-Deadwood Creek	BS*	0.00	0.00	0.00	2.47	2.47	2.47	0.00	3389.24	0	0	0	0	0	0	2	2	2	2	2	2	0	0	1315.48	0	0	0	0.33	0.33	0.33	0
18020125020102	Canyon Creek-Deadwood Creek	BY*	2.47	2.47	2.47	0.00	0.00	0.00	2.47	3389.24	2	2	2	2	2	2	0	0	0	0	0	0	2	2	1315.48	0.33	0.33	0.33	0	0	0	0.33
18020125020102	Canyon Creek-Deadwood Creek	CS*	0.00	0.00	0.00	1.53	4.63	2.09	0.00	3389.24	0	0	0	0	0	0	1	0	4	0	1	0	0	0	1315.48	0	0	0	0.23	0.49	0.23	0
18020125020102	Canyon Creek-Deadwood Creek	CY*	1.53	2.09	1.53	0.00	0.00	0.00	2.09	3389.24	1	0	1	0	1	0	0	0	0	0	0	0	1	0	1315.48	0.23	0.23	0.23	0	0	0	0.23
18020125020102	Canyon Creek-Deadwood Creek	ES*	0.00	0.00	0.00	0.75	0.75	0.75	0.00	3389.24	0	0	0	0	0	0	3	1	3	1	3	1	0	0	1315.48	0	0	0	0.19	0.19	0.19	0
18020125020102	Canyon Creek-Deadwood Creek	EY*	0.75	0.75	0.75	0.00	0.00	0.00	0.75	3389.24	3	1	3	1	3	1	0	0	0	0	0	0	3	1	1315.48	0.19	0.19	0.19	0	0	0	0.19
18020125020102	Canyon Creek-Deadwood Creek	FY	0.00	5.08	5.63	5.63	2.53	5.08	5.08	3389.24	0	0	6	0	6	0	6	0	3	0	6	0	6	0	1315.48	0	2.33	2.33	2.33	2.07	2.33	2.33
18020125020102	Canyon Creek-Deadwood Creek	LY*	5.63	0.00	0.00	0.00	0.00	0.00	0.00	3389.24	6	0	0	0	0	0	0	0	0	0	0	0	0	0	1315.48	2.33	0	0	0	0	0	0
	Sum All =		10.38	10.38	10.38	10.38	10.38	10.38	10.38	3389.24	12	3	12	3	12	3	12	3	12	3	12	3	12	3	1315.48	3.08	3.08	3.08	3.08	3.08	3.08	3.08
	*** Value Per SqMi All =**		**1.96**	**1.96**	**1.96**	**1.96**	**1.96**	**1.96**	**1.96**	**5.30**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.06**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**	**1.50**
	*** Sum Open-Motorized, Native Surface Routes =**		10.38	5.31	4.75	4.75	7.86	5.31	5.31		12	3	6	3	6	3	6	3	9	3	6	3	6	3		3.08	0.75	0.75	0.75	1.01	0.75	0.75
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.96**	**1.00**	**0.90**	**0.90**	**1.48**	**1.00**	**1.00**	**5.30**	**2.3**	**0.6**	**1.1**	**0.6**	**1.1**	**0.6**	**1.1**	**0.6**	**1.7**	**0.6**	**1.1**	**0.6**	**1.1**	**0.6**	**2.06**	**1.50**	**0.36**	**0.36**	**0.36**	**0.49**	**0.36**	**0.36**
18020125020103	Canyon Creek-Morristown Ravine	AY	1.89	0.00	1.89	1.89	0.00	1.89	1.89	1,888.16	5	2	0	0	5	2	5	2	0	0	5	2	5	2	1,018.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020103	Canyon Creek-Morristown Ravine	BS*	0.00	0.00	0.00	5.71	5.71	5.71	0.00	1,888.16	0	0	0	0	0	0	1	3	1	3	1	3	0	0	1,018.11	0.00	0.00	0.00	0.98	0.98	0.98	0.00
18020125020103	Canyon Creek-Morristown Ravine	BY*	5.71	7.60	5.71	0.00	1.89	0.00	5.71	1,888.16	1	3	6	5	1	3	0	0	5	2	0	0	1	3	1,018.11	0.98	0.98	0.98	0.00	0.00	0.00	0.98
18020125020103	Canyon Creek-Morristown Ravine	CS*	0.00	0.00	0.00	0.00	4.14	0.00	0.00	1,888.16	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1,018.11	0.00	0.00	0.00	0.00	0.62	0.00	0.00
18020125020103	Canyon Creek-Morristown Ravine	FY	0.00	6.90	6.90	6.90	2.76	6.90	6.90	1,888.16	0	0	4	1	4	1	4	1	1	1	4	1	4	1	1,018.11	0.00	1.60	1.60	1.60	0.98	1.60	1.60
18020125020103	Canyon Creek-Morristown Ravine	IY	0.06	0.06	0.06	0.06	0.06	0.06	0.06	1,888.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,018.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020103	Canyon Creek-Morristown Ravine	LY*	6.90	0.00	0.00	0.00	0.00	0.00	0.00	1,888.16	4	1	0	0	0	0	0	0	0	0	0	0	0	0	1,018.11	1.60	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		14.56	14.56	14.56	14.56	14.56	14.56	14.56	1888.16	10	6	10	6	10	6	10	6	10	6	10	6	10	6	1018.11	2.58	2.58	2.58	2.58	2.58	2.58	2.58
	*** Value Per SqMi All =**		**4.93**	**4.93**	**4.93**	**4.93**	**4.93**	**4.93**	**4.93**	**2.95**	**3.4**	**2.0**	**3.4**	**2.0**	**3.4**	**2.0**	**3.4**	**2.0**	**3.4**	**2.0**	**3.4**	**2.0**	**3.4**	**2.0**	**1.59**	**1.62**	**1.62**	**1.62**	**1.62**	**1.62**	**1.62**	**1.62**
	*** Sum Open-Motorized, Native Surface Routes =**		12.61	7.60	5.71	5.71	11.74	5.71	5.71		5	4	6	5	1	3	1	3	9	5	1	3	1	3		2.58	0.98	0.98	0.98	1.6	0.98	0.98
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.27**	**2.58**	**1.94**	**1.94**	**3.98**	**1.94**	**1.94**	**2.95**	**1.7**	**1.4**	**2.0**	**1.7**	**0.3**	**1.0**	**0.3**	**1.0**	**3.1**	**1.7**	**0.3**	**1.0**	**0.3**	**1.0**	**1.59**	**1.62**	**0.62**	**0.62**	**0.62**	**1.01**	**0.62**	**0.62**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125020104	Little Canyon Creek	AY	17.74	0.37	17.74	17.74	0.37	17.74	17.74	7,671.01	12	9	0	2	12	9	12	9	0	2	12	9	12	9	1,952.57	4.71	0.00	4.71	4.71	0.00	4.71	4.71
18020125020104	Little Canyon Creek	BS*	0.00	0.00	0.00	22.86	22.86	22.86	0.00	7,671.01	0	0	0	0	0	0	10	5	10	5	10	5	0	0	1,952.57	0.00	0.00	0.00	3.27	3.27	3.27	0.00
18020125020104	Little Canyon Creek	BY*	22.86	40.23	22.86	0.00	17.37	0.00	22.86	7,671.01	10	5	22	12	10	5	0	0	12	7	0	0	10	5	1,952.57	3.27	7.98	3.27	0.00	4.71	0.00	3.27
18020125020104	Little Canyon Creek	CS*	0.00	0.00	0.00	0.61	15.62	0.61	0.00	7,671.01	0	0	0	0	0	0	0	0	8	5	0	0	0	0	1,952.57	0.00	0.00	0.00	0.04	2.67	0.04	0.00
18020125020104	Little Canyon Creek	CY*	0.05	0.61	0.05	0.00	0.00	0.00	0.05	7,671.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,952.57	0.00	0.04	0.00	0.00	0.00	0.00	0.00
18020125020104	Little Canyon Creek	FY	0.00	21.57	22.13	21.57	6.56	21.57	22.13	7,671.01	0	0	12	8	12	8	12	8	4	3	12	8	12	8	1,952.57	0.00	4.93	4.97	4.93	2.30	4.93	4.97
18020125020104	Little Canyon Creek	IY	0.09	0.09	0.09	0.09	0.09	0.09	0.09	7,671.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,952.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020104	Little Canyon Creek	KY	1.44	1.44	1.44	1.44	1.44	1.44	1.44	7,671.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,952.57	0.21	0.21	0.21	0.21	0.21	0.21	0.21
18020125020104	Little Canyon Creek	LY*	22.13	0.00	0.00	0.00	0.00	0.00	0.00	7,671.01	12	8	0	0	0	0	0	0	0	0	0	0	0	0	1,952.57	4.97	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		64.32	64.32	64.32	64.32	64.32	64.32	64.32	7671.01	34	22	34	22	34	22	34	22	34	22	34	22	34	22	1952.57	13.16	13.16	13.16	13.16	13.16	13.16	13.16
	*** Value Per SqMi All =**		**5.37**	**5.37**	**5.37**	**5.37**	**5.37**	**5.37**	**5.37**	**11.99**	**2.8**	**1.8**	**2.8**	**1.8**	**2.8**	**1.8**	**2.8**	**1.8**	**2.8**	**1.8**	**2.8**	**1.8**	**2.8**	**1.8**	**3.05**	**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**4.31**
	*** Sum Open-Motorized, Native Surface Routes =**		45.04	40.84	22.91	23.47	55.86	23.47	22.91		22	13	22	12	10	5	10	5	30	17	10	5	10	5		8.24	8.02	3.27	3.31	10.65	3.31	3.27
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.76**	**3.41**	**1.91**	**1.96**	**4.66**	**1.96**	**1.91**	**11.99**	**1.8**	**1.1**	**1.8**	**1.0**	**0.8**	**0.4**	**0.8**	**0.4**	**2.5**	**1.4**	**0.8**	**0.4**	**0.8**	**0.4**	**3.05**	**2.70**	**2.63**	**1.07**	**1.08**	**3.49**	**1.08**	**1.07**
18020125020105	Canyon Creek/Pipe Creek	AY	5.79	5.40	5.79	5.79	5.40	5.79	5.79	2,946.39	14	10	9	8	14	10	14	10	9	8	14	10	14	10	1,157.33	1.87	1.77	1.87	1.87	1.77	1.87	1.87
18020125020105	Canyon Creek/Pipe Creek	BS*	0.00	0.00	0.00	1.25	1.25	1.25	0.00	2,946.39	0	0	0	0	0	0	2	2	2	2	2	2	0	0	1,157.33	0.00	0.00	0.00	0.32	0.32	0.32	0.00
18020125020105	Canyon Creek/Pipe Creek	BY*	1.25	1.64	1.25	0.00	0.39	0.00	1.25	2,946.39	2	2	7	4	2	2	0	0	5	2	0	0	2	2	1,157.33	0.32	0.42	0.32	0.00	0.10	0.00	0.32
18020125020105	Canyon Creek/Pipe Creek	CS*	0.00	0.00	0.00	0.02	5.97	0.02	0.00	2,946.39	0	0	0	0	0	0	0	0	8	0	0	0	0	0	1,157.33	0.00	0.00	0.00	0.02	1.30	0.02	0.00
18020125020105	Canyon Creek/Pipe Creek	CY*	0.00	0.02	0.00	0.00	0.00	0.00	0.00	2,946.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,157.33	0.00	0.02	0.00	0.00	0.00	0.00	0.00
18020125020105	Canyon Creek/Pipe Creek	FY	0.00	8.96	8.98	8.96	3.01	8.96	8.98	2,946.39	0	0	8	1	8	1	8	1	0	1	8	1	8	1	1,157.33	0.00	2.06	2.08	2.06	0.77	2.06	2.08
18020125020105	Canyon Creek/Pipe Creek	LY*	8.98	0.00	0.00	0.00	0.00	0.00	0.00	2,946.39	8	1	0	0	0	0	0	0	0	0	0	0	0	0	1,157.33	2.08	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		16.03	16.03	16.03	16.03	16.03	16.03	16.03	2946.39	24	13	24	13	24	13	24	13	24	13	24	13	24	13	1157.33	4.27	4.27	4.27	4.27	4.26	4.27	4.27
	*** Value Per SqMi All =**		**3.48**	**3.48**	**3.48**	**3.48**	**3.48**	**3.48**	**3.48**	**4.60**	**5.2**	**2.8**	**5.2**	**2.8**	**5.2**	**2.8**	**5.2**	**2.8**	**5.2**	**2.8**	**5.2**	**2.8**	**5.2**	**2.8**	**1.81**	**2.36**	**2.36**	**2.36**	**2.36**	**2.36**	**2.36**	**2.36**
	*** Sum Open-Motorized, Native Surface Routes =**		10.24	1.66	1.25	1.27	7.61	1.27	1.25		10	3	7	4	2	2	2	2	15	4	2	2	2	2		2.4	0.44	0.32	0.34	1.72	0.34	0.32
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.22**	**0.36**	**0.27**	**0.28**	**1.65**	**0.28**	**0.27**	**4.60**	**2.2**	**0.7**	**1.5**	**0.9**	**0.4**	**0.4**	**0.4**	**0.4**	**3.3**	**0.9**	**0.4**	**0.4**	**0.4**	**0.4**	**1.81**	**1.33**	**0.24**	**0.18**	**0.19**	**0.95**	**0.19**	**0.18**
18020125020107	Lower Canyon Creek	AY	5.27	2.13	5.27	5.27	2.13	2.13	5.27	3,202.39	9	9	9	6	9	9	9	9	9	6	9	6	9	9	1,012.21	1.22	0.58	1.22	1.22	0.58	0.58	1.22
18020125020107	Lower Canyon Creek	BS*	0.00	0.00	0.00	2.01	5.15	5.15	0.00	3,202.39	0	0	0	0	0	0	0	1	0	4	0	4	0	0	1,012.21	0.00	0.00	0.00	0.59	1.22	1.22	0.00
18020125020107	Lower Canyon Creek	BY*	2.01	5.15	2.01	0.00	0.00	0.00	2.01	3,202.39	0	1	0	4	0	1	0	0	0	0	0	0	0	1	1,012.21	0.59	1.22	0.59	0.00	0.00	0.00	0.59
18020125020107	Lower Canyon Creek	CS*	0.00	0.00	0.00	0.00	6.71	0.00	0.00	3,202.39	0	0	0	0	0	0	0	0	2	4	0	0	0	0	1,012.21	0.00	0.00	0.00	0.00	1.13	0.00	0.00
18020125020107	Lower Canyon Creek	DS*	0.00	0.00	0.00	0.00	0.17	0.17	0.00	3,202.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,012.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020107	Lower Canyon Creek	ES*	0.00	0.00	0.00	0.09	0.09	0.09	0.00	3,202.39	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1,012.21	0.00	0.00	0.00	0.09	0.09	0.09	0.00
18020125020107	Lower Canyon Creek	EY*	0.09	0.09	0.09	0.00	0.00	0.00	0.09	3,202.39	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1,012.21	0.09	0.09	0.09	0.00	0.00	0.00	0.09
18020125020107	Lower Canyon Creek	FY	0.00	10.06	10.06	10.06	3.18	9.89	10.06	3,202.39	0	0	2	5	2	5	2	5	0	1	2	5	2	5	1,012.21	0.00	1.36	1.36	1.36	0.22	1.36	1.36
18020125020107	Lower Canyon Creek	LY*	10.06	0.00	0.00	0.00	0.00	0.00	0.00	3,202.39	2	5	0	0	0	0	0	0	0	0	0	0	0	0	1,012.21	1.36	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		17.43	17.43	17.43	17.43	17.43	17.43	17.43	3202.39	12	16	12	16	12	16	12	16	12	16	12	16	12	16	1012.21	3.26	3.25	3.26	3.26	3.24	3.25	3.26
	*** Value Per SqMi All =**		**3.48**	**3.48**	**3.48**	**3.48**	**3.48**	**3.48**	**3.48**	**5.00**	**2.4**	**3.2**	**2.4**	**3.2**	**2.4**	**3.2**	**2.4**	**3.2**	**2.4**	**3.2**	**2.4**	**3.2**	**2.4**	**3.2**	**1.58**	**2.06**	**2.05**	**2.06**	**2.06**	**2.05**	**2.05**	**2.06**
	*** Sum Open-Motorized, Native Surface Routes =**		12.16	5.25	2.11	2.11	12.12	5.41	2.11		3	7	1	5	1	2	1	2	3	9	1	5	1	2		2.04	1.31	0.68	0.68	2.44	1.31	0.68
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.43**	**1.05**	**0.42**	**0.42**	**2.42**	**1.08**	**0.42**	**5.00**	**0.6**	**1.4**	**0.2**	**1.0**	**0.2**	**0.4**	**0.2**	**0.4**	**0.6**	**1.8**	**0.2**	**1.0**	**0.2**	**0.4**	**1.58**	**1.29**	**0.83**	**0.43**	**0.43**	**1.54**	**0.83**	**0.43**
18020125020302	North Yuba River-Lost Creek	AY	0.40	0.40	0.40	0.40	0.40	0.40	0.40	3,471.31	1	1	1	1	1	1	1	1	1	1	1	1	1	1	876.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020302	North Yuba River-Lost Creek	BS*	7.48	7.48	7.48	9.41	9.41	9.41	7.48	3,471.31	1	7	1	7	1	7	1	7	1	7	1	7	1	7	876.67	0.98	0.98	0.98	0.98	0.98	0.98	0.98
18020125020302	North Yuba River-Lost Creek	BY*	1.93	1.93	1.93	0.00	0.00	0.00	1.93	3,471.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	876.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020302	North Yuba River-Lost Creek	CS*	0.68	0.68	0.68	1.12	1.12	1.12	0.68	3,471.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	876.67	0.00	0.00	0.00	0.13	0.13	0.13	0.00
18020125020302	North Yuba River-Lost Creek	CY*	0.44	0.44	0.44	0.00	0.00	0.00	0.44	3,471.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	876.67	0.13	0.13	0.13	0.00	0.00	0.00	0.13
18020125020302	North Yuba River-Lost Creek	ES*	0.24	0.24	0.24	1.02	1.02	1.02	0.24	3,471.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	876.67	0.00	0.00	0.00	0.13	0.13	0.13	0.00
18020125020302	North Yuba River-Lost Creek	EY*	0.77	0.77	0.77	0.00	0.00	0.00	0.77	3,471.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	876.67	0.13	0.13	0.13	0.00	0.00	0.00	0.13
18020125020302	North Yuba River-Lost Creek	FY	0.00	3.56	3.56	3.56	3.56	3.56	3.56	3,471.31	0	0	2	2	2	2	2	2	2	2	2	2	2	2	876.67	0.00	0.93	0.93	0.93	0.93	0.93	0.93
18020125020302	North Yuba River-Lost Creek	HY*	2.42	2.42	2.42	2.42	2.42	2.42	2.42	3,471.31	0	1	0	1	0	1	0	1	0	1	0	1	0	1	876.67	0.42	0.42	0.42	0.42	0.42	0.42	0.42
18020125020302	North Yuba River-Lost Creek	LS*	2.70	0.00	0.00	0.00	0.00	0.00	0.00	3,471.31	2	1	0	0	0	0	0	0	0	0	0	0	0	0	876.67	0.85	0.00	0.00	0.00	0.00	0.00	0.00
18020125020302	North Yuba River-Lost Creek	LY*	0.86	0.00	0.00	0.00	0.00	0.00	0.00	3,471.31	0	1	0	0	0	0	0	0	0	0	0	0	0	0	876.67	0.08	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		17.92	17.92	17.92	17.92	17.92	17.92	17.92	38184.41	4	11	4	11	4	11	4	11	4	11	4	11	4	11	876.67	2.59	2.59	2.59	2.59	2.59	2.59	2.59
	*** Value Per SqMi All =**		**3.30**	**3.30**	**3.30**	**3.30**	**3.30**	**3.30**	**3.30**	**5.42**	**0.7**	**2.0**	**0.7**	**2.0**	**0.7**	**2.0**	**0.7**	**2.0**	**0.7**	**2.0**	**0.7**	**2.0**	**0.7**	**2.0**	**1.37**	**1.89**	**1.89**	**1.89**	**1.89**	**1.89**	**1.89**	**1.89**
	*** Sum Open-Motorized, Native Surface Routes =**		17.52	13.96	13.96	13.96	13.96	13.96	13.96	31241.79	3	10	1	8	1	8	1	8	1	8	1	8	1	8		2.59	1.66	1.66	1.66	1.66	1.66	1.66
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.29**	**0.23**	**0.23**	**0.23**	**0.23**	**0.23**	**0.23**	**59.66**	**0.1**	**0.2**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**1.37**	**1.89**	**1.21**	**1.21**	**1.21**	**1.21**	**1.21**	**1.21**
18020125020303	North Yuba River-Empire Creek	AY	0.28	0.28	0.28	0.28	0.28	0.28	0.28	986.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	234.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020303	North Yuba River-Empire Creek	BS*	0.37	0.37	0.37	0.37	0.37	0.37	0.37	986.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	234.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020303	North Yuba River-Empire Creek	FY	0.00	0.88	0.88	0.88	0.88	0.88	0.88	986.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	234.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020303	North Yuba River-Empire Creek	HY*	0.05	0.05	0.05	0.05	0.05	0.05	0.05	986.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	234.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020303	North Yuba River-Empire Creek	LS*	0.66	0.00	0.00	0.00	0.00	0.00	0.00	986.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	234.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020303	North Yuba River-Empire Creek	LY*	0.23	0.00	0.00	0.00	0.00	0.00	0.00	986.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	234.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		1.59	1.59	1.59	1.59	1.59	1.59	1.59	78878.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	234.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi All =**		**1.03**	**1.03**	**1.03**	**1.03**	**1.03**	**1.03**	**1.03**	**1.54**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.37**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	*** Sum Open-Motorized, Native Surface Routes =**		1.30	0.42	0.42	0.42	0.42	0.42	0.42	74421.537	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**123.25**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.37**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125020304	Bullards Bar Reservoir-Mill Creek	AY	4.08	4.08	4.08	4.08	4.08	4.08	4.08	4,534.73	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,237.72	0.12	0.12	0.12	0.12	0.12	0.12	0.12
18020125020304	Bullards Bar Reservoir-Mill Creek	BS*	1.07	1.07	1.07	1.07	1.07	1.07	1.07	4,534.73	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,237.72	0.08	0.08	0.08	0.08	0.08	0.08	0.08
18020125020304	Bullards Bar Reservoir-Mill Creek	FY	0.93	8.65	8.65	8.65	8.65	8.65	8.65	4,534.73	0	0	0	2	0	2	0	2	0	2	0	2	0	2	1,237.72	0.35	1.30	1.30	1.30	1.30	1.30	1.30
18020125020304	Bullards Bar Reservoir-Mill Creek	GY	3.88	3.88	3.88	3.88	3.88	3.88	3.88	4,534.73	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1,237.72	0.97	0.97	0.97	0.97	0.97	0.97	0.97
18020125020304	Bullards Bar Reservoir-Mill Creek	HY*	9.65	9.65	9.65	9.65	9.65	9.65	9.65	4,534.73	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1,237.72	1.91	1.91	1.91	1.91	1.91	1.91	1.91
18020125020304	Bullards Bar Reservoir-Mill Creek	LS*	3.33	0.00	0.00	0.00	0.00	0.00	0.00	4,534.73	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1,237.72	0.34	0.00	0.00	0.00	0.00	0.00	0.00
18020125020304	Bullards Bar Reservoir-Mill Creek	LY*	4.38	0.00	0.00	0.00	0.00	0.00	0.00	4,534.73	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1,237.72	0.60	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		27.32	27.32	27.32	27.32	27.32	27.32	27.32	4534.73	5	8	5	8	5	8	5	8	5	8	5	8	5	8	1237.72	4.37	4.38	4.38	4.38	4.38	4.38	4.38
	*** Value Per SqMi All =**		**3.86**	**3.86**	**3.86**	**3.86**	**3.86**	**3.86**	**3.86**	**7.09**	**0.7**	**1.1**	**0.7**	**1.1**	**0.7**	**1.1**	**0.7**	**1.1**	**0.7**	**1.1**	**0.7**	**1.1**	**0.7**	**1.1**	**1.93**	**2.26**	**2.26**	**2.26**	**2.26**	**2.26**	**2.26**	**2.26**
	*** Sum Open-Motorized, Native Surface Routes =**		18.43	10.72	10.72	10.72	10.72	10.72	10.72	27208.38	3	6	3	4	3	4	3	4	3	4	3	4	3	4		2.93	1.99	1.99	1.99	1.99	1.99	1.99
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.60**	**1.51**	**1.51**	**1.51**	**1.51**	**1.51**	**1.51**	**7.09**	**0.4**	**0.8**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**1.93**	**1.52**	**1.03**	**1.03**	**1.03**	**1.03**	**1.03**	**1.03**
18020125020305	Willow Creek	AY	3.18	0.17	3.18	3.18	0.17	2.81	3.18	8,191.91	4	1	1	0	4	1	4	1	1	0	4	1	4	1	1,907.13	0.80	0.00	0.80	0.80	0.00	0.77	0.80
18020125020305	Willow Creek	BS*	0.00	0.00	0.00	16.81	17.19	17.19	0.00	8,191.91	0	0	0	0	0	0	5	4	5	4	5	4	0	0	1,907.13	0.00	0.00	0.00	2.19	2.22	2.22	0.00
18020125020305	Willow Creek	BY*	16.81	19.83	16.81	0.00	2.64	0.00	16.81	8,191.91	5	4	8	5	5	4	0	0	3	1	0	0	5	4	1,907.13	2.19	2.99	2.19	0.00	0.77	0.00	2.19
18020125020305	Willow Creek	CS*	0.00	0.00	0.00	0.16	1.10	0.16	0.00	8,191.91	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1,907.13	0.00	0.00	0.00	0.16	0.16	0.16	0.00
18020125020305	Willow Creek	CY*	0.00	0.16	0.00	0.00	0.00	0.00	0.00	8,191.91	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1,907.13	0.00	0.16	0.00	0.00	0.00	0.00	0.00
18020125020305	Willow Creek	FY	0.00	13.85	14.01	13.85	13.11	13.85	14.01	8,191.91	0	0	6	7	7	8	6	7	6	7	6	7	7	8	1,907.13	0.00	2.01	2.17	2.01	2.01	2.01	2.17
18020125020305	Willow Creek	GY	21.64	21.64	21.64	21.64	21.64	21.64	21.64	8,191.91	11	12	11	12	11	12	11	12	11	12	11	12	11	12	1,907.13	6.91	6.91	6.91	6.91	6.91	6.91	6.91
18020125020305	Willow Creek	HY*	10.56	10.56	10.56	10.56	10.36	10.56	10.56	8,191.91	3	1	3	1	3	1	3	1	3	1	3	1	3	1	1,907.13	1.98	1.98	1.98	1.98	1.98	1.98	1.98
18020125020305	Willow Creek	IY	0.86	0.86	0.86	0.86	0.86	0.86	0.86	8,191.91	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,907.13	0.16	0.16	0.16	0.16	0.16	0.16	0.16
18020125020305	Willow Creek	KY	9.33	9.33	9.33	9.33	9.33	9.33	9.33	8,191.91	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1,907.13	2.09	2.09	2.09	2.09	2.09	2.09	2.09
18020125020305	Willow Creek	LS*	0.95	0.00	0.00	0.00	0.00	0.00	0.00	8,191.91	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1,907.13	0.10	0.00	0.00	0.00	0.00	0.00	0.00
18020125020305	Willow Creek	LY*	13.06	0.00	0.00	0.00	0.00	0.00	0.00	8,191.91	6	7	0	0	0	0	0	0	0	0	0	0	0	0	1,907.13	2.07	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		76.40	76.40	76.40	76.40	76.40	76.40	76.40	8191.91	34	31	34	31	34	31	34	31	34	31	34	31	34	31	1907.13	16.30	16.30	16.30	16.30	16.30	16.30	16.30
	*** Value Per SqMi All =**		**5.97**	**5.97**	**5.97**	**5.97**	**5.97**	**5.97**	**5.97**	**12.80**	**2.7**	**2.4**	**2.7**	**2.4**	**2.7**	**2.4**	**2.7**	**2.4**	**2.7**	**2.4**	**2.7**	**2.4**	**2.7**	**2.4**	**2.98**	**5.47**	**5.47**	**5.47**	**5.47**	**5.47**	**5.47**	**5.47**
	*** Sum Open-Motorized, Native Surface Routes =**		41.38	30.55	27.38	27.54	31.29	27.91	27.38	73727.19	15	13	12	7	8	5	9	6	12	7	9	6	8	5		6.34	5.13	4.17	4.33	5.13	4.36	9.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.23**	**2.39**	**2.14**	**2.15**	**2.44**	**2.18**	**2.14**	**12.80**	**1.2**	**1.0**	**0.9**	**0.5**	**0.6**	**0.4**	**0.7**	**0.5**	**0.9**	**0.5**	**0.7**	**0.5**	**0.6**	**0.4**	**2.98**	**2.13**	**1.72**	**1.40**	**1.45**	**1.72**	**1.46**	**3.02**
18020125020306	Bullards Bar Reservoir-Bridger Creek	AY	2.73	2.73	2.73	2.73	2.73	2.73	2.73	6,377.20	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,449.01	0.27	0.27	0.27	0.27	0.27	0.27	0.27
18020125020306	Bullards Bar Reservoir-Bridger Creek	BS*	1.18	1.18	1.18	3.45	3.45	3.45	1.18	6,377.20	1	2	1	2	1	2	1	3	1	3	1	3	1	2	1,449.01	0.09	0.09	0.09	0.31	0.31	0.31	0.09
18020125020306	Bullards Bar Reservoir-Bridger Creek	BY*	2.27	2.27	2.27	0.00	0.00	0.00	2.27	6,377.20	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1,449.01	0.22	0.22	0.22	0.00	0.00	0.00	0.22
18020125020306	Bullards Bar Reservoir-Bridger Creek	CS*	0.00	0.00	0.00	0.00	0.05	0.05	0.00	6,377.20	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1,449.01	0.00	0.00	0.00	0.00	0.05	0.05	0.00
18020125020306	Bullards Bar Reservoir-Bridger Creek	CY*	0.00	0.05	0.00	0.00	0.00	0.00	0.00	6,377.20	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1,449.01	0.00	0.05	0.00	0.00	0.00	0.00	0.00
18020125020306	Bullards Bar Reservoir-Bridger Creek	FY	2.02	9.55	9.61	9.61	9.55	9.55	9.61	6,377.20	0	0	1	1	2	1	2	1	1	1	1	1	2	1	1,449.01	0.38	1.31	1.36	1.36	1.31	1.31	1.36
18020125020306	Bullards Bar Reservoir-Bridger Creek	GY	6.67	6.67	6.67	6.67	6.67	6.67	6.67	6,377.20	8	4	8	4	8	4	8	4	8	4	8	4	8	4	1,449.01	2.06	2.06	2.06	2.06	2.06	2.06	2.06
18020125020306	Bullards Bar Reservoir-Bridger Creek	HY*	8.16	8.16	8.16	8.16	8.16	8.16	8.16	6,377.20	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,449.01	1.96	1.96	1.96	1.96	1.96	1.96	1.96
18020125020306	Bullards Bar Reservoir-Bridger Creek	IY	14.52	14.52	14.52	14.52	14.52	14.52	14.52	6,377.20	2	8	2	8	2	8	2	8	2	8	2	8	2	8	1,449.01	8.29	8.29	8.29	8.29	8.29	8.29	8.29
18020125020306	Bullards Bar Reservoir-Bridger Creek	KY	1.47	1.47	1.47	1.47	1.47	1.47	1.47	6,377.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,449.01	0.13	0.13	0.13	0.13	0.13	0.13	0.13
18020125020306	Bullards Bar Reservoir-Bridger Creek	LS*	3.41	0.00	0.00	0.00	0.00	0.00	0.00	6,377.20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,449.01	0.13	0.00	0.00	0.00	0.00	0.00	0.00
18020125020306	Bullards Bar Reservoir-Bridger Creek	LY*	4.17	0.00	0.00	0.00	0.00	0.00	0.00	6,377.20	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1,449.01	0.86	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		46.60	46.60	46.60	46.60	46.60	46.60	46.60	6377.20	14	17	14	17	14	17	14	17	14	17	14	17	14	17	1449.01	14.39	14.38	14.38	14.38	14.38	14.38	14.38
	*** Value Per SqMi All =**		**4.68**	**4.68**	**4.68**	**4.68**	**4.68**	**4.68**	**4.68**	**9.96**	**1.4**	**1.7**	**1.4**	**1.7**	**1.4**	**1.7**	**1.4**	**1.7**	**1.4**	**1.7**	**1.4**	**1.7**	**1.4**	**1.7**	**2.26**	**6.36**	**6.35**	**6.35**	**6.35**	**6.35**	**6.35**	**6.35**
	*** Sum Open-Motorized, Native Surface Routes =**		19.19	11.66	11.61	11.61	11.66	11.66	11.61	57394.8	3	5	2	4	1	4	1	4	2	4	2	4	1	4		3.26	2.32	2.27	2.27	2.32	2.32	2.19
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.93**	**1.17**	**1.16**	**1.16**	**1.17**	**1.17**	**1.16**	**9.96**	**0.3**	**0.5**	**0.2**	**0.4**	**0.1**	**0.4**	**0.1**	**0.4**	**0.2**	**0.4**	**0.2**	**0.4**	**0.1**	**0.4**	**2.26**	**1.44**	**1.02**	**1.00**	**1.00**	**1.02**	**1.02**	**0.97**
18020125020308	Bullard Bar Reservoir-Lower North Yuba River	AY	0.40	0.40	0.40	0.40	0.40	0.40	0.40	701.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	414.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020308	Bullard Bar Reservoir-Lower North Yuba River	FY	0.00	2.52	2.52	2.52	2.52	2.52	2.52	701.77	0	0	1	0	1	0	1	0	1	0	1	0	1	0	414.62	0.00	0.32	0.32	0.32	0.32	0.32	0.32
18020125020308	Bullard Bar Reservoir-Lower North Yuba River	GY	1.16	1.16	1.16	1.16	1.16	1.16	1.16	701.77	1	0	1	0	1	0	1	0	1	0	1	0	1	0	414.62	0.33	0.33	0.33	0.33	0.33	0.33	0.33
18020125020308	Bullard Bar Reservoir-Lower North Yuba River	HY*	0.18	0.18	0.18	0.18	0.18	0.18	0.18	701.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	414.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125020308	Bullard Bar Reservoir-Lower North Yuba River	IY	1.15	1.15	1.15	1.15	1.15	1.15	1.15	701.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	414.62	0.37	0.37	0.37	0.37	0.37	0.37	0.37
18020125020308	Bullard Bar Reservoir-Lower North Yuba River	LS*	2.28	0.00	0.00	0.00	0.00	0.00	0.00	701.77	1	0	0	0	0	0	0	0	0	0	0	0	0	0	414.62	0.32	0.00	0.00	0.00	0.00	0.00	0.00
18020125020308	Bullard Bar Reservoir-Lower North Yuba River	LY*	0.24	0.00	0.00	0.00	0.00	0.00	0.00	701.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	414.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		5.42	5.42	5.42	5.42	5.42	5.42	5.42	701.77	2	0	2	0	2	0	2	0	2	0	2	0	2	0	414.62	1.02	1.02	1.02	1.02	1.02	1.02	1.02
	*** Value Per SqMi All =**		**4.94**	**4.94**	**4.94**	**4.94**	**4.94**	**4.94**	**4.94**	**1.10**	**1.8**	**0.0**	**1.8**	**0.0**	**1.8**	**0.0**	**1.8**	**0.0**	**1.8**	**0.0**	**1.8**	**0.0**	**1.8**	**0.0**	**0.65**	**1.57**	**1.57**	**1.57**	**1.57**	**1.57**	**1.57**	**1.57**
	*** Sum Open-Motorized, Native Surface Routes =**		2.70	0.18	0.18	0.18	0.18	0.18	0.18		20.71	24.21	18.61	23.11	17.51	23.11	17.51	23.11	18.61	23.11	18.61	23.11	17.51	23.11		0.32	0	0	0	0	0	0.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.46**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**	**1.10**	**18.9**	**22.1**	**17.0**	**21.1**	**16.0**	**21.1**	**16.0**	**21.1**	**17.0**	**21.1**	**17.0**	**21.1**	**16.0**	**21.1**	**0.65**	**0.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
18020125030101	Headwaters Middle Yuba River	BS*	0.00	0.00	0.00	17.82	17.82	17.82	0.00	7,683.69	0	0	0	0	0	0	1	24	1	24	1	24	0	0	1,812.99	0.00	0.00	0.00	3.03	3.03	3.03	0.00
18020125030101	Headwaters Middle Yuba River	BY*	17.82	17.82	17.82	0.00	0.00	0.00	17.82	7,683.69	1	24	1	24	1	24	0	0	0	0	0	0	1	24	1,812.99	3.03	3.03	3.03	0.00	0.00	0.00	3.03
18020125030101	Headwaters Middle Yuba River	FY	0.00	1.05	1.05	1.05	1.05	1.05	1.05	7,683.69	0	0	0	1	0	1	0	1	0	1	0	1	0	1	1,812.99	0.00	0.26	0.26	0.26	0.26	0.26	0.26
18020125030101	Headwaters Middle Yuba River	GY	3.67	3.67	3.67	3.67	3.67	3.67	3.67	7,683.69	4	0	4	0	4	0	4	0	4	0	4	0	4	0	1,812.99	1.03	1.03	1.03	1.03	1.03	1.03	1.03
18020125030101	Headwaters Middle Yuba River	HY*	5.75	5.75	5.75	5.75	5.75	5.75	5.75	7,683.69	0	2	0	2	0	2	0	2	0	2	0	2	0	2	1,812.99	0.95	0.95	0.95	0.95	0.95	0.95	0.95
18020125030101	Headwaters Middle Yuba River	JY	5.56	5.56	5.56	5.56	5.56	5.56	5.56	7,683.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,812.99	0.08	0.08	0.08	0.08	0.08	0.08	0.08
18020125030101	Headwaters Middle Yuba River	LY*	1.05	0.00	0.00	0.00	0.00	0.00	0.00	7,683.69	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1,812.99	0.26	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		33.85	33.85	33.85	33.85	33.85	33.85	33.85	7683.69	5	27	5	27	5	27	5	27	5	27	5	27	5	27	1812.99	5.35	5.35	5.35	5.35	5.35	5.35	5.35
	*** Value Per SqMi All =**		**2.82**	**2.82**	**2.82**	**2.82**	**2.82**	**2.82**	**2.82**	**12.01**	**0.4**	**2.2**	**0.4**	**2.2**	**0.4**	**2.2**	**0.4**	**2.2**	**0.4**	**2.2**	**0.4**	**2.2**	**0.4**	**2.2**	**2.83**	**1.89**	**1.89**	**1.89**	**1.89**	**1.89**	**1.89**	**1.89**
	*** Sum Open-Motorized, Native Surface Routes =**		24.62	23.57	23.57	23.57	23.57	23.57	23.57		1	27	1	26	1	26	1	26	1	26	1	26	1	26		4.24	3.98	3.98	3.98	3.98	3.98	3.98
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.05**	**1.96**	**1.96**	**1.96**	**1.96**	**1.96**	**1.96**	**12.01**	**0.1**	**2.2**	**0.1**	**2.2**	**0.1**	**2.2**	**0.1**	**2.2**	**0.1**	**2.2**	**0.1**	**2.2**	**0.1**	**2.2**	**2.83**	**1.50**	**1.40**	**1.40**	**1.40**	**1.40**	**1.40**	**1.40**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125030102	Upper Pass Creek	AY	5.60	2.87	5.60	5.60	2.87	3.29	5.60	5,251.07	4	4	3	3	4	4	4	4	3	3	3	3	4	4	1,201.76	1.76	1.20	1.76	1.76	1.20	1.20	1.76
18020125030102	Upper Pass Creek	BS*	0.00	0.00	0.00	15.68	17.99	17.99	0.00	5,251.07	0	0	0	0	0	0	10	7	11	8	11	8	0	0	1,201.76	0.00	0.00	0.00	3.22	3.78	3.78	0.00
18020125030102	Upper Pass Creek	BY*	15.68	18.42	15.68	0.00	0.42	0.00	15.68	5,251.07	10	7	11	8	10	7	0	0	0	0	0	0	10	7	1,201.76	3.22	3.78	3.22	0.00	0.00	0.00	3.22
18020125030102	Upper Pass Creek	FY	0.00	1.74	1.74	1.74	1.74	1.74	1.74	5,251.07	0	0	0	1	0	1	0	1	0	1	0	1	0	1	1,201.76	0.00	0.46	0.46	0.46	0.46	0.46	0.46
18020125030102	Upper Pass Creek	GY	2.46	2.46	2.46	2.46	2.46	2.46	2.46	5,251.07	4	3	4	3	4	3	4	3	4	3	4	3	4	3	1,201.76	1.28	1.28	1.28	1.28	1.28	1.28	1.28
18020125030102	Upper Pass Creek	HY*	5.82	5.82	5.82	5.82	5.82	5.82	5.82	5,251.07	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1,201.76	1.44	1.44	1.44	1.44	1.44	1.44	1.44
18020125030102	Upper Pass Creek	JY	0.07	0.07	0.07	0.07	0.07	0.07	0.07	5,251.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,201.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030102	Upper Pass Creek	LY*	1.74	0.00	0.00	0.00	0.00	0.00	0.00	5,251.07	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1,201.76	0.46	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		31.38	31.38	31.38	31.38	31.38	31.38	31.38	5251.07	19	17	19	17	19	17	19	17	19	17	19	17	19	17	1201.76	8.16	8.16	8.16	8.16	8.16	8.16	8.16
	*** Value Per SqMi All =**		**3.82**	**3.82**	**3.82**	**3.82**	**3.82**	**3.82**	**3.82**	**8.20**	**2.3**	**2.1**	**2.3**	**2.1**	**2.3**	**2.1**	**2.3**	**2.1**	**2.3**	**2.1**	**2.3**	**2.1**	**2.3**	**2.1**	**1.88**	**4.35**	**4.35**	**4.35**	**4.35**	**4.35**	**4.35**	**4.35**
	*** Sum Open-Motorized, Native Surface Routes =**		23.24	24.23	21.50	21.50	24.23	23.81	21.50		11	10	12	10	11	9	11	9	12	10	12	10	11	9		5.12	5.22	4.66	4.66	5.22	5.22	4.66
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.83**	**2.95**	**2.62**	**2.62**	**2.95**	**2.90**	**2.62**	**8.20**	**1.3**	**1.2**	**1.5**	**1.2**	**1.3**	**1.1**	**1.3**	**1.1**	**1.5**	**1.2**	**1.5**	**1.2**	**1.3**	**1.1**	**1.88**	**2.73**	**2.78**	**2.48**	**2.48**	**2.78**	**2.78**	**2.48**
18020125030103	Lower Pass Creek	AY	9.43	1.68	9.43	9.43	1.68	1.68	9.43	5,034.93	7	7	1	2	7	7	7	7	1	2	1	2	7	7	920.61	1.88	0.31	1.88	1.88	0.31	0.31	1.88
18020125030103	Lower Pass Creek	BS*	0.00	0.00	0.00	12.15	19.74	19.74	0.00	5,034.93	0	0	0	0	0	0	6	16	12	21	12	21	0	0	920.61	0.00	0.00	0.00	1.57	3.02	3.02	0.00
18020125030103	Lower Pass Creek	BY*	12.15	19.90	12.15	0.00	0.16	0.16	12.15	5,034.93	6	16	12	21	6	16	0	0	0	0	0	0	6	16	920.61	1.57	3.14	1.57	0.00	0.12	0.12	1.57
18020125030103	Lower Pass Creek	FY	0.00	1.89	1.89	1.89	1.89	1.89	1.89	5,034.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	920.61	0.00	0.23	0.23	0.23	0.23	0.23	0.23
18020125030103	Lower Pass Creek	HY*	4.86	4.86	4.86	4.86	4.86	4.86	4.86	5,034.93	2	1	2	1	2	1	2	1	2	1	2	1	2	1	920.61	1.11	1.11	1.11	1.11	1.11	1.11	1.11
18020125030103	Lower Pass Creek	IY	0.37	0.37	0.37	0.37	0.37	0.37	0.37	5,034.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	920.61	0.04	0.04	0.04	0.04	0.04	0.04	0.04
18020125030103	Lower Pass Creek	JY	1.39	1.39	1.39	1.39	1.39	1.39	1.39	5,034.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	920.61	0.09	0.09	0.09	0.09	0.09	0.09	0.09
18020125030103	Lower Pass Creek	LY*	1.89	0.00	0.00	0.00	0.00	0.00	0.00	5,034.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	920.61	0.23	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		30.09	30.09	30.09	30.09	30.09	30.09	30.09	5034.93	15	24	15	24	15	24	15	24	15	24	15	24	15	24	920.61	4.92	4.92	4.92	4.92	4.92	4.92	4.92
	*** Value Per SqMi All =**		**3.82**	**3.82**	**3.82**	**3.82**	**3.82**	**3.82**	**3.82**	**7.87**	**1.9**	**3.1**	**1.9**	**3.1**	**1.9**	**3.1**	**1.9**	**3.1**	**1.9**	**3.1**	**1.9**	**3.1**	**1.9**	**3.1**	**1.44**	**3.42**	**3.42**	**3.42**	**3.42**	**3.42**	**3.42**	**3.42**
	*** Sum Open-Motorized, Native Surface Routes =**		18.90	24.76	17.01	17.01	24.76	24.76	17.01		8	17	14	22	8	17	8	17	14	22	14	22	8	17		2.91	4.25	2.68	2.68	4.25	4.25	2.68
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.40**	**3.15**	**2.16**	**2.16**	**3.15**	**3.15**	**2.16**	**7.87**	**1.0**	**2.2**	**1.8**	**2.8**	**1.0**	**2.2**	**1.0**	**2.2**	**1.8**	**2.8**	**1.8**	**2.8**	**1.0**	**2.2**	**1.44**	**2.02**	**2.95**	**1.86**	**1.86**	**2.95**	**2.95**	**1.86**
18020125030104	Jackson Meadows Reservoir	AY	7.26	4.45	7.26	7.26	4.45	4.45	7.26	5,896.47	4	5	2	1	4	5	4	5	2	1	2	1	4	5	1,162.50	1.47	0.90	1.47	1.47	0.90	0.90	1.47
18020125030104	Jackson Meadows Reservoir	BS*	0.00	0.00	0.00	7.98	10.66	9.33	0.00	5,896.47	0	0	0	0	0	0	1	3	3	7	3	6	0	0	1,162.50	0.00	0.00	0.00	2.25	2.82	2.64	0.00
18020125030104	Jackson Meadows Reservoir	BY*	7.98	10.78	7.98	0.00	0.12	1.45	7.98	5,896.47	1	3	3	7	1	3	0	0	0	0	0	1	1	3	1,162.50	2.25	2.82	2.25	0.00	0.00	0.19	2.25
18020125030104	Jackson Meadows Reservoir	FY	0.00	1.67	1.67	1.67	1.67	1.67	1.67	5,896.47	0	0	1	0	1	0	1	0	1	0	1	0	1	0	1,162.50	0.00	0.19	0.19	0.19	0.19	0.19	0.19
18020125030104	Jackson Meadows Reservoir	GY	6.18	6.18	6.18	6.18	6.18	6.18	6.18	5,896.47	11	3	11	3	11	3	11	3	11	3	11	3	11	3	1,162.50	3.55	3.55	3.55	3.55	3.55	3.55	3.55
18020125030104	Jackson Meadows Reservoir	HY*	2.29	2.29	2.29	2.29	2.29	2.29	2.29	5,896.47	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,162.50	0.97	0.97	0.97	0.97	0.97	0.97	0.97
18020125030104	Jackson Meadows Reservoir	IY	0.69	0.69	0.69	0.69	0.69	0.69	0.69	5,896.47	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,162.50	0.36	0.36	0.36	0.36	0.36	0.36	0.36
18020125030104	Jackson Meadows Reservoir	JY	3.13	3.13	3.13	3.13	3.13	3.13	3.13	5,896.47	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,162.50	0.09	0.09	0.09	0.09	0.09	0.09	0.09
18020125030104	Jackson Meadows Reservoir	LY*	1.67	0.00	0.00	0.00	0.00	0.00	0.00	5,896.47	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,162.50	0.19	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		29.19	29.19	29.19	29.19	29.19	29.19	29.19	5896.47	22	12	22	12	22	12	22	12	22	12	22	12	22	12	1162.50	8.88	8.88	8.88	8.88	8.88	8.89	8.88
	*** Value Per SqMi All =**		**3.17**	**3.17**	**3.17**	**3.17**	**3.17**	**3.17**	**3.17**	**9.21**	**2.4**	**1.3**	**2.4**	**1.3**	**2.4**	**1.3**	**2.4**	**1.3**	**2.4**	**1.3**	**2.4**	**1.3**	**2.4**	**1.3**	**1.82**	**4.89**	**4.89**	**4.89**	**4.89**	**4.89**	**4.89**	**4.89**
	*** Sum Open-Motorized, Native Surface Routes =**		11.94	13.07	10.26	10.26	13.07	13.07	10.26		4	3	5	7	3	3	3	3	5	7	5	7	3	3		3.41	3.79	3.22	3.22	3.79	3.8	3.22
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.30**	**1.42**	**1.11**	**1.11**	**1.42**	**1.42**	**1.11**	**9.21**	**0.4**	**0.3**	**0.5**	**0.8**	**0.3**	**0.3**	**0.3**	**0.3**	**0.5**	**0.8**	**0.5**	**0.8**	**0.3**	**0.3**	**1.82**	**1.88**	**2.09**	**1.77**	**1.77**	**2.09**	**2.09**	**1.77**
18020125030201	Middle Yuba River-Milton Reservoir	AY	1.62	0.00	1.62	1.62	0.00	0.00	1.62	6,527.34	0	2	0	0	0	2	0	2	0	0	0	0	0	2	1,215.01	0.15	0.00	0.15	0.15	0.00	0.00	0.15
18020125030201	Middle Yuba River-Milton Reservoir	BS*	0.00	0.00	0.00	12.83	13.83	12.83	0.00	6,527.34	0	0	0	0	0	0	2	5	2	6	2	5	0	0	1,215.01	0.00	0.00	0.00	2.81	2.96	2.81	0.00
18020125030201	Middle Yuba River-Milton Reservoir	BY*	12.83	14.45	12.83	0.00	0.62	1.62	12.83	6,527.34	2	5	2	7	2	5	0	0	0	1	0	2	2	5	1,215.01	2.81	2.96	2.81	0.00	0.00	0.15	2.81
18020125030201	Middle Yuba River-Milton Reservoir	CS*	0.00	0.00	0.00	0.00	0.04	0.04	0.00	6,527.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,215.01	0.00	0.00	0.00	0.00	0.04	0.04	0.00
18020125030201	Middle Yuba River-Milton Reservoir	CY*	0.00	0.04	0.00	0.00	0.00	0.00	0.00	6,527.34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,215.01	0.00	0.04	0.00	0.00	0.00	0.00	0.00
18020125030201	Middle Yuba River-Milton Reservoir	FY	1.75	4.68	4.71	4.71	4.68	4.68	4.71	6,527.34	0	2	1	3	1	3	1	3	1	3	1	3	1	3	1,215.01	0.27	1.03	1.07	1.07	1.03	1.03	1.07
18020125030201	Middle Yuba River-Milton Reservoir	GY	5.73	5.73	5.73	5.73	5.73	5.73	5.73	6,527.34	4	2	4	2	4	2	4	2	4	2	4	2	4	2	1,215.01	2.17	2.17	2.17	2.17	2.17	2.17	2.17
18020125030201	Middle Yuba River-Milton Reservoir	HY*	7.69	7.69	7.69	7.69	7.69	7.69	7.69	6,527.34	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,215.01	1.19	1.19	1.19	1.19	1.19	1.19	1.19
18020125030201	Middle Yuba River-Milton Reservoir	JY	2.90	2.90	2.90	2.90	2.90	2.90	2.90	6,527.34	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1,215.01	0.97	0.97	0.97	0.97	0.97	0.97	0.97
18020125030201	Middle Yuba River-Milton Reservoir	LY*	2.96	0.00	0.00	0.00	0.00	0.00	0.00	6,527.34	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1,215.01	0.80	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		35.48	35.48	35.48	35.48	35.48	35.48	35.48	6527.34	10	14	10	14	10	14	10	14	10	14	10	14	10	14	1215.01	8.36	8.36	8.36	8.36	8.36	8.36	8.36
	*** Value Per SqMi All =**		**3.48**	**3.48**	**3.48**	**3.48**	**3.48**	**3.48**	**3.48**	**10.20**	**1.0**	**1.4**	**1.0**	**1.4**	**1.0**	**1.4**	**1.0**	**1.4**	**1.0**	**1.4**	**1.0**	**1.4**	**1.0**	**1.4**	**1.90**	**4.40**	**4.40**	**4.40**	**4.40**	**4.40**	**4.40**	**4.40**
	*** Sum Open-Motorized, Native Surface Routes =**		23.48	22.18	20.52	20.52	22.18	22.18	20.52		5	6	4	7	4	5	4	5	4	7	4	7	4	5		4.8	4.19	4	4	4.19	4.19	4.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.30**	**2.17**	**2.01**	**2.01**	**2.17**	**2.17**	**2.01**	**10.20**	**0.5**	**0.6**	**0.4**	**0.7**	**0.4**	**0.5**	**0.4**	**0.5**	**0.4**	**0.7**	**0.4**	**0.7**	**0.4**	**0.5**	**1.90**	**2.53**	**2.21**	**2.11**	**2.11**	**2.21**	**2.21**	**2.11**
18020125030202	East Fork Creek	AY	9.85	0.42	9.85	9.85	0.42	0.42	9.85	8,449.57	3	3	0	0	3	3	3	3	0	0	0	0	3	3	1,509.35	1.43	0.07	1.43	1.43	0.07	0.07	1.43
18020125030202	East Fork Creek	BS*	0.00	0.00	0.00	16.53	17.93	17.71	0.00	8,449.57	0	0	0	0	0	0	6	2	7	4	7	3	0	0	1,509.35	0.00	0.00	0.00	4.42	4.87	4.75	0.00
18020125030202	East Fork Creek	BY*	16.53	25.96	16.53	0.00	8.03	8.25	16.53	8,449.57	6	2	9	5	6	2	0	0	2	1	2	2	6	2	1,509.35	4.42	5.78	4.42	0.00	0.92	1.03	4.42
18020125030202	East Fork Creek	FY	0.84	5.82	5.82	5.82	5.82	5.82	5.82	8,449.57	0	1	2	1	2	1	2	1	2	1	2	1	2	1	1,509.35	0.46	2.23	2.23	2.23	2.23	2.23	2.23
18020125030202	East Fork Creek	GY	0.81	0.81	0.81	0.81	0.81	0.81	0.81	8,449.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,509.35	0.44	0.44	0.44	0.44	0.44	0.44	0.44
18020125030202	East Fork Creek	HY*	24.34	24.34	24.34	24.34	24.34	24.34	24.34	8,449.57	3	1	3	1	3	1	3	1	3	1	3	1	3	1	1,509.35	2.12	2.12	2.12	2.12	2.12	2.12	2.12
18020125030202	East Fork Creek	LY*	4.97	0.00	0.00	0.00	0.00	0.00	0.00	8,449.57	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1,509.35	1.77	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		57.36	57.36	57.36	57.36	57.36	57.36	57.36	8449.57	14	7	14	7	14	7	14	7	14	7	14	7	14	7	1509.35	10.64	10.64	10.64	10.64	10.65	10.64	10.64
	*** Value Per SqMi All =**		**4.34**	**4.34**	**4.34**	**4.34**	**4.34**	**4.34**	**4.34**	**13.20**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**2.36**	**4.51**	**4.51**	**4.51**	**4.51**	**4.52**	**4.51**	**4.51**
	*** Sum Open-Motorized, Native Surface Routes =**		45.85	50.30	40.87	40.87	50.30	50.30	40.87		11	3	12	6	9	3	9	3	12	6	12	6	9	3		8.31	7.9	6.54	6.54	7.91	7.9	6.54
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.47**	**3.81**	**3.10**	**3.10**	**3.81**	**3.81**	**3.10**	**13.20**	**0.8**	**0.2**	**0.9**	**0.5**	**0.7**	**0.2**	**0.7**	**0.2**	**0.9**	**0.5**	**0.9**	**0.5**	**0.7**	**0.2**	**2.36**	**3.52**	**3.35**	**2.77**	**2.77**	**3.35**	**3.35**	**2.77**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125030203	Middle Yuba River-Box Canyons	AY	4.50	0.00	4.50	4.50	0.00	0.05	4.50	9,696.78	3	0	0	0	3	0	3	0	0	0	0	0	3	0	1,612.94	0.65	0.00	0.65	0.65	0.00	0.00	0.65
18020125030203	Middle Yuba River-Box Canyons	BS*	0.00	0.00	0.00	7.38	7.38	7.38	0.00	9,696.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,612.94	0.00	0.00	0.00	0.80	0.80	0.80	0.00
18020125030203	Middle Yuba River-Box Canyons	BY*	7.38	11.88	7.38	0.00	4.50	4.46	7.38	9,696.78	0	0	3	0	0	0	0	0	3	0	3	0	0	0	1,612.94	0.80	1.45	0.80	0.00	0.65	0.65	0.80
18020125030203	Middle Yuba River-Box Canyons	FY	0.00	3.27	3.27	3.27	3.27	3.27	3.27	9,696.78	0	0	1	0	1	0	1	0	1	0	1	0	1	0	1,612.94	0.00	0.68	0.68	0.68	0.68	0.68	0.68
18020125030203	Middle Yuba River-Box Canyons	GY	6.53	6.53	6.53	6.53	6.53	6.53	6.53	9,696.78	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,612.94	0.25	0.25	0.25	0.25	0.25	0.25	0.25
18020125030203	Middle Yuba River-Box Canyons	HY*	15.86	15.86	15.86	15.86	15.86	15.86	15.86	9,696.78	5	2	5	2	5	2	5	2	5	2	5	2	5	2	1,612.94	2.19	2.19	2.19	2.19	2.19	2.19	2.19
18020125030203	Middle Yuba River-Box Canyons	LY*	3.27	0.00	0.00	0.00	0.00	0.00	0.00	9,696.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,612.94	0.68	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		37.54	37.54	37.54	37.54	37.54	37.54	37.54	9696.78	10	3	10	3	10	3	10	3	10	3	10	3	10	3	1612.94	4.57	4.57	4.57	4.57	4.57	4.57	4.57
	*** Value Per SqMi All =**		**2.48**	**2.48**	**2.48**	**2.48**	**2.48**	**2.48**	**2.48**	**15.15**	**0.7**	**0.2**	**0.7**	**0.2**	**0.7**	**0.2**	**0.7**	**0.2**	**0.7**	**0.2**	**0.7**	**0.2**	**0.7**	**0.2**	**2.52**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**	**1.81**
	*** Sum Open-Motorized, Native Surface Routes =**		26.51	27.74	23.23	23.23	27.74	27.69	23.23		6	2	8	2	5	2	5	2	8	2	8	2	5	2		3.67	3.64	2.99	2.99	3.64	3.64	2.99
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.75**	**1.83**	**1.53**	**1.53**	**1.83**	**1.83**	**1.53**	**15.15**	**0.4**	**0.1**	**0.5**	**0.1**	**0.3**	**0.1**	**0.3**	**0.1**	**0.5**	**0.1**	**0.5**	**0.1**	**0.3**	**0.1**	**2.52**	**1.46**	**1.44**	**1.19**	**1.19**	**1.44**	**1.44**	**1.19**
18020125030301	Middle Yuba River-National Gulch	AY	0.74	0.74	0.74	0.74	0.74	0.74	0.74	6,686.97	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,287.19	0.36	0.36	0.36	0.36	0.36	0.36	0.36
18020125030301	Middle Yuba River-National Gulch	BS*	0.00	0.00	0.00	21.96	21.96	21.96	0.00	6,686.97	0	0	0	0	0	0	2	10	2	10	2	10	0	0	1,287.19	0.00	0.00	0.00	2.55	2.55	2.55	0.00
18020125030301	Middle Yuba River-National Gulch	BY*	21.96	21.96	21.96	0.00	0.00	0.00	21.96	6,686.97	2	10	2	10	2	10	0	0	0	0	0	0	2	10	1,287.19	2.55	2.55	2.55	0.00	0.00	0.00	2.55
18020125030301	Middle Yuba River-National Gulch	CS*	0.00	0.00	0.00	0.91	0.91	0.91	0.00	6,686.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,287.19	0.00	0.00	0.00	0.14	0.14	0.14	0.00
18020125030301	Middle Yuba River-National Gulch	CY*	0.91	0.91	0.91	0.00	0.00	0.00	0.91	6,686.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,287.19	0.14	0.14	0.14	0.00	0.00	0.00	0.14
18020125030301	Middle Yuba River-National Gulch	FY	0.00	10.33	10.33	10.33	10.33	10.33	10.33	6,686.97	0	0	2	5	2	5	2	5	2	5	2	5	2	5	1,287.19	0.00	1.78	1.78	1.78	1.78	1.78	1.78
18020125030301	Middle Yuba River-National Gulch	GY	2.99	2.99	2.99	2.99	2.99	2.99	2.99	6,686.97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,287.19	0.03	0.03	0.03	0.03	0.03	0.03	0.03
18020125030301	Middle Yuba River-National Gulch	HY*	13.52	13.52	13.52	13.52	13.52	13.52	13.52	6,686.97	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1,287.19	1.36	1.36	1.36	1.36	1.36	1.36	1.36
18020125030301	Middle Yuba River-National Gulch	LY*	10.33	0.00	0.00	0.00	0.00	0.00	0.00	6,686.97	2	5	0	0	0	0	0	0	0	0	0	0	0	0	1,287.19	1.78	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		50.45	50.45	50.45	50.45	50.45	50.45	50.45	6686.97	5	19	5	19	5	19	5	19	5	19	5	19	5	19	1287.19	6.22	6.22	6.22	6.22	6.22	6.22	6.22
	*** Value Per SqMi All =**		**4.83**	**4.83**	**4.83**	**4.83**	**4.83**	**4.83**	**4.83**	**10.45**	**0.5**	**1.8**	**0.5**	**1.8**	**0.5**	**1.8**	**0.5**	**1.8**	**0.5**	**1.8**	**0.5**	**1.8**	**0.5**	**1.8**	**2.01**	**3.09**	**3.09**	**3.09**	**3.09**	**3.09**	**3.09**	**3.09**
	*** Sum Open-Motorized, Native Surface Routes =**		46.73	36.39	36.39	36.39	36.39	36.39	36.39		5	18	3	13	3	13	3	13	3	13	3	13	3	13		5.83	4.05	4.05	4.05	4.05	4.05	4.05
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.47**	**3.48**	**3.48**	**3.48**	**3.48**	**3.48**	**3.48**	**10.45**	**0.5**	**1.7**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**2.01**	**2.90**	**2.01**	**2.01**	**2.01**	**2.01**	**2.01**	**2.01**
18020125030302	Wolf Creek	BS*	0.00	0.00	0.00	8.01	8.01	8.01	0.00	5,550.73	0	0	0	0	0	0	2	0	2	0	2	0	0	0	1,000.81	0.00	0.00	0.00	0.75	0.75	0.75	0.00
18020125030302	Wolf Creek	BY*	8.01	8.01	8.01	0.00	0.00	0.00	8.01	5,550.73	2	0	2	0	2	0	0	0	0	0	0	0	2	0	1,000.81	0.75	0.75	0.75	0.00	0.00	0.00	0.75
18020125030302	Wolf Creek	FY	0.00	5.63	5.63	5.63	5.63	5.63	5.63	5,550.73	0	0	1	5	1	5	1	5	1	5	1	5	1	5	1,000.81	0.00	1.01	1.01	1.01	1.01	1.01	1.01
18020125030302	Wolf Creek	GY	4.94	4.94	4.94	4.94	4.94	4.94	4.94	5,550.73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,000.81	0.24	0.24	0.24	0.24	0.24	0.24	0.24
18020125030302	Wolf Creek	HY*	13.92	13.92	13.92	13.92	13.92	13.92	13.92	5,550.73	2	6	2	6	2	6	2	6	2	6	2	6	2	6	1,000.81	1.52	1.52	1.52	1.52	1.52	1.52	1.52
18020125030302	Wolf Creek	LY*	5.63	0.00	0.00	0.00	0.00	0.00	0.00	5,550.73	1	5	0	0	0	0	0	0	0	0	0	0	0	0	1,000.81	1.01	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		32.50	32.50	32.50	32.50	32.50	32.50	32.50	5550.73	5	11	5	11	5	11	5	11	5	11	5	11	5	11	1000.81	3.52	3.52	3.52	3.52	3.52	3.52	3.52
	*** Value Per SqMi All =**		**3.75**	**3.75**	**3.75**	**3.75**	**3.75**	**3.75**	**3.75**	**8.67**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**1.56**	**2.25**	**2.25**	**2.25**	**2.25**	**2.25**	**2.25**	**2.25**
	*** Sum Open-Motorized, Native Surface Routes =**		27.56	21.93	21.93	21.93	21.93	21.93	21.93		5	11	4	6	4	6	4	6	4	6	4	6	4	6		3.28	2.27	2.27	2.27	2.27	2.27	2.27
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.18**	**2.53**	**2.53**	**2.53**	**2.53**	**2.53**	**2.53**	**8.67**	**0.6**	**1.3**	**0.5**	**0.7**	**0.5**	**0.7**	**0.5**	**0.7**	**0.5**	**0.7**	**0.5**	**0.7**	**0.5**	**0.7**	**1.56**	**2.10**	**1.45**	**1.45**	**1.45**	**1.45**	**1.45**	**1.45**
18020125030303	Bloody Run	AY	3.43	3.29	3.43	3.43	3.29	3.29	3.43	4,212.62	1	1	1	1	1	1	1	1	1	1	1	1	1	1	802.59	0.48	0.48	0.48	0.48	0.48	0.48	0.48
18020125030303	Bloody Run	BS*	3.04	3.04	3.04	3.76	3.90	3.90	3.04	4,212.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	802.59	0.11	0.11	0.11	0.18	0.18	0.18	0.11
18020125030303	Bloody Run	BY*	0.72	0.85	0.72	0.00	0.00	0.00	0.72	4,212.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	802.59	0.07	0.07	0.07	0.00	0.00	0.00	0.07
18020125030303	Bloody Run	CS*	0.00	0.00	0.00	0.00	1.02	0.00	0.00	4,212.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	802.59	0.00	0.00	0.00	0.00	0.11	0.00	0.00
18020125030303	Bloody Run	FY	0.00	6.44	6.44	6.44	5.48	6.44	6.44	4,212.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	802.59	0.00	1.22	1.22	1.22	1.12	1.22	1.22
18020125030303	Bloody Run	GY	11.34	11.34	11.34	11.34	11.34	11.34	11.34	4,212.62	3	0	3	0	3	0	3	0	3	0	3	0	3	0	802.59	2.52	2.52	2.52	2.52	2.52	2.52	2.52
18020125030303	Bloody Run	HY*	10.90	10.90	10.90	10.90	10.84	10.90	10.90	4,212.62	0	1	0	1	0	1	0	1	0	1	0	1	0	1	802.59	1.73	1.73	1.73	1.73	1.73	1.73	1.73
18020125030303	Bloody Run	KY	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4,212.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	802.59	0.56	0.56	0.56	0.56	0.56	0.56	0.56
18020125030303	Bloody Run	LS*	1.62	0.00	0.00	0.00	0.00	0.00	0.00	4,212.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	802.59	0.15	0.00	0.00	0.00	0.00	0.00	0.00
18020125030303	Bloody Run	LY*	4.82	0.00	0.00	0.00	0.00	0.00	0.00	4,212.62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	802.59	1.07	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		40.64	40.64	40.64	40.64	40.64	40.64	40.64	4212.62	4	2	4	2	4	2	4	2	4	2	4	2	4	2	802.59	6.69	6.69	6.69	6.69	6.70	6.69	6.69
	*** Value Per SqMi All =**		**6.17**	**6.17**	**6.17**	**6.17**	**6.17**	**6.17**	**6.17**	**6.58**	**0.6**	**0.3**	**0.6**	**0.3**	**0.6**	**0.3**	**0.6**	**0.3**	**0.6**	**0.3**	**0.6**	**0.3**	**0.6**	**0.3**	**1.25**	**5.33**	**5.33**	**5.33**	**5.33**	**5.34**	**5.33**	**5.33**
	*** Sum Open-Motorized, Native Surface Routes =**		21.10	14.80	14.66	14.66	15.76	14.80	14.66		0	1	0	1	0	1	0	1	0	1	0	1	0	1		3.13	1.91	1.91	1.91	1.91	2.02	1.91	1.91
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.21**	**2.25**	**2.23**	**2.23**	**2.39**	**2.25**	**2.23**	**6.58**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**1.25**	**2.50**	**1.52**	**1.52**	**1.52**	**1.61**	**1.52**	**1.52**
18020125030304	Middle Yuba River-Moores Flat Creek	AY	0.89	0.89	0.89	0.89	0.89	0.89	0.89	8207.53	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1587.56	0.06	0.06	0.06	0.06	0.06	0.06	0.06
18020125030304	Middle Yuba River-Moores Flat Creek	BS*	0.22	0.22	0.22	6.92	6.92	6.92	0.22	8207.53	0	0	0	0	0	0	0	3	0	3	0	3	0	0	1587.56	0	0	0	0.29	0.29	0.29	0
18020125030304	Middle Yuba River-Moores Flat Creek	BY*	6.70	6.70	6.70	0.00	0.00	0.00	6.70	8207.53	0	3	0	3	0	3	0	0	0	0	0	0	0	3	1587.56	0.29	0.29	0.29	0	0	0	0.29
18020125030304	Middle Yuba River-Moores Flat Creek	CS*	0.00	0.00	0.00	4.98	5.67	5.05	0.00	8207.53	0	0	0	0	0	0	0	2	0	2	0	2	0	0	1587.56	0	0	0	0.8	1.02	0.82	0
18020125030304	Middle Yuba River-Moores Flat Creek	CY*	4.98	5.05	4.98	0.00	0.00	0.00	5.03	8207.53	0	2	0	2	0	2	0	0	0	0	0	0	0	2	1587.56	0.8	0.82	0.8	0	0	0	0.8
18020125030304	Middle Yuba River-Moores Flat Creek	ES*	0.00	0.00	0.00	0.00	0.47	0.47	0.00	8207.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1587.56	0	0	0	0	0	0	0
18020125030304	Middle Yuba River-Moores Flat Creek	EY*	0.00	0.47	0.00	0.00	0.00	0.00	0.47	8207.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1587.56	0	0	0	0	0	0	0
18020125030304	Middle Yuba River-Moores Flat Creek	FY	0.00	9.70	10.15	10.15	9.19	9.70	9.72	8207.53	0	0	4	4	4	4	4	4	4	4	4	4	4	4	1587.56	0	1.92	1.94	1.94	1.73	1.92	1.94
18020125030304	Middle Yuba River-Moores Flat Creek	GY	12.64	12.64	12.64	12.64	12.64	12.64	12.64	8207.53	1	9	1	9	1	9	1	9	1	9	1	9	1	9	1587.56	1.79	1.79	1.79	1.79	1.79	1.79	1.79
18020125030304	Middle Yuba River-Moores Flat Creek	HY*	9.99	9.92	9.99	9.99	9.80	9.92	9.92	8207.53	0	13	0	13	0	13	0	13	0	13	0	13	0	13	1587.56	1.83	1.83	1.83	1.83	1.83	1.83	1.83
18020125030304	Middle Yuba River-Moores Flat Creek	KY	1.24	1.24	1.24	1.24	1.24	1.24	1.24	8207.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1587.56	0.01	0.01	0.01	0.01	0.01	0.01	0.01
18020125030304	Middle Yuba River-Moores Flat Creek	LS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8207.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1587.56	0	0	0	0	0	0	0
18020125030304	Middle Yuba River-Moores Flat Creek	LY*	10.15	0.00	0.00	0.00	0.00	0.00	0.00	8207.53	4	4	0	0	0	0	0	0	0	0	0	0	0	0	1587.56	1.94	0	0	0	0	0	0
	Sum All =		46.83	46.83	46.83	46.83	46.83	46.83	46.83	8207.53	5	32	5	32	5	32	5	32	5	32	5	32	5	32	1587.56	6.72	6.72	6.72	6.72	6.73	6.72	6.72
	*** Value Per SqMi All =**		**3.65**	**3.65**	**3.65**	**3.65**	**3.65**	**3.65**	**3.65**	**12.82**	**0.4**	**2.5**	**0.4**	**2.5**	**0.4**	**2.5**	**0.4**	**2.5**	**0.4**	**2.5**	**0.4**	**2.5**	**0.4**	**2.5**	**2.48**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**	**2.71**
	*** Sum Open-Motorized, Native Surface Routes =**		32.05	22.36	21.90	21.90	22.87	22.36	22.34		4	22	0	18	0	18	0	18	0	18	0	18	0	18		4.86	2.94	2.92	2.92	3.14	2.94	2.92
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.50**	**1.74**	**1.71**	**1.71**	**1.78**	**1.74**	**1.74**	**12.82**	**0.3**	**1.7**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**2.48**	**1.96**	**1.19**	**1.18**	**1.18**	**1.27**	**1.19**	**1.18**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125030401	Headwaters Oregon Creek	AY	0.01	0.01	0.01	0.01	0.01	0.01	0.01	5,205.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	820.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030401	Headwaters Oregon Creek	BS*	0.00	0.00	0.00	3.27	3.27	3.27	0.00	5,205.16	0	0	0	0	0	0	0	1	0	1	0	1	0	0	820.80	0.00	0.00	0.00	0.06	0.06	0.06	0.00
18020125030401	Headwaters Oregon Creek	BY*	3.27	3.27	3.27	0.00	0.00	0.00	3.27	5,205.16	0	1	0	1	0	1	0	0	0	0	0	0	0	1	820.80	0.06	0.06	0.06	0.00	0.00	0.00	0.06
18020125030401	Headwaters Oregon Creek	CS*	0.00	0.00	0.00	0.32	0.32	0.32	0.00	5,205.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	820.80	0.00	0.00	0.00	0.23	0.23	0.23	0.00
18020125030401	Headwaters Oregon Creek	CY*	0.00	0.32	0.00	0.00	0.00	0.00	0.00	5,205.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	820.80	0.00	0.23	0.00	0.00	0.00	0.00	0.00
18020125030401	Headwaters Oregon Creek	FY	0.00	12.62	12.94	12.62	12.62	12.62	12.94	5,205.16	0	0	2	6	2	6	2	6	2	6	2	6	2	6	820.80	0.00	2.55	2.78	2.55	2.55	2.55	2.78
18020125030401	Headwaters Oregon Creek	GY	17.74	17.74	17.74	17.74	17.74	17.74	17.74	5,205.16	8	10	8	10	8	10	8	10	8	10	8	10	8	10	820.80	5.03	5.03	5.03	5.03	5.03	5.03	5.03
18020125030401	Headwaters Oregon Creek	HY*	1.16	1.16	1.16	1.16	1.16	1.16	1.16	5,205.16	0	1	0	1	0	1	0	1	0	1	0	1	0	1	820.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030401	Headwaters Oregon Creek	IY	10.45	10.45	10.45	10.45	10.45	10.45	10.45	5,205.16	1	7	1	7	1	7	1	7	1	7	1	7	1	7	820.80	2.38	2.38	2.38	2.38	2.38	2.38	2.38
18020125030401	Headwaters Oregon Creek	LY*	12.94	0.00	0.00	0.00	0.00	0.00	0.00	5,205.16	2	6	0	0	0	0	0	0	0	0	0	0	0	0	820.80	2.78	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		45.57	45.57	45.57	45.57	45.57	45.57	45.57	5205.16	11	25	11	25	11	25	11	25	11	25	11	25	11	25	820.80	10.25	10.25	10.25	10.25	10.25	10.25	10.25
	*** Value Per SqMi All =**		**5.60**	**5.60**	**5.60**	**5.60**	**5.60**	**5.60**	**5.60**	**8.13**	**1.4**	**3.1**	**1.4**	**3.1**	**1.4**	**3.1**	**1.4**	**3.1**	**1.4**	**3.1**	**1.4**	**3.1**	**1.4**	**3.1**	**1.28**	**7.99**	**7.99**	**7.99**	**7.99**	**7.99**	**7.99**	**7.99**
	*** Sum Open-Motorized, Native Surface Routes =**		17.38	4.75	4.44	4.75	4.75	4.75	4.44		2	8	0	2	0	2	0	2	0	2	0	2	0	2		2.84	0.29	0.06	0.29	0.29	0.29	0.06
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.14**	**0.58**	**0.55**	**0.58**	**0.58**	**0.58**	**0.55**	**8.13**	**0.2**	**1.0**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**0.0**	**0.2**	**1.28**	**2.21**	**0.23**	**0.05**	**0.23**	**0.23**	**0.23**	**0.05**
18020125030402	Oregon Creek-Miller Creek	BS*	0.00	0.00	0.00	16.09	16.09	16.09	0.00	5,657.34	0	0	0	0	0	0	4	11	4	11	4	11	0	0	948.16	0.00	0.00	0.00	1.93	1.93	1.93	0.00
18020125030402	Oregon Creek-Miller Creek	BY*	16.09	16.09	16.09	0.00	0.00	0.00	16.09	5,657.34	4	11	4	11	4	11	0	0	0	0	0	0	4	11	948.16	1.93	1.93	1.93	0.00	0.00	0.00	1.93
18020125030402	Oregon Creek-Miller Creek	CS*	0.00	0.00	0.00	0.10	0.50	0.10	0.00	5,657.34	0	0	0	0	0	0	1	0	1	0	1	0	0	0	948.16	0.00	0.00	0.00	0.09	0.09	0.09	0.00
18020125030402	Oregon Creek-Miller Creek	CY*	0.00	0.10	0.00	0.00	0.00	0.00	0.00	5,657.34	0	0	1	0	0	0	0	0	0	0	0	0	0	0	948.16	0.00	0.09	0.00	0.00	0.00	0.00	0.00
18020125030402	Oregon Creek-Miller Creek	FY	0.00	9.15	9.25	9.15	8.97	9.15	9.25	5,657.34	0	0	0	9	1	9	0	9	0	9	0	9	1	9	948.16	0.00	1.35	1.44	1.35	1.35	1.35	1.44
18020125030402	Oregon Creek-Miller Creek	GY	10.46	10.46	10.46	10.46	10.46	10.46	10.46	5,657.34	4	4	4	4	4	4	4	4	4	4	4	4	4	4	948.16	3.01	3.01	3.01	3.01	3.01	3.01	3.01
18020125030402	Oregon Creek-Miller Creek	HY*	12.82	12.82	12.82	12.82	12.60	12.82	12.82	5,657.34	1	5	1	5	1	5	1	5	1	5	1	5	1	5	948.16	0.60	0.60	0.60	0.60	0.60	0.60	0.60
18020125030402	Oregon Creek-Miller Creek	IY	3.05	3.05	3.05	3.05	3.05	3.05	3.05	5,657.34	1	4	1	4	1	4	1	4	1	4	1	4	1	4	948.16	0.65	0.65	0.65	0.65	0.65	0.65	0.65
18020125030402	Oregon Creek-Miller Creek	LY*	9.25	0.00	0.00	0.00	0.00	0.00	0.00	5,657.34	1	9	0	0	0	0	0	0	0	0	0	0	0	0	948.16	1.44	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		51.66	51.66	51.66	51.66	51.66	51.66	51.66	5657.34	11	33	11	33	11	33	11	33	11	33	11	33	11	33	8533.44	7.63	7.63	7.63	7.63	7.63	7.63	7.63
	*** Value Per SqMi All =**		**5.84**	**5.84**	**5.84**	**5.84**	**5.84**	**5.84**	**5.84**	**8.84**	**1.2**	**3.7**	**1.2**	**3.7**	**1.2**	**3.7**	**1.2**	**3.7**	**1.2**	**3.7**	**1.2**	**3.7**	**1.2**	**3.7**	**1.48**	**5.15**	**5.15**	**5.15**	**5.15**	**5.15**	**5.15**	**5.15**
	*** Sum Open-Motorized, Native Surface Routes =**		38.16	29.01	28.91	29.01	29.19	29.01	28.91		6	25	6	16	5	16	6	16	6	16	6	16	5	16		3.97	2.62	2.53	2.62	2.62	2.62	2.53
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.32**	**3.28**	**3.27**	**3.28**	**3.30**	**3.28**	**3.27**	**8.84**	**0.7**	**2.8**	**0.7**	**1.8**	**0.6**	**1.8**	**0.7**	**1.8**	**0.7**	**1.8**	**0.7**	**1.8**	**0.6**	**1.8**	**13.33**	**0.30**	**0.20**	**0.19**	**0.20**	**0.20**	**0.20**	**0.19**
18020125030403	Oregon Creek-Marion Creek	AY	0.05	0.05	0.05	0.05	0.05	0.05	0.05	4,243.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	761.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030403	Oregon Creek-Marion Creek	BS*	0.00	0.00	0.00	7.37	7.38	7.37	0.00	4,243.95	0	0	0	0	0	0	1	5	1	5	1	5	0	0	761.91	0.00	0.00	0.00	0.56	0.56	0.56	0.00
18020125030403	Oregon Creek-Marion Creek	BY*	7.37	7.37	7.37	0.00	0.00	0.00	7.37	4,243.95	1	5	1	5	1	5	0	0	0	0	0	0	1	5	761.91	0.56	0.56	0.56	0.00	0.00	0.00	0.56
18020125030403	Oregon Creek-Marion Creek	CS*	0.00	0.00	0.00	0.00	1.80	0.00	0.00	4,243.95	0	0	0	0	0	0	0	0	1	1	0	0	0	0	761.91	0.00	0.00	0.00	0.00	0.23	0.00	0.00
18020125030403	Oregon Creek-Marion Creek	FY	0.00	7.26	7.26	7.26	5.68	7.26	7.26	4,243.95	0	0	3	2	3	2	3	2	2	1	3	2	3	2	761.91	0.00	0.88	0.88	0.88	0.66	0.88	0.88
18020125030403	Oregon Creek-Marion Creek	GY	6.56	6.56	6.56	6.56	6.56	6.56	6.56	4,243.95	3	0	3	0	3	0	3	0	3	0	3	0	3	0	761.91	0.47	0.47	0.47	0.47	0.47	0.47	0.47
18020125030403	Oregon Creek-Marion Creek	HY*	6.23	6.23	6.23	6.23	6.00	6.23	6.23	4,243.95	0	2	0	2	0	2	0	2	0	2	0	2	0	2	761.91	0.50	0.50	0.50	0.50	0.50	0.50	0.50
18020125030403	Oregon Creek-Marion Creek	LS*	0.44	0.00	0.00	0.00	0.00	0.00	0.00	4,243.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	761.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030403	Oregon Creek-Marion Creek	LY*	6.82	0.00	0.00	0.00	0.00	0.00	0.00	4,243.95	3	2	0	0	0	0	0	0	0	0	0	0	0	0	761.91	0.88	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		27.47	27.47	27.47	27.47	27.47	27.47	27.47	4243.95	7	9	7	9	7	9	7	9	7	9	7	9	7	9	6857.19	2.41	2.41	2.41	2.41	2.42	2.41	2.41
	*** Value Per SqMi All =**		**4.14**	**4.14**	**4.14**	**4.14**	**4.14**	**4.14**	**4.14**	**6.63**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.19**	**2.02**	**2.02**	**2.02**	**2.02**	**2.03**	**2.02**	**2.02**
	*** Sum Open-Motorized, Native Surface Routes =**		20.86	13.60	13.60	13.60	15.18	13.60	13.60		4	9	1	7	1	7	1	7	2	8	1	7	1	7		1.94	1.06	1.06	1.06	1.29	1.06	1.06
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.15**	**2.05**	**2.05**	**2.05**	**2.29**	**2.05**	**2.05**	**6.63**	**0.6**	**1.4**	**0.2**	**1.1**	**0.2**	**1.1**	**0.2**	**1.1**	**0.3**	**1.2**	**0.2**	**1.1**	**0.2**	**1.1**	**10.71**	**0.18**	**0.10**	**0.10**	**0.10**	**0.12**	**0.10**	**0.10**
18020125030404	Lower Oregon Creek	AY	0.54	0.54	0.54	0.54	0.54	0.54	0.54	7,370.83	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,607.20	0.53	0.53	0.53	0.53	0.53	0.53	0.53
18020125030404	Lower Oregon Creek	BS*	3.14	3.14	3.14	6.53	6.53	6.53	3.14	7,370.83	0	1	0	1	0	1	1	2	1	2	1	2	0	1	1,607.20	0.07	0.07	0.07	0.84	0.84	0.84	0.07
18020125030404	Lower Oregon Creek	BY*	3.39	3.39	3.39	0.00	0.00	0.00	3.39	7,370.83	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1,607.20	0.77	0.77	0.77	0.00	0.00	0.00	0.77
18020125030404	Lower Oregon Creek	CS*	0.00	0.00	0.00	0.00	0.30	0.00	0.00	7,370.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,607.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030404	Lower Oregon Creek	FY	0.00	7.29	7.29	7.29	7.13	7.29	7.29	7,370.83	0	0	0	1	0	1	0	1	0	1	0	1	0	1	1,607.20	0.00	0.76	0.76	0.76	0.76	0.76	0.76
18020125030404	Lower Oregon Creek	GY	20.23	20.23	20.23	20.23	20.23	20.23	20.23	7,370.83	6	12	6	12	6	12	6	12	6	12	6	12	6	12	1,607.20	5.81	5.81	5.81	5.81	5.81	5.81	5.81
18020125030404	Lower Oregon Creek	HY*	18.88	18.88	18.88	18.88	18.75	18.88	18.88	7,370.83	3	8	3	8	3	8	3	8	3	8	3	8	3	8	1,607.20	3.65	3.65	3.65	3.65	3.65	3.65	3.65
18020125030404	Lower Oregon Creek	IY	0.63	0.63	0.63	0.63	0.63	0.63	0.63	7,370.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,607.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030404	Lower Oregon Creek	LS*	2.05	0.00	0.00	0.00	0.00	0.00	0.00	7,370.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,607.20	0.36	0.00	0.00	0.00	0.00	0.00	0.00
18020125030404	Lower Oregon Creek	LY*	5.25	0.00	0.00	0.00	0.00	0.00	0.00	7,370.83	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1,607.20	0.40	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		54.11	54.11	54.11	54.11	54.11	54.11	54.11	7370.83	10	24	10	24	10	24	10	24	10	24	10	24	10	24	14464.80	11.59	11.59	11.59	11.59	11.59	11.59	11.59
	*** Value Per SqMi All =**		**4.70**	**4.70**	**4.70**	**4.70**	**4.70**	**4.70**	**4.70**	**11.52**	**0.9**	**2.1**	**0.9**	**2.1**	**0.9**	**2.1**	**0.9**	**2.1**	**0.9**	**2.1**	**0.9**	**2.1**	**0.9**	**2.1**	**2.51**	**4.62**	**4.62**	**4.62**	**4.62**	**4.62**	**4.62**	**4.62**
	*** Sum Open-Motorized, Native Surface Routes =**		32.71	25.41	25.41	25.41	25.58	25.41	25.41		4	11	4	10	4	10	4	10	4	10	4	10	4	10		5.25	4.49	4.49	4.49	4.49	4.49	4.49
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.84**	**2.21**	**2.21**	**2.21**	**2.22**	**2.21**	**2.21**	**11.52**	**0.3**	**1.0**	**0.3**	**0.9**	**0.3**	**0.9**	**0.3**	**0.9**	**0.3**	**0.9**	**0.3**	**0.9**	**0.3**	**0.9**	**22.60**	**0.23**	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**
18020125030501	Upper Kanaka Creek	AY	3.70	3.70	3.70	3.70	3.70	3.70	3.70	5,458.13	1	0	1	0	1	0	1	0	1	0	1	0	1	0	929.47	0.34	0.34	0.34	0.34	0.34	0.34	0.34
18020125030501	Upper Kanaka Creek	BS*	0.00	0.00	0.00	6.10	6.10	6.10	0.00	5,458.13	0	0	0	0	0	0	1	0	1	0	1	0	0	0	929.47	0.00	0.00	0.00	0.24	0.24	0.24	0.00
18020125030501	Upper Kanaka Creek	BY*	6.10	6.10	6.10	0.00	0.00	0.00	6.10	5,458.13	1	0	1	0	1	0	0	0	0	0	0	0	1	0	929.47	0.24	0.24	0.24	0.00	0.00	0.00	0.24
18020125030501	Upper Kanaka Creek	CS*	0.00	0.00	0.00	0.11	0.57	0.11	0.00	5,458.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	929.47	0.00	0.00	0.00	0.11	0.24	0.11	0.00
18020125030501	Upper Kanaka Creek	CY*	0.00	0.11	0.00	0.00	0.00	0.00	0.00	5,458.13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	929.47	0.00	0.11	0.00	0.00	0.00	0.00	0.00
18020125030501	Upper Kanaka Creek	FY	0.00	11.71	11.82	11.71	11.25	11.71	11.82	5,458.13	0	0	5	3	5	3	5	3	5	3	5	3	5	3	929.47	0.00	2.13	2.24	2.13	1.99	2.13	2.24
18020125030501	Upper Kanaka Creek	GY	10.78	10.78	10.78	10.78	10.78	10.78	10.78	5,458.13	3	5	3	5	3	5	3	5	3	5	3	5	3	5	929.47	1.57	1.57	1.57	1.57	1.57	1.57	1.57
18020125030501	Upper Kanaka Creek	HY*	7.26	7.26	7.26	7.26	7.26	7.26	7.26	5,458.13	4	6	4	6	4	6	4	6	4	6	4	6	4	6	929.47	1.73	1.73	1.73	1.73	1.73	1.73	1.73
18020125030501	Upper Kanaka Creek	LY*	11.82	0.00	0.00	0.00	0.00	0.00	0.00	5,458.13	5	3	0	0	0	0	0	0	0	0	0	0	0	0	929.47	2.24	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		39.67	39.67	39.67	39.67	39.67	39.67	39.67	5458.13	14	14	14	14	14	14	14	14	14	14	14	14	14	14	8365.23	6.12	6.12	6.12	6.12	6.11	6.12	6.12
	*** Value Per SqMi All =**		**4.65**	**4.65**	**4.65**	**4.65**	**4.65**	**4.65**	**4.65**	**8.53**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.6**	**1.45**	**4.21**	**4.21**	**4.21**	**4.21**	**4.21**	**4.21**	**4.21**
	*** Sum Open-Motorized, Native Surface Routes =**		25.18	13.48	13.36	13.48	13.93	13.48	13.36		10	9	5	6	5	6	5	6	5	6	5	6	5	6		4.21	2.08	1.97	2.08	2.21	2.08	1.97
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.95**	**1.58**	**1.57**	**1.58**	**1.63**	**1.58**	**1.57**	**8.53**	**1.2**	**1.1**	**0.6**	**0.7**	**0.6**	**0.7**	**0.6**	**0.7**	**0.6**	**0.7**	**0.6**	**0.7**	**0.6**	**0.7**	**13.07**	**0.32**	**0.16**	**0.15**	**0.16**	**0.17**	**0.16**	**0.15**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125030502	Lower Kanaka Creek	AY	0.01	0.01	0.01	0.01	0.01	0.01	0.01	6,043.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,256.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030502	Lower Kanaka Creek	BS*	0.00	0.00	0.00	6.34	6.34	6.34	0.00	6,043.80	0	0	0	0	0	0	1	3	1	3	1	3	0	0	1,256.59	0.00	0.00	0.00	0.55	0.55	0.55	0.00
18020125030502	Lower Kanaka Creek	BY*	6.34	6.34	6.34	0.00	0.00	0.00	6.34	6,043.80	1	3	1	3	1	3	0	0	0	0	0	0	1	3	1,256.59	0.55	0.55	0.55	0.00	0.00	0.00	0.55
18020125030502	Lower Kanaka Creek	CS*	0.00	0.00	0.00	0.39	0.39	0.39	0.00	6,043.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,256.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030502	Lower Kanaka Creek	CY*	0.39	0.39	0.39	0.00	0.00	0.00	0.39	6,043.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,256.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030502	Lower Kanaka Creek	FY	0.00	10.11	10.11	10.11	10.11	10.11	10.11	6,043.80	0	0	3	6	3	6	3	6	3	6	3	6	3	6	1,256.59	0.00	1.72	1.72	1.72	1.72	1.72	1.72
18020125030502	Lower Kanaka Creek	GY	17.06	17.06	17.06	17.06	17.06	17.06	17.06	6,043.80	3	13	3	13	3	13	3	13	3	13	3	13	3	13	1,256.59	2.30	2.30	2.30	2.30	2.30	2.30	2.30
18020125030502	Lower Kanaka Creek	HY*	8.90	8.90	8.90	8.90	8.90	8.90	8.90	6,043.80	2	9	2	9	2	9	2	9	2	9	2	9	2	9	1,256.59	2.22	2.22	2.22	2.22	2.22	2.22	2.22
18020125030502	Lower Kanaka Creek	LY*	10.11	0.00	0.00	0.00	0.00	0.00	0.00	6,043.80	3	6	0	0	0	0	0	0	0	0	0	0	0	0	1,256.59	1.72	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		42.80	42.80	42.80	42.80	42.80	42.80	42.80	6043.80	9	31	9	31	9	31	9	31	9	31	9	31	9	31	11309.31	6.79	6.79	6.79	6.79	6.79	6.79	6.79
	*** Value Per SqMi All =**		**4.53**	**4.53**	**4.53**	**4.53**	**4.53**	**4.53**	**4.53**	**9.44**	**1.0**	**3.3**	**1.0**	**3.3**	**1.0**	**3.3**	**1.0**	**3.3**	**1.0**	**3.3**	**1.0**	**3.3**	**1.0**	**3.3**	**1.96**	**3.46**	**3.46**	**3.46**	**3.46**	**3.46**	**3.46**	**3.46**
	*** Sum Open-Motorized, Native Surface Routes =**		25.73	15.62	15.62	15.62	15.62	15.62	15.62		6	18	3	12	3	12	3	12	3	12	3	12	3	12		4.49	2.77	2.77	2.77	2.77	2.77	2.77
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.72**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**1.65**	**9.44**	**0.6**	**1.9**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**17.67**	**0.25**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**
18020125030503	Middle Yuba River-Indian Creek	AY	7.37	7.37	7.37	7.37	7.37	7.37	7.37	7,052.72	1	5	1	5	1	5	1	5	1	5	1	5	1	5	1,323.90	1.98	1.98	1.98	1.98	1.98	1.98	1.98
18020125030503	Middle Yuba River-Indian Creek	BS*	1.92	1.92	1.92	4.86	4.86	4.86	1.92	7,052.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,323.90	0.12	0.12	0.12	0.23	0.23	0.23	0.12
18020125030503	Middle Yuba River-Indian Creek	BY*	2.94	2.94	2.94	0.00	0.00	0.00	2.94	7,052.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,323.90	0.12	0.12	0.12	0.00	0.00	0.00	0.12
18020125030503	Middle Yuba River-Indian Creek	FY	0.00	11.82	11.82	11.82	11.82	11.82	11.82	7,052.72	0	0	1	3	1	3	1	3	1	3	1	3	1	3	1,323.90	0.00	1.12	1.12	1.12	1.12	1.12	1.12
18020125030503	Middle Yuba River-Indian Creek	GY	10.83	10.83	10.83	10.83	10.83	10.83	10.83	7,052.72	2	7	2	7	2	7	2	7	2	7	2	7	2	7	1,323.90	0.91	0.91	0.91	0.91	0.91	0.91	0.91
18020125030503	Middle Yuba River-Indian Creek	HY*	20.80	20.80	20.80	20.80	20.80	20.80	20.80	7,052.72	1	6	1	6	1	6	1	6	1	6	1	6	1	6	1,323.90	1.23	1.23	1.23	1.23	1.23	1.23	1.23
18020125030503	Middle Yuba River-Indian Creek	KY	0.68	0.68	0.68	0.68	0.68	0.68	0.68	7,052.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,323.90	0.08	0.08	0.08	0.08	0.08	0.08	0.08
18020125030503	Middle Yuba River-Indian Creek	LS*	7.15	0.00	0.00	0.00	0.00	0.00	0.00	7,052.72	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1,323.90	0.84	0.00	0.00	0.00	0.00	0.00	0.00
18020125030503	Middle Yuba River-Indian Creek	LY*	4.67	0.00	0.00	0.00	0.00	0.00	0.00	7,052.72	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1,323.90	0.28	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		56.35	56.35	56.35	56.35	56.35	56.35	56.35	7052.72	5	21	5	21	5	21	5	21	5	21	5	21	5	21	11915.10	5.56	5.56	5.56	5.55	5.55	5.55	5.56
	*** Value Per SqMi All =**		**5.11**	**5.11**	**5.11**	**5.11**	**5.11**	**5.11**	**5.11**	**11.02**	**0.5**	**1.9**	**0.5**	**1.9**	**0.5**	**1.9**	**0.5**	**1.9**	**0.5**	**1.9**	**0.5**	**1.9**	**0.5**	**1.9**	**2.07**	**2.69**	**2.69**	**2.69**	**2.68**	**2.68**	**2.68**	**2.69**
	*** Sum Open-Motorized, Native Surface Routes =**		37.47	25.65	25.65	25.65	25.65	25.65	25.65		2	9	1	6	1	6	1	6	1	6	1	6	1	6		2.59	1.47	1.47	1.46	1.46	1.46	1.47
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.40**	**2.33**	**2.33**	**2.33**	**2.33**	**2.33**	**2.33**	**11.02**	**0.2**	**0.8**	**0.1**	**0.5**	**0.1**	**0.5**	**0.1**	**0.5**	**0.1**	**0.5**	**0.1**	**0.5**	**0.1**	**0.5**	**18.62**	**0.14**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**	**0.08**
18020125030504	Grizzly Creek	AY	3.93	3.93	3.93	3.93	3.93	3.93	3.93	2,306.25	1	0	1	0	1	0	1	0	1	0	1	0	1	0	513.43	0.21	0.21	0.21	0.21	0.21	0.21	0.21
18020125030504	Grizzly Creek	BS*	5.20	5.20	5.20	5.20	5.20	5.20	5.20	2,306.25	4	0	4	0	4	0	4	0	4	0	4	0	4	0	513.43	1.52	1.52	1.52	1.52	1.52	1.52	1.52
18020125030504	Grizzly Creek	CS*	0.00	0.00	0.00	0.00	1.42	0.00	0.00	2,306.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	513.43	0.00	0.00	0.00	0.00	0.04	0.00	0.00
18020125030504	Grizzly Creek	FY	0.00	5.89	5.89	5.89	4.47	5.89	5.89	2,306.25	0	0	3	0	3	0	3	0	3	0	3	0	3	0	513.43	0.00	0.80	0.80	0.80	0.77	0.80	0.80
18020125030504	Grizzly Creek	GY	1.86	1.86	1.86	1.86	1.86	1.86	1.86	2,306.25	1	1	1	1	1	1	1	1	1	1	1	1	1	1	513.43	0.52	0.52	0.52	0.52	0.52	0.52	0.52
18020125030504	Grizzly Creek	HY*	4.61	4.61	4.61	4.61	4.61	4.61	4.61	2,306.25	1	0	1	0	1	0	1	0	1	0	1	0	1	0	513.43	0.54	0.54	0.54	0.54	0.54	0.54	0.54
18020125030504	Grizzly Creek	KY	1.17	1.17	1.17	1.17	1.17	1.17	1.17	2,306.25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	513.43	0.77	0.77	0.77	0.77	0.77	0.77	0.77
18020125030504	Grizzly Creek	LS*	5.89	0.00	0.00	0.00	0.00	0.00	0.00	2,306.25	3	0	0	0	0	0	0	0	0	0	0	0	0	0	513.43	0.80	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		22.66	22.66	22.66	22.66	22.66	22.66	22.66	2306.25	10	1	10	1	10	1	10	1	10	1	10	1	10	1	4126.06	4.36	4.36	4.36	4.36	4.37	4.36	4.36
	*** Value Per SqMi All =**		**6.29**	**6.29**	**6.29**	**6.29**	**6.29**	**6.29**	**6.29**	**3.60**	**2.8**	**0.3**	**2.8**	**0.3**	**2.8**	**0.3**	**2.8**	**0.3**	**2.8**	**0.3**	**2.8**	**0.3**	**2.8**	**0.3**	**0.80**	**5.43**	**5.43**	**5.43**	**5.43**	**5.45**	**5.43**	**5.43**
	*** Sum Open-Motorized, Native Surface Routes =**		15.70	9.81	9.81	9.81	11.23	9.81	9.81		8	0	5	0	5	0	5	0	5	0	5	0	5	0		2.86	2.06	2.06	2.06	2.1	2.06	2.06
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.36**	**2.72**	**2.72**	**2.72**	**3.12**	**2.72**	**2.72**	**3.60**	**2.2**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**6.45**	**0.44**	**0.32**	**0.32**	**0.32**	**0.33**	**0.32**	**0.32**
18020125030505	Middle Yuba River-Studhorse Canyon	AY	0.44	0.44	0.44	0.44	0.44	0.44	0.44	4,837.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,224.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030505	Middle Yuba River-Studhorse Canyon	BS*	2.46	2.46	2.46	6.94	6.94	6.94	2.46	4,837.78	0	0	0	0	0	0	2	0	2	0	2	0	0	0	1,224.54	0.00	0.00	0.00	1.38	1.38	1.38	0.00
18020125030505	Middle Yuba River-Studhorse Canyon	BY*	4.48	4.48	4.48	0.00	0.00	0.00	4.48	4,837.78	0	2	0	2	0	2	0	0	0	0	0	0	0	2	1,224.54	1.38	1.38	1.38	0.00	0.00	0.00	1.38
18020125030505	Middle Yuba River-Studhorse Canyon	CS*	0.00	0.00	0.00	0.00	0.05	0.00	0.00	4,837.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,224.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030505	Middle Yuba River-Studhorse Canyon	FY	0.00	3.35	3.35	3.35	3.29	3.35	3.35	4,837.78	0	0	1	2	1	2	1	2	1	2	1	2	1	2	1,224.54	0.00	1.24	1.24	1.24	1.24	1.24	1.24
18020125030505	Middle Yuba River-Studhorse Canyon	GY	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4,837.78	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1,224.54	0.89	0.89	0.89	0.89	0.89	0.89	0.89
18020125030505	Middle Yuba River-Studhorse Canyon	HY*	4.59	4.59	4.59	4.59	4.59	4.59	4.59	4,837.78	0	2	0	2	0	2	0	2	0	2	0	2	0	2	1,224.54	0.89	0.89	0.89	0.89	0.89	0.89	0.89
18020125030505	Middle Yuba River-Studhorse Canyon	LS*	1.13	0.00	0.00	0.00	0.00	0.00	0.00	4,837.78	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1,224.54	0.17	0.00	0.00	0.00	0.00	0.00	0.00
18020125030505	Middle Yuba River-Studhorse Canyon	LY*	2.22	0.00	0.00	0.00	0.00	0.00	0.00	4,837.78	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,224.54	1.08	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		19.45	19.45	19.45	19.45	19.45	19.45	19.45	4837.78	2	10	2	10	2	10	2	10	2	10	2	10	2	10	11020.86	4.41	4.40	4.40	4.40	4.40	4.40	4.40
	*** Value Per SqMi All =**		**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**7.56**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**1.91**	**2.30**	**2.30**	**2.30**	**2.30**	**2.30**	**2.30**	**2.30**
	*** Sum Open-Motorized, Native Surface Routes =**		14.87	11.53	11.53	11.53	11.58	11.53	11.53		1	6	0	4	0	4	0	4	0	4	0	4	0	4		3.52	2.27	2.27	2.27	2.27	2.27	2.27
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.97**	**1.53**	**1.53**	**1.53**	**1.53**	**1.53**	**1.53**	**7.56**	**0.1**	**0.8**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**0.5**	**17.22**	**0.20**	**0.13**	**0.13**	**0.13**	**0.13**	**0.13**	**0.13**
18020125030506	Lower Middle Yuba River	AY	0.43	0.43	0.43	0.43	0.43	0.43	0.43	4,996.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,174.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030506	Lower Middle Yuba River	BS*	1.99	1.99	1.99	2.14	2.14	2.14	1.99	4,996.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,174.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030506	Lower Middle Yuba River	BY*	0.15	0.15	0.15	0.00	0.00	0.00	0.15	4,996.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,174.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030506	Lower Middle Yuba River	CS*	0.00	0.00	0.00	0.00	2.61	0.00	0.00	4,996.53	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1,174.36	0.00	0.00	0.00	0.00	0.09	0.00	0.00
18020125030506	Lower Middle Yuba River	FY	0.00	11.20	11.20	11.20	10.81	11.20	11.20	4,996.53	0	0	2	0	2	0	2	0	2	0	2	0	2	0	1,174.36	0.00	1.42	1.42	1.42	1.42	1.42	1.42
18020125030506	Lower Middle Yuba River	GY	12.22	12.22	12.22	12.22	12.22	12.22	12.22	4,996.53	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1,174.36	2.05	2.05	2.05	2.05	2.05	2.05	2.05
18020125030506	Lower Middle Yuba River	HY*	10.71	10.71	10.71	10.71	8.49	10.71	10.71	4,996.53	1	3	1	3	1	3	1	3	0	3	1	3	1	3	1,174.36	1.80	1.80	1.80	1.80	1.71	1.80	1.80
18020125030506	Lower Middle Yuba River	IY	0.26	0.26	0.26	0.26	0.26	0.26	0.26	4,996.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,174.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030506	Lower Middle Yuba River	LS*	10.29	0.00	0.00	0.00	0.00	0.00	0.00	4,996.53	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,174.36	1.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125030506	Lower Middle Yuba River	LY*	0.91	0.00	0.00	0.00	0.00	0.00	0.00	4,996.53	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,174.36	0.42	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		36.96	36.96	36.96	36.96	36.96	36.96	36.96	4996.53	7	7	7	7	7	7	7	7	7	7	7	7	7	7	10569.24	5.27	5.27	5.27	5.27	5.27	5.27	5.27
	*** Value Per SqMi All =**		**4.73**	**4.73**	**4.73**	**4.73**	**4.73**	**4.73**	**4.73**	**7.81**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**0.9**	**1.83**	**2.87**	**2.87**	**2.87**	**2.87**	**2.87**	**2.87**	**2.87**
	*** Sum Open-Motorized, Native Surface Routes =**		24.05	12.85	12.85	12.85	13.24	12.85	12.85		3	3	1	3	1	3	1	3	1	3	1	3	1	3		3.22	1.8	1.80	1.8	1.8	1.8	1.80
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.08**	**1.65**	**1.65**	**1.65**	**1.70**	**1.65**	**1.65**	**7.81**	**0.4**	**0.4**	**0.1**	**0.4**	**0.1**	**0.4**	**0.1**	**0.4**	**0.1**	**0.4**	**0.1**	**0.4**	**0.1**	**0.4**	**16.51**	**0.19**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125040101	Headwaters South Yuba River	BS*	0.00	0.00	0.00	6.03	6.03	6.03	0.00	6675.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1353.85	0	0	0	1.36	1.36	1.36	0
18020125040101	Headwaters South Yuba River	BY*	6.03	6.03	6.03	0.00	0.00	0.00	6.03	6675.63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1353.85	1.36	1.36	1.36	0	0	0	1.36
18020125040101	Headwaters South Yuba River	CS*	0.00	0.00	0.00	0.00	1.73	1.73	0.00	6675.63	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1353.85	0	0	0	0	0.17	0.17	0
18020125040101	Headwaters South Yuba River	CY*	0.00	1.73	0.00	0.00	0.00	0.00	1.73	6675.63	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1353.85	0	0.17	0	0	0	0	0.17
18020125040101	Headwaters South Yuba River	FY	0.11	8.88	10.61	10.61	8.88	8.88	8.88	6675.63	0	0	0	1	1	1	1	1	0	1	0	1	0	1	1353.85	0	0.89	1.06	1.06	0.89	0.89	0.89
18020125040101	Headwaters South Yuba River	GY	12.38	12.38	12.38	12.38	12.38	12.38	12.38	6675.63	13	2	13	2	13	2	13	2	13	2	13	2	13	2	1353.85	5.19	5.19	5.19	5.19	5.19	5.19	5.19
18020125040101	Headwaters South Yuba River	HY*	32.27	32.27	32.27	32.27	32.27	32.27	32.27	6675.63	18	2	18	2	18	2	18	2	18	2	18	2	18	2	1353.85	10.73	10.73	10.73	10.73	10.73	10.73	10.73
18020125040101	Headwaters South Yuba River	IY	1.62	1.62	1.62	1.62	1.62	1.62	1.62	6675.63	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1353.85	0.43	0.43	0.43	0.43	0.43	0.43	0.43
18020125040101	Headwaters South Yuba River	JY	4.52	4.52	4.52	4.52	4.52	4.52	4.52	6675.63	3	1	3	1	3	1	3	1	3	1	3	1	3	1	1353.85	0.56	0.56	0.56	0.56	0.56	0.56	0.56
18020125040101	Headwaters South Yuba River	LY*	10.50	0.00	0.00	0.00	0.00	0.00	0.00	6675.63	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1353.85	1.06	0	0	0	0	0	0
	Sum All =		67.44	67.45	67.45	67.45	67.45	67.45	67.45	6675.63	35	7	35	7	35	7	35	7	35	7	35	7	35	7	1353.85	19.33	19.33	19.33	19.33	19.33	19.33	19.33
	*** Value Per SqMi All =**		**6.47**	**6.47**	**6.47**	**6.47**	**6.47**	**6.47**	**6.47**	**10.43**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**3.4**	**0.7**	**2.12**	**9.14**	**9.14**	**9.14**	**9.14**	**9.14**	**9.14**	**9.14**
	*** Sum Open-Motorized, Native Surface Routes =**		48.81	40.04	38.31	38.31	40.04	40.04	40.04		19	3	19	2	18	2	18	2	19	2	19	2	19	2		13.15	12.26	12.09	12.09	12.26	12.26	12.26
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.68**	**3.84**	**3.67**	**3.67**	**3.84**	**3.84**	**3.84**	**10.43**	**1.8**	**0.3**	**1.8**	**0.2**	**1.7**	**0.2**	**1.7**	**0.2**	**1.8**	**0.2**	**1.8**	**0.2**	**1.8**	**0.2**	**2.12**	**6.22**	**5.80**	**5.72**	**5.72**	**5.80**	**5.80**	**5.80**
18020125040102	South Yuba River-Lower Castle Creek	AY	0.28	0.00	0.28	0.28	0.00	0.00	0.28	6594.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1207.97	0.1	0	0.1	0.1	0	0	0.1
18020125040102	South Yuba River-Lower Castle Creek	BS*	2.09	2.09	2.09	7.51	7.51	7.51	2.09	6594.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1207.97	0.43	0.43	0.43	0.84	0.84	0.84	0.43
18020125040102	South Yuba River-Lower Castle Creek	BY*	5.42	5.70	5.42	0.00	0.28	0.28	5.42	6594.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1207.97	0.42	0.51	0.42	0	0.1	0.1	0.42
18020125040102	South Yuba River-Lower Castle Creek	CS*	0.00	0.00	0.00	2.13	2.77	2.77	0.00	6594.87	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1207.97	0	0	0	0.66	0.66	0.66	0
18020125040102	South Yuba River-Lower Castle Creek	CY*	2.08	2.77	2.08	0.00	0.00	0.00	2.73	6594.87	1	0	1	0	1	0	0	0	0	0	0	0	1	0	1207.97	0.64	0.66	0.64	0	0	0	0.64
18020125040102	South Yuba River-Lower Castle Creek	FY	0.00	8.82	9.51	9.46	8.82	8.82	8.86	6594.87	0	0	2	1	2	1	2	1	2	1	2	1	2	1	1207.97	0	2.21	2.22	2.21	2.21	2.21	2.22
18020125040102	South Yuba River-Lower Castle Creek	GY	4.04	4.04	4.04	4.04	4.04	4.04	4.04	6594.87	13	0	13	0	13	0	13	0	13	0	13	0	13	0	1207.97	1.36	1.36	1.36	1.36	1.36	1.36	1.36
18020125040102	South Yuba River-Lower Castle Creek	HY*	8.78	8.78	8.78	8.78	8.78	8.78	8.78	6594.87	4	0	4	0	4	0	4	0	4	0	4	0	4	0	1207.97	2.65	2.65	2.65	2.65	2.65	2.65	2.65
18020125040102	South Yuba River-Lower Castle Creek	IY	4.86	4.86	4.86	4.86	4.86	4.86	4.86	6594.87	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1207.97	1.77	1.77	1.77	1.77	1.77	1.77	1.77
18020125040102	South Yuba River-Lower Castle Creek	JY	2.59	2.59	2.59	2.59	2.59	2.59	2.59	6594.87	3	1	3	1	3	1	3	1	3	1	3	1	3	1	1207.97	0.8	0.8	0.8	0.8	0.8	0.8	0.8
18020125040102	South Yuba River-Lower Castle Creek	LY*	9.51	0.00	0.00	0.00	0.00	0.00	0.00	6594.87	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1207.97	2.22	0	0	0	0	0	0
	Sum All =		39.66	39.66	39.66	39.66	39.66	39.66	39.66	6594.87	24	3	24	3	24	3	24	3	24	3	24	3	24	3	1207.97	10.39	10.39	10.39	10.39	10.39	10.39	10.39
	*** Value Per SqMi All =**		**3.85**	**3.85**	**3.85**	**3.85**	**3.85**	**3.85**	**3.85**	**10.30**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**2.3**	**0.3**	**1.89**	**5.50**	**5.50**	**5.50**	**5.50**	**5.50**	**5.50**	**5.50**
	*** Sum Open-Motorized, Native Surface Routes =**		27.88	19.34	18.37	18.42	19.34	19.34	19.02		7	1	5	0	5	0	5	0	5	0	5	0	5	0		6.36	4.25	4.14	4.15	4.25	4.25	4.14
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.71**	**1.88**	**1.78**	**1.79**	**1.88**	**1.88**	**1.85**	**10.30**	**0.7**	**0.1**	**0.5**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**0.5**	**0.0**	**1.89**	**3.37**	**2.25**	**2.19**	**2.20**	**2.25**	**2.25**	**2.19**
18020125040103	South Yuba River-Cascade Lakes	CS*	0.00	0.00	0.00	2.27	2.27	2.27	0.00	6,861.32	0	0	0	0	0	0	2	0	2	0	2	0	0	0	1,201.70	0.00	0.00	0.00	0.55	0.55	0.55	0.00
18020125040103	South Yuba River-Cascade Lakes	CY*	2.23	2.27	2.23	0.00	0.00	0.00	2.23	6,861.32	2	0	2	0	2	0	0	0	0	0	0	0	2	0	1,201.70	0.53	0.55	0.53	0.00	0.00	0.00	0.53
18020125040103	South Yuba River-Cascade Lakes	FY	0.00	1.91	1.95	1.91	1.91	1.91	1.95	6,861.32	0	0	0	2	0	2	0	2	0	2	0	2	0	2	1,201.70	0.00	0.60	0.62	0.60	0.60	0.60	0.62
18020125040103	South Yuba River-Cascade Lakes	GY	18.83	18.83	18.83	18.83	18.83	18.83	18.83	6,861.32	13	8	13	8	13	8	13	8	13	8	13	8	13	8	1,201.70	4.96	4.96	4.96	4.96	4.96	4.96	4.96
18020125040103	South Yuba River-Cascade Lakes	HY*	26.62	26.62	26.62	26.62	26.62	26.62	26.62	6,861.32	8	1	8	1	8	1	8	1	8	1	8	1	8	1	1,201.70	4.56	4.56	4.56	4.56	4.56	4.56	4.56
18020125040103	South Yuba River-Cascade Lakes	IY	1.12	1.12	1.12	1.12	1.12	1.12	1.12	6,861.32	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,201.70	0.94	0.94	0.94	0.94	0.94	0.94	0.94
18020125040103	South Yuba River-Cascade Lakes	KY	0.10	0.10	0.10	0.10	0.10	0.10	0.10	6,861.32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,201.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040103	South Yuba River-Cascade Lakes	LY*	1.95	0.00	0.00	0.00	0.00	0.00	0.00	6,861.32	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1,201.70	0.62	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		50.86	50.86	50.86	50.86	50.86	50.86	50.86	6861.32	24	11	24	11	24	11	24	11	24	11	24	11	24	11	1201.70	11.61	11.61	11.61	11.61	11.61	11.61	11.61
	*** Value Per SqMi All =**		**4.74**	**4.74**	**4.74**	**4.74**	**4.74**	**4.74**	**4.74**	**10.72**	**2.2**	**1.0**	**2.2**	**1.0**	**2.2**	**1.0**	**2.2**	**1.0**	**2.2**	**1.0**	**2.2**	**1.0**	**2.2**	**1.0**	**1.88**	**6.18**	**6.18**	**6.18**	**6.18**	**6.18**	**6.18**	**6.18**
	*** Sum Open-Motorized, Native Surface Routes =**		30.80	28.89	28.85	28.89	28.89	28.89	28.85		10	3	10	1	10	1	10	1	10	1	10	1	10	1		5.71	5.11	5.09	5.11	5.11	5.11	5.09
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.87**	**2.69**	**2.69**	**2.69**	**2.69**	**2.69**	**2.69**	**10.72**	**0.9**	**0.3**	**0.9**	**0.1**	**0.9**	**0.1**	**0.9**	**0.1**	**0.9**	**0.1**	**0.9**	**0.1**	**0.9**	**0.1**	**1.88**	**3.04**	**2.72**	**2.71**	**2.72**	**2.72**	**2.72**	**2.71**
18020125040104	South Yuba River-Big Bend	AS	0.16	0.00	0.16	0.16	0.00	0.16	0.16	6,626.84	1	0	0	0	1	0	1	0	0	0	1	0	1	0	879.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040104	South Yuba River-Big Bend	AY	0.39	0.39	0.39	0.39	0.39	0.39	0.39	6,626.84	1	0	1	0	1	0	1	0	1	0	1	0	1	0	879.56	0.25	0.25	0.25	0.25	0.25	0.25	0.25
18020125040104	South Yuba River-Big Bend	BS*	0.00	0.16	0.00	2.49	2.65	2.49	0.00	6,626.84	0	0	1	0	0	0	0	3	1	3	0	3	0	0	879.56	0.00	0.00	0.00	1.23	1.23	1.23	0.00
18020125040104	South Yuba River-Big Bend	BY*	2.49	2.49	2.49	0.00	0.00	0.00	2.49	6,626.84	0	3	0	3	0	3	0	0	0	0	0	0	0	3	879.56	1.23	1.23	1.23	0.00	0.00	0.00	1.23
18020125040104	South Yuba River-Big Bend	FY	0.00	4.88	4.88	4.88	4.88	4.88	4.88	6,626.84	0	0	1	4	1	4	1	4	1	4	1	4	1	4	879.56	0.00	1.83	1.83	1.83	1.83	1.83	1.83
18020125040104	South Yuba River-Big Bend	GY	17.16	17.16	17.16	17.16	17.16	17.16	17.16	6,626.84	10	3	10	3	10	3	10	3	10	3	10	3	10	3	879.56	7.97	7.97	7.97	7.97	7.97	7.97	7.97
18020125040104	South Yuba River-Big Bend	HY*	14.58	14.58	14.58	14.58	14.58	14.58	14.58	6,626.84	2	0	2	0	2	0	2	0	2	0	2	0	2	0	879.56	1.97	1.97	1.97	1.97	1.97	1.97	1.97
18020125040104	South Yuba River-Big Bend	IY	2.78	2.78	2.78	2.78	2.78	2.78	2.78	6,626.84	0	2	0	2	0	2	0	2	0	2	0	2	0	2	879.56	0.62	0.62	0.62	0.62	0.62	0.62	0.62
18020125040104	South Yuba River-Big Bend	LY*	4.88	0.00	0.00	0.00	0.00	0.00	0.00	6,626.84	1	4	0	0	0	0	0	0	0	0	0	0	0	0	879.56	1.83	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		42.42	42.42	42.42	42.42	42.42	42.42	42.42	6626.84	15	12	15	12	15	12	15	12	15	12	15	12	15	12	879.56	13.87	13.87	13.87	13.87	13.87	13.87	13.87
	*** Value Per SqMi All =**		**4.10**	**4.10**	**4.10**	**4.10**	**4.10**	**4.10**	**4.10**	**10.35**	**1.4**	**1.2**	**1.4**	**1.2**	**1.4**	**1.2**	**1.4**	**1.2**	**1.4**	**1.2**	**1.4**	**1.2**	**1.4**	**1.2**	**1.37**	**10.09**	**10.09**	**10.09**	**10.09**	**10.09**	**10.09**	**10.09**
	*** Sum Open-Motorized, Native Surface Routes =**		21.95	17.23	17.07	17.07	17.23	17.07	17.07		3	7	3	3	2	3	2	3	3	3	2	3	2	3		5.03	3.2	3.2	3.2	3.2	3.2	3.20
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.12**	**1.66**	**1.65**	**1.65**	**1.66**	**1.65**	**1.65**	**10.35**	**0.3**	**0.7**	**0.3**	**0.3**	**0.2**	**0.3**	**0.2**	**0.3**	**0.3**	**0.3**	**0.2**	**0.3**	**0.2**	**0.3**	**1.37**	**3.66**	**2.33**	**2.33**	**2.33**	**2.33**	**2.33**	**2.33**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125040105	Rattlesnake Creek	AS	7.03	0.02	7.03	7.03	0.02	7.03	7.03	5,987.16	1	1	0	0	1	1	1	1	0	0	1	1	1	1	934.11	2.56	0.02	2.56	2.56	0.02	2.56	2.56
18020125040105	Rattlesnake Creek	BS*	0.00	7.01	0.00	3.16	10.17	3.16	0.00	5,987.16	0	0	1	1	0	0	0	0	1	1	0	0	0	0	934.11	0.00	2.54	0.00	0.54	3.08	0.54	0.00
18020125040105	Rattlesnake Creek	BY*	3.16	3.16	3.16	0.00	0.00	0.00	3.16	5,987.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	934.11	0.54	0.54	0.54	0.00	0.00	0.00	0.54
18020125040105	Rattlesnake Creek	CS*	0.00	0.00	0.00	0.65	0.84	0.84	0.00	5,987.16	0	0	0	0	0	0	0	0	1	1	1	1	0	0	934.11	0.00	0.00	0.00	0.26	0.45	0.45	0.00
18020125040105	Rattlesnake Creek	CY*	0.32	0.84	0.32	0.00	0.00	0.00	0.32	5,987.16	0	0	1	1	0	0	0	0	0	0	0	0	0	0	934.11	0.00	0.45	0.00	0.00	0.00	0.00	0.00
18020125040105	Rattlesnake Creek	FY	0.00	2.66	3.19	2.85	2.66	2.66	3.19	5,987.16	0	0	1	1	2	2	2	2	1	1	1	1	2	2	934.11	0.00	0.52	0.97	0.71	0.52	0.52	0.97
18020125040105	Rattlesnake Creek	GY	0.32	0.32	0.32	0.32	0.32	0.32	0.32	5,987.16	1	0	1	0	1	0	1	0	1	0	1	0	1	0	934.11	0.17	0.17	0.17	0.17	0.17	0.17	0.17
18020125040105	Rattlesnake Creek	HY*	21.63	21.63	21.63	21.63	21.63	21.63	21.63	5,987.16	5	0	5	0	5	0	5	0	5	0	5	0	5	0	934.11	3.22	3.22	3.22	3.22	3.22	3.22	3.22
18020125040105	Rattlesnake Creek	IY	0.31	0.31	0.31	0.31	0.31	0.31	0.31	5,987.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	934.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040105	Rattlesnake Creek	KY	5.20	5.20	5.20	5.20	5.20	5.20	5.20	5,987.16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	934.11	1.57	1.57	1.57	1.57	1.57	1.57	1.57
18020125040105	Rattlesnake Creek	LY*	3.19	0.00	0.00	0.00	0.00	0.00	0.00	5,987.16	2	2	0	0	0	0	0	0	0	0	0	0	0	0	934.11	0.97	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		41.16	41.16	41.16	41.16	41.16	41.16	41.16	5987.16	10	4	10	4	10	4	10	4	10	4	10	4	10	4	934.11	9.03	9.03	9.03	9.03	9.03	9.03	9.03
	*** Value Per SqMi All =**		**4.40**	**4.40**	**4.40**	**4.40**	**4.40**	**4.40**	**4.40**	**9.35**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**1.46**	**6.19**	**6.19**	**6.19**	**6.19**	**6.19**	**6.19**	**6.19**
	*** Sum Open-Motorized, Native Surface Routes =**		28.30	32.65	25.11	25.45	32.65	25.64	25.11		7	2	7	2	5	0	5	0	7	2	6	1	5	0		4.73	6.75	3.76	4.02	6.75	4.21	3.76
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.03**	**3.49**	**2.68**	**2.72**	**3.49**	**2.74**	**2.68**	**9.35**	**0.7**	**0.2**	**0.7**	**0.2**	**0.5**	**0.0**	**0.5**	**0.0**	**0.7**	**0.2**	**0.6**	**0.1**	**0.5**	**0.0**	**1.46**	**3.24**	**4.62**	**2.58**	**2.75**	**4.62**	**2.88**	**2.58**
18020125040106	South Yuba River-Pierce Meadow	AY	0.09	0.00	0.09	0.09	0.00	0.00	0.09	4927.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	999.6	0.01	0	0.01	0.01	0	0	0.01
18020125040106	South Yuba River-Pierce Meadow	BS*	0.00	0.00	0.00	6.75	6.75	6.75	0.00	4927.61	0	0	0	0	0	0	2	3	2	3	2	3	0	0	999.6	0	0	0	1.92	1.92	1.92	0
18020125040106	South Yuba River-Pierce Meadow	BY*	6.75	6.84	6.75	0.00	0.09	0.09	6.75	4927.61	2	3	2	3	2	3	0	0	0	0	0	0	2	3	999.6	1.92	1.92	1.92	0	0.01	0.01	1.92
18020125040106	South Yuba River-Pierce Meadow	CS*	0.00	0.00	0.00	5.90	6.43	6.18	0.00	4927.61	0	0	0	0	0	0	9	5	9	5	9	5	0	0	999.6	0	0	0	0.99	1.29	1.25	0
18020125040106	South Yuba River-Pierce Meadow	CY*	5.88	6.18	5.88	0.00	0.00	0.00	6.12	4927.61	9	5	9	5	9	5	0	0	0	0	0	0	9	5	999.6	0.98	1.25	0.98	0	0	0	1.22
18020125040106	South Yuba River-Pierce Meadow	FY	0.00	5.16	5.46	5.44	5.16	5.16	5.22	4927.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	999.6	0	1.38	1.66	1.64	1.38	1.38	1.41
18020125040106	South Yuba River-Pierce Meadow	GY	7.57	7.57	7.57	7.57	7.57	7.57	7.57	4927.61	5	1	5	1	5	1	5	1	5	1	5	1	5	1	999.6	3.22	3.22	3.22	3.22	3.22	3.22	3.22
18020125040106	South Yuba River-Pierce Meadow	HY*	5.19	5.19	5.19	5.19	4.94	5.19	5.19	4927.61	1	0	1	0	1	0	1	0	1	0	1	0	1	0	999.6	2	2	2	2	1.96	2	2
18020125040106	South Yuba River-Pierce Meadow	IY	0.19	0.19	0.19	0.19	0.19	0.19	0.19	4927.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	999.6	0.13	0.13	0.13	0.13	0.13	0.13	0.13
18020125040106	South Yuba River-Pierce Meadow	KY	0.68	0.68	0.68	0.68	0.68	0.68	0.68	4927.61	3	0	3	0	3	0	3	0	3	0	3	0	3	0	999.6	0.57	0.57	0.57	0.57	0.57	0.57	0.57
18020125040106	South Yuba River-Pierce Meadow	LY*	5.46	0.00	0.00	0.00	0.00	0.00	0.00	4927.61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	999.6	1.66	0	0	0	0	0	0
	Sum All =		31.81	31.82	31.81	31.81	31.82	31.82	31.81	4927.61	20	9	20	9	20	9	20	9	20	9	20	9	20	9	999.60	10.49	10.47	10.49	10.48	10.48	10.48	10.48
	*** Value Per SqMi All =**		**4.13**	**4.13**	**4.13**	**4.13**	**4.13**	**4.13**	**4.13**	**7.70**	**2.6**	**1.2**	**2.6**	**1.2**	**2.6**	**1.2**	**2.6**	**1.2**	**2.6**	**1.2**	**2.6**	**1.2**	**2.6**	**1.2**	**1.56**	**6.72**	**6.70**	**6.72**	**6.71**	**6.71**	**6.71**	**6.71**
	*** Sum Open-Motorized, Native Surface Routes =**		23.28	18.21	17.82	17.84	18.21	18.21	18.06		12	8	12	8	12	8	12	8	12	8	12	8	12	8		6.56	5.17	4.9	4.91	5.18	5.18	5.14
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.02**	**2.36**	**2.31**	**2.32**	**2.36**	**2.36**	**2.35**	**7.70**	**1.6**	**1.0**	**1.6**	**1.0**	**1.6**	**1.0**	**1.6**	**1.0**	**1.6**	**1.0**	**1.6**	**1.0**	**1.6**	**1.0**	**1.56**	**4.20**	**3.31**	**3.14**	**3.14**	**3.32**	**3.32**	**3.29**
18020125040201	North Creek	BS*	2.20	2.20	2.20	6.20	6.20	6.20	2.20	8,563.45	0	1	0	1	0	1	0	2	0	2	0	2	0	1	2,007.33	0.66	0.66	0.66	1.31	1.31	1.31	0.66
18020125040201	North Creek	BY*	3.99	3.99	3.99	0.00	0.00	0.00	3.99	8,563.45	0	1	0	1	0	1	0	0	0	0	0	0	0	1	2,007.33	0.65	0.65	0.65	0.00	0.00	0.00	0.65
18020125040201	North Creek	CS*	0.00	0.00	0.00	1.10	1.10	1.10	0.00	8,563.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,007.33	0.00	0.00	0.00	0.93	0.93	0.93	0.00
18020125040201	North Creek	CY*	1.10	1.10	1.10	0.00	0.00	0.00	1.10	8,563.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,007.33	0.93	0.93	0.93	0.00	0.00	0.00	0.93
18020125040201	North Creek	FY	0.00	6.49	6.49	6.49	6.49	6.49	6.49	8,563.45	0	0	4	2	4	2	4	2	4	2	4	2	4	2	2,007.33	0.00	2.57	2.57	2.57	2.57	2.57	2.57
18020125040201	North Creek	HY*	1.35	1.35	1.35	1.35	1.35	1.35	1.35	8,563.45	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2,007.33	0.48	0.48	0.48	0.48	0.48	0.48	0.48
18020125040201	North Creek	IY	5.77	5.77	5.77	5.77	5.77	5.77	5.77	8,563.45	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2,007.33	2.61	2.61	2.61	2.61	2.61	2.61	2.61
18020125040201	North Creek	JY	6.48	6.48	6.48	6.48	6.48	6.48	6.48	8,563.45	3	2	3	2	3	2	3	2	3	2	3	2	3	2	2,007.33	2.09	2.09	2.09	2.09	2.09	2.09	2.09
18020125040201	North Creek	KY	0.36	0.36	0.36	0.36	0.36	0.36	0.36	8,563.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,007.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040201	North Creek	LY*	6.49	0.00	0.00	0.00	0.00	0.00	0.00	8,563.45	4	2	0	0	0	0	0	0	0	0	0	0	0	0	2,007.33	2.57	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		27.75	27.75	27.75	27.75	27.75	27.75	27.75	8563.45	12	10	12	10	12	10	12	10	12	10	12	10	12	10	2007.33	9.99	9.99	9.99	9.99	9.99	9.99	9.99
	*** Value Per SqMi All =**		**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	**13.38**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**3.14**	**3.19**	**3.19**	**3.19**	**3.19**	**3.19**	**3.19**	**3.19**
	*** Sum Open-Motorized, Native Surface Routes =**		15.13	8.65	8.65	8.65	8.65	8.65	8.65		5	4	1	2	1	2	1	2	1	2	1	2	1	2		5.29	2.72	2.72	2.72	2.72	2.72	2.72
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.13**	**0.65**	**0.65**	**0.65**	**0.65**	**0.65**	**0.65**	**13.38**	**0.4**	**0.3**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**3.14**	**1.69**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**	**0.87**
18020125040202	Fordyce Lake	AS	0.52	0.00	0.52	0.52	0.00	0.52	0.52	11707.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2927.66	0	0	0	0	0	0	0
18020125040202	Fordyce Lake	AY	0.65	0.00	0.65	0.65	0.00	0.65	0.65	11707.77	1	0	0	0	1	0	1	0	0	0	1	0	1	0	2927.66	0.32	0	0.32	0.32	0	0.32	0.32
18020125040202	Fordyce Lake	BS*	2.28	2.81	2.28	31.07	31.59	31.07	2.28	11707.77	0	1	0	1	0	1	6	9	6	9	6	9	0	1	2927.66	0	0	0	7.36	7.36	7.36	0
18020125040202	Fordyce Lake	BY*	28.78	29.43	28.78	0.00	0.65	0.00	28.78	11707.77	6	8	7	8	6	8	0	0	1	0	0	0	6	8	2927.66	7.36	7.68	7.36	0	0.32	0	7.36
18020125040202	Fordyce Lake	CS*	0.00	0.00	0.00	2.73	3.11	2.88	0.00	11707.77	0	0	0	0	0	0	1	1	1	1	1	1	0	0	2927.66	0	0	0	1.1	1.33	1.1	0
18020125040202	Fordyce Lake	CY*	2.38	3.11	2.38	0.00	0.00	0.00	2.71	11707.77	1	1	1	1	1	1	0	0	0	0	0	0	1	1	2927.66	0.96	1.33	0.96	0	0	0	1.08
18020125040202	Fordyce Lake	FY	0.05	5.66	6.27	5.94	5.66	5.79	5.96	11707.77	0	0	3	0	3	0	3	0	3	0	3	0	3	0	2927.66	0	1.28	1.55	1.41	1.28	1.41	1.43
18020125040202	Fordyce Lake	GY	4.91	4.91	4.91	4.91	4.91	4.91	4.91	11707.77	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2927.66	2.47	2.47	2.47	2.47	2.47	2.47	2.47
18020125040202	Fordyce Lake	HY*	9.01	8.88	9.01	8.98	8.88	8.98	8.98	11707.77	3	2	3	2	3	2	3	2	3	2	3	2	3	2	2927.66	1.51	1.41	1.51	1.51	1.41	1.51	1.51
18020125040202	Fordyce Lake	IY	4.87	4.87	4.87	4.87	4.87	4.87	4.87	11707.77	5	2	5	2	5	2	5	2	5	2	5	2	5	2	2927.66	3.47	3.47	3.47	3.47	3.47	3.47	3.47
18020125040202	Fordyce Lake	JY	3.18	3.18	3.18	3.18	3.18	3.18	3.18	11707.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2927.66	0.05	0.05	0.05	0.05	0.05	0.05	0.05
18020125040202	Fordyce Lake	KY	1.81	1.81	1.81	1.81	1.81	1.81	1.81	11707.77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2927.66	0.15	0.15	0.15	0.15	0.15	0.15	0.15
18020125040202	Fordyce Lake	LY*	6.22	0.00	0.00	0.00	0.00	0.00	0.00	11707.77	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2927.66	1.55	0	0	0	0	0	0
	Sum All =		64.66	64.66	64.66	64.66	64.66	64.66	64.66	11707.77	20	14	20	14	20	14	20	14	20	14	20	14	20	14	2927.66	17.84	17.84	17.84	17.84	17.84	17.84	17.84
	*** Value Per SqMi All =**		**3.53**	**3.53**	**3.53**	**3.53**	**3.53**	**3.53**	**3.53**	**18.29**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**1.1**	**0.8**	**4.57**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**	**3.90**
	*** Sum Open-Motorized, Native Surface Routes =**		48.67	44.23	42.45	42.78	44.23	42.93	42.76		13	12	11	12	10	12	10	12	11	12	10	12	10	12		11.38	10.42	9.83	9.97	10.42	9.97	9.95
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.66**	**2.42**	**2.32**	**2.34**	**2.42**	**2.35**	**2.34**	**18.29**	**0.7**	**0.7**	**0.6**	**0.7**	**0.5**	**0.7**	**0.5**	**0.7**	**0.6**	**0.7**	**0.5**	**0.7**	**0.5**	**0.7**	**4.57**	**2.49**	**2.28**	**2.15**	**2.18**	**2.28**	**2.18**	**2.18**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125040203	Upper Fordyce Creek	BS*	0.00	0.00	0.00	0.39	0.39	0.39	0.00	7907.39	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1911.19	0	0	0	0.08	0.08	0.08	0
18020125040203	Upper Fordyce Creek	BY*	0.39	0.39	0.39	0.00	0.00	0.00	0.39	7907.39	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1911.19	0.08	0.08	0.08	0	0	0	0.08
18020125040203	Upper Fordyce Creek	CS*	0.00	0.00	0.00	9.85	11.24	10.99	0.00	7907.39	0	0	0	0	0	0	8	6	9	6	8	6	0	0	1911.19	0	0	0	4.75	5.54	5.31	0
18020125040203	Upper Fordyce Creek	CY*	9.85	11.24	9.85	0.00	0.00	0.00	10.97	7907.39	8	6	9	6	8	6	0	0	0	0	0	0	8	6	1911.19	4.75	5.54	4.75	0	0	0	5.29
18020125040203	Upper Fordyce Creek	FY	0.00	0.35	1.62	1.62	0.35	0.49	0.51	7907.39	0	0	1	0	2	0	2	0	1	0	2	0	2	0	1911.19	0	0.14	0.8	0.8	0.14	0.24	0.26
18020125040203	Upper Fordyce Creek	HY*	0.26	0.13	0.26	0.26	0.13	0.26	0.26	7907.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1911.19	0.25	0.13	0.25	0.25	0.13	0.25	0.25
18020125040203	Upper Fordyce Creek	IY	3.83	3.83	3.83	3.83	3.83	3.83	3.83	7907.39	4	1	4	1	4	1	4	1	4	1	4	1	4	1	1911.19	2.08	2.08	2.08	2.08	2.08	2.08	2.08
18020125040203	Upper Fordyce Creek	LY*	1.62	0.00	0.00	0.00	0.00	0.00	0.00	7907.39	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1911.19	0.8	0	0	0	0	0	0
	Sum All =		15.95	15.95	15.95	15.95	15.95	15.95	15.95	7907.39	14	8	14	8	14	8	14	8	14	8	14	8	14	8	1911.19	7.96	7.97	7.96	7.96	7.97	7.96	7.96
	*** Value Per SqMi All =**		**1.29**	**1.29**	**1.29**	**1.29**	**1.29**	**1.29**	**1.29**	**12.36**	**1.1**	**0.6**	**1.1**	**0.6**	**1.1**	**0.6**	**1.1**	**0.6**	**1.1**	**0.6**	**1.1**	**0.6**	**1.1**	**0.6**	**2.99**	**2.67**	**2.67**	**2.67**	**2.67**	**2.67**	**2.67**	**2.67**
	*** Sum Open-Motorized, Native Surface Routes =**		12.12	11.77	10.50	10.50	11.77	11.63	11.62		10	7	9	7	8	7	8	7	9	7	8	7	8	7		5.88	5.75	5.08	5.08	5.75	5.64	5.62
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.98**	**0.95**	**0.85**	**0.85**	**0.95**	**0.94**	**0.94**	**12.36**	**0.8**	**0.6**	**0.7**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.7**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**2.99**	**1.97**	**1.93**	**1.70**	**1.70**	**1.93**	**1.89**	**1.88**
18020125040204	Lower Fordyce Creek	AY	2.27	0.00	2.27	2.27	0.00	0.00	2.27	5,958.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,671.49	0.04	0.00	0.04	0.04	0.00	0.00	0.04
18020125040204	Lower Fordyce Creek	BS*	0.00	0.00	0.00	2.27	3.43	3.43	0.00	5,958.83	0	0	0	0	0	0	1	4	1	4	1	4	0	0	1,671.49	0.00	0.00	0.00	0.45	0.49	0.49	0.00
18020125040204	Lower Fordyce Creek	BY*	2.27	4.54	2.27	0.00	1.11	1.11	2.27	5,958.83	1	4	1	4	1	4	0	0	0	0	0	0	1	4	1,671.49	0.45	0.49	0.45	0.00	0.00	0.00	0.45
18020125040204	Lower Fordyce Creek	CS*	0.00	0.00	0.00	1.26	1.26	1.26	0.00	5,958.83	0	0	0	0	0	0	7	5	7	5	7	5	0	0	1,671.49	0.00	0.00	0.00	0.69	0.69	0.69	0.00
18020125040204	Lower Fordyce Creek	CY*	1.17	1.26	1.17	0.00	0.00	0.00	1.17	5,958.83	7	5	7	5	7	5	0	0	0	0	0	0	7	5	1,671.49	0.69	0.69	0.69	0.00	0.00	0.00	0.69
18020125040204	Lower Fordyce Creek	FY	0.43	1.16	1.25	1.16	1.16	1.16	1.25	5,958.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,671.49	0.00	0.04	0.04	0.04	0.04	0.04	0.04
18020125040204	Lower Fordyce Creek	HY*	2.06	2.06	2.06	2.06	2.06	2.06	2.06	5,958.83	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,671.49	0.28	0.28	0.28	0.28	0.28	0.28	0.28
18020125040204	Lower Fordyce Creek	IY	13.39	13.39	13.39	13.39	13.39	13.39	13.39	5,958.83	10	4	10	4	10	4	10	4	10	4	10	4	10	4	1,671.49	5.89	5.89	5.89	5.89	5.89	5.89	5.89
18020125040204	Lower Fordyce Creek	LY*	0.82	0.00	0.00	0.00	0.00	0.00	0.00	5,958.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,671.49	0.04	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		22.41	22.41	22.41	22.41	22.41	22.41	22.41	5958.83	20	13	20	13	20	13	20	13	20	13	20	13	20	13	1671.49	7.39	7.39	7.39	7.39	7.39	7.39	7.39
	*** Value Per SqMi All =**		**2.41**	**2.41**	**2.41**	**2.41**	**2.41**	**2.41**	**2.41**	**9.31**	**2.1**	**1.4**	**2.1**	**1.4**	**2.1**	**1.4**	**2.1**	**1.4**	**2.1**	**1.4**	**2.1**	**1.4**	**2.1**	**1.4**	**2.61**	**2.83**	**2.83**	**2.83**	**2.83**	**2.83**	**2.83**	**2.83**
	*** Sum Open-Motorized, Native Surface Routes =**		6.32	7.86	5.50	5.59	7.86	7.86	5.50		10	9	10	9	10	9	10	9	10	9	10	9	10	9		1.46	1.46	1.42	1.42	1.46	1.46	1.42
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.68**	**0.84**	**0.59**	**0.60**	**0.84**	**0.84**	**0.59**	**9.31**	**1.1**	**1.0**	**1.1**	**1.0**	**1.1**	**1.0**	**1.1**	**1.0**	**1.1**	**1.0**	**1.1**	**1.0**	**1.1**	**1.0**	**2.61**	**0.56**	**0.56**	**0.54**	**0.54**	**0.56**	**0.56**	**0.54**
18020125040301	Lake Spaulding	AY	0.16	0.00	0.16	0.16	0.00	0.00	0.16	3,662.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	464.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040301	Lake Spaulding	BS*	0.00	0.00	0.00	0.00	0.16	0.16	0.00	3,662.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	464.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040301	Lake Spaulding	BY*	0.00	0.16	0.00	0.00	0.00	0.00	0.00	3,662.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	464.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040301	Lake Spaulding	FY	0.00	0.73	0.73	0.73	0.73	0.73	0.73	3,662.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	464.29	0.00	0.13	0.13	0.13	0.13	0.13	0.13
18020125040301	Lake Spaulding	GY	8.74	8.74	8.74	8.74	8.74	8.74	8.74	3,662.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	464.29	0.50	0.50	0.50	0.50	0.50	0.50	0.50
18020125040301	Lake Spaulding	HY*	5.63	5.63	5.63	5.63	5.63	5.63	5.63	3,662.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	464.29	1.05	1.05	1.05	1.05	1.05	1.05	1.05
18020125040301	Lake Spaulding	IY	1.80	1.80	1.80	1.80	1.80	1.80	1.80	3,662.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	464.29	0.99	0.99	0.99	0.99	0.99	0.99	0.99
18020125040301	Lake Spaulding	LY*	0.73	0.00	0.00	0.00	0.00	0.00	0.00	3,662.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	464.29	0.13	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		17.06	17.06	17.06	17.06	17.06	17.06	17.06	3662.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	464.29	2.67	2.67	2.67	2.67	2.67	2.67	2.67
	*** Value Per SqMi All =**		**2.98**	**2.98**	**2.98**	**2.98**	**2.98**	**2.98**	**2.98**	**5.72**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.73**	**3.68**	**3.68**	**3.68**	**3.68**	**3.68**	**3.68**	**3.68**
	*** Sum Open-Motorized, Native Surface Routes =**		6.36	5.79	5.63	5.63	5.79	5.79	5.63		0	0	0	0	0	0	0	0	0	0	0	0	0	0		1.18	1.05	1.05	1.05	1.05	1.05	1.05
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.11**	**1.01**	**0.98**	**0.98**	**1.01**	**1.01**	**0.98**	**5.72**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.73**	**1.63**	**1.45**	**1.45**	**1.45**	**1.45**	**1.45**	**1.45**
18020125040302	South Yuba River-Jordan Creek	AY	8.27	0.79	8.27	8.27	0.79	0.79	8.27	6,744.52	5	1	0	0	5	1	5	1	0	0	0	0	5	1	1,345.79	2.09	0.76	2.09	2.09	0.76	0.76	2.09
18020125040302	South Yuba River-Jordan Creek	BS*	0.00	0.00	0.00	4.48	6.75	6.75	0.00	6,744.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,345.79	0.00	0.00	0.00	0.61	0.69	0.69	0.00
18020125040302	South Yuba River-Jordan Creek	BY*	4.48	11.96	4.48	0.00	5.21	5.21	4.48	6,744.52	0	0	5	1	0	0	0	0	5	1	5	1	0	0	1,345.79	0.61	1.95	0.61	0.00	1.26	1.26	0.61
18020125040302	South Yuba River-Jordan Creek	CS*	0.00	0.00	0.00	0.02	1.03	0.04	0.00	6,744.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,345.79	0.00	0.00	0.00	0.00	0.02	0.02	0.00
18020125040302	South Yuba River-Jordan Creek	CY*	0.00	0.04	0.00	0.00	0.00	0.00	0.00	6,744.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,345.79	0.00	0.02	0.00	0.00	0.00	0.00	0.00
18020125040302	South Yuba River-Jordan Creek	FY	0.00	2.99	3.03	3.01	2.57	2.99	3.03	6,744.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,345.79	0.00	0.78	0.80	0.80	0.78	0.78	0.80
18020125040302	South Yuba River-Jordan Creek	GY	0.62	0.62	0.62	0.62	0.62	0.62	0.62	6,744.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,345.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040302	South Yuba River-Jordan Creek	HY*	7.08	7.08	7.08	7.08	6.51	7.08	7.08	6,744.52	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,345.79	1.62	1.62	1.62	1.62	1.62	1.62	1.62
18020125040302	South Yuba River-Jordan Creek	IY	3.59	3.59	3.59	3.59	3.59	3.59	3.59	6,744.52	4	0	4	0	4	0	4	0	4	0	4	0	4	0	1,345.79	1.71	1.71	1.71	1.71	1.71	1.71	1.71
18020125040302	South Yuba River-Jordan Creek	LY*	3.03	0.00	0.00	0.00	0.00	0.00	0.00	6,744.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,345.79	0.80	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		27.08	27.08	27.08	27.08	27.08	27.08	27.08	6744.52	11	1	11	1	11	1	11	1	11	1	11	1	11	1	1345.79	6.83	6.84	6.83	6.83	6.84	6.84	6.83
	*** Value Per SqMi All =**		**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**10.54**	**1.0**	**0.1**	**1.0**	**0.1**	**1.0**	**0.1**	**1.0**	**0.1**	**1.0**	**0.1**	**1.0**	**0.1**	**1.0**	**0.1**	**2.10**	**3.25**	**3.25**	**3.25**	**3.25**	**3.25**	**3.25**	**3.25**
	*** Sum Open-Motorized, Native Surface Routes =**		14.59	19.08	11.55	11.58	19.51	19.08	11.55		2	0	7	1	2	0	2	0	7	1	7	1	2	0		3.03	3.59	2.23	2.23	3.59	3.59	2.23
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.38**	**1.81**	**1.10**	**1.10**	**1.85**	**1.81**	**1.10**	**10.54**	**0.2**	**0.0**	**0.7**	**0.1**	**0.2**	**0.0**	**0.2**	**0.0**	**0.7**	**0.1**	**0.7**	**0.1**	**0.2**	**0.0**	**2.10**	**1.44**	**1.71**	**1.06**	**1.06**	**1.71**	**1.71**	**1.06**
18020125040303	Fall Creek	AY	13.82	0.00	13.82	13.82	0.00	0.00	13.82	6,508.64	8	5	0	0	8	5	8	5	0	0	0	0	8	5	1,317.65	2.92	0.00	2.92	2.92	0.00	0.00	2.92
18020125040303	Fall Creek	BS*	0.00	0.00	0.00	10.93	14.50	14.50	0.00	6,508.64	0	0	0	0	0	0	2	2	5	2	5	2	0	0	1,317.65	0.00	0.00	0.00	2.08	2.47	2.47	0.00
18020125040303	Fall Creek	BY*	10.93	24.75	10.93	0.00	10.25	10.25	10.93	6,508.64	2	2	10	7	2	2	0	0	5	5	5	5	2	2	1,317.65	2.08	5.00	2.08	0.00	2.53	2.53	2.08
18020125040303	Fall Creek	CS*	0.00	0.00	0.00	0.29	1.06	0.29	0.00	6,508.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,317.65	0.00	0.00	0.00	0.16	0.34	0.16	0.00
18020125040303	Fall Creek	CY*	0.00	0.29	0.00	0.00	0.00	0.00	0.00	6,508.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,317.65	0.00	0.16	0.00	0.00	0.00	0.00	0.00
18020125040303	Fall Creek	FY	0.00	9.07	9.36	9.07	8.57	9.07	9.36	6,508.64	0	0	2	2	2	2	2	2	2	2	2	2	2	2	1,317.65	0.00	2.16	2.32	2.16	1.98	2.16	2.32
18020125040303	Fall Creek	HY*	16.70	16.70	16.70	16.70	16.43	16.70	16.70	6,508.64	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1,317.65	1.38	1.38	1.38	1.38	1.38	1.38	1.38
18020125040303	Fall Creek	IY	3.01	3.01	3.01	3.01	3.01	3.01	3.01	6,508.64	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1,317.65	1.23	1.23	1.23	1.23	1.23	1.23	1.23
18020125040303	Fall Creek	KY	2.75	2.75	2.75	2.75	2.75	2.75	2.75	6,508.64	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,317.65	0.98	0.98	0.98	0.98	0.98	0.98	0.98
18020125040303	Fall Creek	LY*	9.36	0.00	0.00	0.00	0.00	0.00	0.00	6,508.64	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1,317.65	2.32	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		56.57	56.57	56.57	56.57	56.57	56.57	56.57	6508.64	16	13	16	13	16	13	16	13	16	13	16	13	16	13	1317.65	10.91	10.91	10.91	10.91	10.91	10.91	10.91
	*** Value Per SqMi All =**		**5.56**	**5.56**	**5.56**	**5.56**	**5.56**	**5.56**	**5.56**	**10.17**	**1.6**	**1.3**	**1.6**	**1.3**	**1.6**	**1.3**	**1.6**	**1.3**	**1.6**	**1.3**	**1.6**	**1.3**	**1.6**	**1.3**	**2.06**	**5.30**	**5.30**	**5.30**	**5.30**	**5.30**	**5.30**	**5.30**
	*** Sum Open-Motorized, Native Surface Routes =**		36.99	41.75	27.63	27.93	42.24	41.75	27.63		5	7	11	10	3	5	3	5	11	10	11	10	3	5		5.78	6.54	3.46	3.62	6.72	6.54	3.46
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.64**	**4.10**	**2.72**	**2.75**	**4.15**	**4.10**	**2.72**	**10.17**	**0.5**	**0.7**	**1.1**	**1.0**	**0.3**	**0.5**	**0.3**	**0.5**	**1.1**	**1.0**	**1.1**	**1.0**	**0.3**	**0.5**	**2.06**	**2.81**	**3.18**	**1.68**	**1.76**	**3.26**	**3.18**	**1.68**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125040304	South Yuba River-Diamond Creek	AS	2.58	0.00	2.58	2.58	0.00	0.00	2.58	5752.6	1	0	0	0	1	0	1	0	0	0	0	0	1	0	1198.13	1.11	0	1.11	1.11	0	0	1.11
18020125040304	South Yuba River-Diamond Creek	AY	1.70	0.00	1.70	1.70	0.00	1.55	1.70	5752.6	1	1	0	0	1	1	1	1	0	0	1	1	1	1	1198.13	0.25	0	0.25	0.25	0	0.25	0.25
18020125040304	South Yuba River-Diamond Creek	BS*	0.00	2.58	0.00	7.56	10.13	10.13	0.00	5752.6	0	0	1	0	0	0	2	2	3	2	3	2	0	0	1198.13	0	1.11	0	1.08	2.19	2.19	0
18020125040304	South Yuba River-Diamond Creek	BY*	7.56	9.26	7.56	0.00	1.70	0.15	7.56	5752.6	2	2	3	3	2	2	0	0	1	1	0	0	2	2	1198.13	1.08	1.33	1.08	0	0.25	0	1.08
18020125040304	South Yuba River-Diamond Creek	CS*	0.00	0.02	0.00	0.85	3.92	2.38	0.00	5752.6	0	0	0	0	0	0	0	2	1	4	0	3	0	0	1198.13	0	0	0	0.64	1.4	1.15	0
18020125040304	South Yuba River-Diamond Creek	CY*	0.83	2.36	0.83	0.00	0.00	0.00	0.83	5752.6	0	2	0	3	0	2	0	0	0	0	0	0	0	2	1198.13	0.64	1.15	0.64	0	0	0	0.64
18020125040304	South Yuba River-Diamond Creek	FY	0.00	3.08	4.63	4.61	2.40	3.08	4.63	5752.6	0	0	0	1	0	2	0	2	0	0	0	1	0	2	1198.13	0	0.51	1.02	1.02	0.45	0.51	1.02
18020125040304	South Yuba River-Diamond Creek	GY	4.15	4.15	4.15	4.15	4.15	4.15	4.15	5752.6	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1198.13	0.56	0.56	0.56	0.56	0.56	0.56	0.56
18020125040304	South Yuba River-Diamond Creek	HY*	9.21	9.21	9.21	9.21	8.34	9.21	9.21	5752.6	5	4	5	4	5	4	5	4	4	4	5	4	5	4	1198.13	3.68	3.68	3.68	3.68	3.49	3.68	3.68
18020125040304	South Yuba River-Diamond Creek	IY	5.14	5.14	5.14	5.14	5.14	5.14	5.14	5752.6	0	2	0	2	0	2	0	2	0	2	0	2	0	2	1198.13	0.19	0.19	0.19	0.19	0.19	0.19	0.19
18020125040304	South Yuba River-Diamond Creek	LY*	4.63	0.00	0.00	0.00	0.00	0.00	0.00	5752.6	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1198.13	1.02	0	0	0	0	0	0
	Sum All =		35.79	35.80	35.79	35.79	35.80	35.80	35.79	5752.60	10	13	10	13	10	13	10	13	10	13	10	13	10	13	1198.13	8.53	8.53	8.53	8.53	8.53	8.53	8.53
	*** Value Per SqMi All =**		**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**8.99**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.1**	**1.4**	**1.87**	**4.56**	**4.56**	**4.56**	**4.56**	**4.56**	**4.56**	**4.56**
	*** Sum Open-Motorized, Native Surface Routes =**		22.22	23.42	17.60	17.62	24.10	21.87	17.60		7	10	9	10	7	8	7	8	9	11	8	9	7	8		6.42	7.27	5.40	5.40	7.33	7.02	5.40
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.47**	**2.61**	**1.96**	**1.96**	**2.68**	**2.43**	**1.96**	**8.99**	**0.8**	**1.1**	**1.0**	**1.1**	**0.8**	**0.9**	**0.8**	**0.9**	**1.0**	**1.2**	**0.9**	**1.0**	**0.8**	**0.9**	**1.87**	**3.43**	**3.88**	**2.88**	**2.88**	**3.92**	**3.75**	**2.88**
18020125040401	Headwaters Canyon Creek	AY	0.32	0.00	0.00	0.00	0.00	0.00	0.00	6061.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1619.31	0.32	0	0	0	0	0	0
18020125040401	Headwaters Canyon Creek	BS*	0.00	0.00	0.00	0.51	0.51	0.51	0.00	6061.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1619.31	0	0	0	0.51	0.51	0.51	0
18020125040401	Headwaters Canyon Creek	BY*	0.20	0.51	0.51	0.00	0.00	0.00	0.51	6061.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1619.31	0.19	0.51	0.51	0	0	0	0.51
18020125040401	Headwaters Canyon Creek	CS*	0.00	0.00	0.00	0.04	0.10	0.10	0.00	6061.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1619.31	0	0	0	0	0	0	0
18020125040401	Headwaters Canyon Creek	CY*	0.04	0.10	0.04	0.00	0.00	0.00	0.10	6061.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1619.31	0	0	0	0	0	0	0
18020125040401	Headwaters Canyon Creek	FY	4.92	5.00	5.05	5.05	5.00	5.00	5.00	6061.07	2	4	2	4	2	4	2	4	2	4	2	4	2	4	1619.31	2.79	2.83	2.83	2.83	2.83	2.83	2.83
18020125040401	Headwaters Canyon Creek	GY	0.10	0.10	0.10	0.10	0.10	0.10	0.10	6061.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1619.31	0	0	0	0	0	0	0
18020125040401	Headwaters Canyon Creek	IY	3.33	3.33	3.33	3.33	3.33	3.33	3.33	6061.07	3	2	3	2	3	2	3	2	3	2	3	2	3	2	1619.31	1.38	1.38	1.38	1.38	1.38	1.38	1.38
18020125040401	Headwaters Canyon Creek	LY*	0.13	0.00	0.00	0.00	0.00	0.00	0.00	6061.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1619.31	0.04	0	0	0	0	0	0
	Sum All =		9.04	9.04	9.04	9.04	9.04	9.04	9.04	6061.07	5	6	5	6	5	6	5	6	5	6	5	6	5	6	1619.31	4.72	4.72	4.72	4.72	4.72	4.72	4.72
	*** Value Per SqMi All =**		**0.95**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**	**9.47**	**0.5**	**0.6**	**0.5**	**0.6**	**0.5**	**0.6**	**0.5**	**0.6**	**0.5**	**0.6**	**0.5**	**0.6**	**0.5**	**0.6**	**2.53**	**1.87**	**1.87**	**1.87**	**1.87**	**1.87**	**1.87**	**1.87**
	*** Sum Open-Motorized, Native Surface Routes =**		0.37	0.61	0.55	0.55	0.61	0.61	0.61		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.23	0.51	0.51	0.51	0.51	0.51	0.51
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.04**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**0.06**	**9.47**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.53**	**0.09**	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**
18020125040402	Canyon Creek-Sawmill Lake	AY	2.08	0.00	0.06	0.06	0.00	0.00	0.06	4799.44	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1323.75	1.06	0	0	0	0	0	0
18020125040402	Canyon Creek-Sawmill Lake	BS*	0.00	0.00	0.00	3.79	3.79	3.79	0.00	4799.44	0	0	0	0	0	0	2	1	2	1	2	1	0	0	1323.75	0	0	0	1.18	1.18	1.18	0
18020125040402	Canyon Creek-Sawmill Lake	BY*	1.78	3.85	3.79	0.00	0.06	0.06	3.79	4799.44	1	0	2	1	2	1	0	0	0	0	0	0	2	1	1323.75	0.12	1.18	1.18	0	0	0	1.18
18020125040402	Canyon Creek-Sawmill Lake	CS*	0.00	0.00	0.00	0.02	0.36	0.36	0.00	4799.44	0	0	0	0	0	0	1	0	1	1	1	1	0	0	1323.75	0	0	0	0.02	0.08	0.08	0
18020125040402	Canyon Creek-Sawmill Lake	CY*	0.00	0.36	0.00	0.00	0.00	0.00	0.00	4799.44	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1323.75	0	0.08	0	0	0	0	0
18020125040402	Canyon Creek-Sawmill Lake	FY	0.18	2.04	2.40	2.39	2.04	2.04	2.40	4799.44	0	0	0	1	1	2	0	2	0	1	0	1	1	2	1323.75	0	0.4	0.48	0.46	0.4	0.4	0.48
18020125040402	Canyon Creek-Sawmill Lake	GY	0.14	0.14	0.14	0.14	0.14	0.14	0.14	4799.44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1323.75	0.1	0.1	0.1	0.1	0.1	0.1	0.1
18020125040402	Canyon Creek-Sawmill Lake	IY	9.18	9.18	9.18	9.18	9.18	9.18	9.18	4799.44	7	0	7	0	7	0	7	0	7	0	7	0	7	0	1323.75	4.73	4.73	4.73	4.73	4.73	4.73	4.73
18020125040402	Canyon Creek-Sawmill Lake	LY*	2.23	0.00	0.00	0.00	0.00	0.00	0.00	4799.44	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1323.75	0.48	0	0	0	0	0	0
	Sum All =		15.58	15.58	15.58	15.58	15.58	15.58	15.58	4799.44	10	3	10	3	10	3	10	3	10	3	10	3	10	3	1323.75	6.49	6.49	6.49	6.49	6.49	6.49	6.49
	*** Value Per SqMi All =**		**2.08**	**2.08**	**2.08**	**2.08**	**2.08**	**2.08**	**2.08**	**7.50**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**2.07**	**3.14**	**3.14**	**3.14**	**3.14**	**3.14**	**3.14**	**3.14**
	*** Sum Open-Motorized, Native Surface Routes =**		4.00	4.21	3.79	3.81	4.21	4.21	3.79		2	2	3	2	2	1	3	1	3	2	3	2	2	1		0.60	1.26	1.18	1.20	1.26	1.26	1.18
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.53**	**0.56**	**0.51**	**0.51**	**0.56**	**0.56**	**0.51**	**7.50**	**0.3**	**0.3**	**0.4**	**0.3**	**0.3**	**0.1**	**0.4**	**0.1**	**0.4**	**0.3**	**0.4**	**0.3**	**0.3**	**0.1**	**2.07**	**0.29**	**0.61**	**0.57**	**0.58**	**0.61**	**0.61**	**0.57**
18020125040403	Canyon Creek-Bowman Lake	AY	2.29	0.20	1.14	1.14	0.20	0.20	1.14	7,262.65	2	0	0	0	1	0	1	0	0	0	0	0	1	0	1,167.91	1.15	0.20	0.45	0.45	0.20	0.20	0.45
18020125040403	Canyon Creek-Bowman Lake	BS*	0.00	0.00	0.00	12.13	13.07	13.07	0.00	7,262.65	0	0	0	0	0	0	4	2	5	2	5	2	0	0	1,167.91	0.00	0.00	0.00	2.57	2.82	2.82	0.00
18020125040403	Canyon Creek-Bowman Lake	BY*	10.98	13.07	12.13	0.00	0.00	0.00	12.13	7,262.65	3	2	5	2	4	2	0	0	0	0	0	0	4	2	1,167.91	1.86	2.82	2.57	0.00	0.00	0.00	2.57
18020125040403	Canyon Creek-Bowman Lake	CS*	0.00	0.00	0.00	0.32	0.32	0.32	0.00	7,262.65	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1,167.91	0.00	0.00	0.00	0.26	0.26	0.26	0.00
18020125040403	Canyon Creek-Bowman Lake	CY*	0.00	0.32	0.00	0.00	0.00	0.00	0.00	7,262.65	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1,167.91	0.00	0.26	0.00	0.00	0.00	0.00	0.00
18020125040403	Canyon Creek-Bowman Lake	FY	0.00	2.90	3.22	2.90	2.90	2.90	3.22	7,262.65	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1,167.91	0.00	0.20	0.47	0.20	0.20	0.20	0.47
18020125040403	Canyon Creek-Bowman Lake	GY	7.10	7.10	7.10	7.10	7.10	7.10	7.10	7,262.65	5	1	5	1	5	1	5	1	5	1	5	1	5	1	1,167.91	3.98	3.98	3.98	3.98	3.98	3.98	3.98
18020125040403	Canyon Creek-Bowman Lake	HY*	4.60	4.60	4.60	4.60	4.60	4.60	4.60	7,262.65	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,167.91	1.39	1.39	1.39	1.39	1.39	1.39	1.39
18020125040403	Canyon Creek-Bowman Lake	IY	1.08	1.08	1.08	1.08	1.08	1.08	1.08	7,262.65	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,167.91	0.17	0.17	0.17	0.17	0.17	0.17	0.17
18020125040403	Canyon Creek-Bowman Lake	LY*	3.22	0.00	0.00	0.00	0.00	0.00	0.00	7,262.65	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,167.91	0.47	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		29.27	29.27	29.27	29.27	29.27	29.27	29.27	7262.65	15	3	15	3	15	3	15	3	15	3	15	3	15	3	1167.91	9.02	9.02	9.03	9.02	9.02	9.02	9.03
	*** Value Per SqMi All =**		**2.58**	**2.58**	**2.58**	**2.58**	**2.58**	**2.58**	**2.58**	**11.35**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.3**	**0.3**	**1.82**	**4.94**	**4.94**	**4.95**	**4.94**	**4.94**	**4.94**	**4.95**
	*** Sum Open-Motorized, Native Surface Routes =**		18.80	17.99	16.73	17.05	17.99	17.99	16.73		6	2	8	2	6	2	7	2	8	2	8	2	6	2		3.72	4.47	3.96	4.22	4.47	4.47	3.96
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.66**	**1.59**	**1.47**	**1.50**	**1.59**	**1.59**	**1.47**	**11.35**	**0.5**	**0.2**	**0.7**	**0.2**	**0.5**	**0.2**	**0.6**	**0.2**	**0.7**	**0.2**	**0.7**	**0.2**	**0.5**	**0.2**	**1.82**	**2.04**	**2.45**	**2.17**	**2.31**	**2.45**	**2.45**	**2.17**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125040404	Canyon Creek-Texas Creek	AY	2.21	0.00	2.21	2.21	0.00	0.00	2.21	7,929.37	4	0	0	0	4	0	4	0	0	0	0	0	4	0	1,840.37	0.51	0.00	0.51	0.51	0.00	0.00	0.51
18020125040404	Canyon Creek-Texas Creek	BS*	0.00	0.00	0.00	16.02	17.24	17.24	0.00	7,929.37	0	0	0	0	0	0	9	6	10	6	10	6	0	0	1,840.37	0.00	0.00	0.00	3.96	4.38	4.38	0.00
18020125040404	Canyon Creek-Texas Creek	BY*	16.02	18.23	16.02	0.00	0.99	0.99	16.02	7,929.37	9	6	13	6	9	6	0	0	3	0	3	0	9	6	1,840.37	3.96	4.47	3.96	0.00	0.09	0.09	3.96
18020125040404	Canyon Creek-Texas Creek	CS*	0.00	0.00	0.00	0.06	0.06	0.06	0.00	7,929.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,840.37	0.00	0.00	0.00	0.04	0.04	0.04	0.00
18020125040404	Canyon Creek-Texas Creek	CY*	0.00	0.06	0.00	0.00	0.00	0.00	0.00	7,929.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,840.37	0.00	0.04	0.00	0.00	0.00	0.00	0.00
18020125040404	Canyon Creek-Texas Creek	FY	1.45	10.45	10.50	10.45	10.45	10.45	10.50	7,929.37	2	0	5	1	5	1	5	1	5	1	5	1	5	1	1,840.37	0.70	2.29	2.32	2.29	2.29	2.29	2.32
18020125040404	Canyon Creek-Texas Creek	GY	1.80	1.80	1.80	1.80	1.80	1.80	1.80	7,929.37	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,840.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040404	Canyon Creek-Texas Creek	HY*	11.44	11.44	11.44	11.44	11.44	11.44	11.44	7,929.37	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,840.37	1.38	1.38	1.38	1.38	1.38	1.38	1.38
18020125040404	Canyon Creek-Texas Creek	IY	5.26	5.26	5.26	5.26	5.26	5.26	5.26	7,929.37	6	0	6	0	6	0	6	0	6	0	6	0	6	0	1,840.37	3.77	3.77	3.77	3.77	3.77	3.77	3.77
18020125040404	Canyon Creek-Texas Creek	KY	0.48	0.48	0.48	0.48	0.48	0.48	0.48	7,929.37	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,840.37	0.15	0.15	0.15	0.15	0.15	0.15	0.15
18020125040404	Canyon Creek-Texas Creek	LY*	9.05	0.00	0.00	0.00	0.00	0.00	0.00	7,929.37	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1,840.37	1.62	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		47.71	47.71	47.71	47.71	47.71	47.71	47.71	7929.37	28	7	28	7	28	7	28	7	28	7	28	7	28	7	1840.37	12.09	12.10	12.09	12.10	12.10	12.10	12.09
	*** Value Per SqMi All =**		**3.85**	**3.85**	**3.85**	**3.85**	**3.85**	**3.85**	**3.85**	**12.39**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.3**	**0.6**	**2.88**	**4.20**	**4.21**	**4.20**	**4.21**	**4.21**	**4.21**	**4.20**
	*** Sum Open-Motorized, Native Surface Routes =**		36.51	29.73	27.46	27.52	29.73	29.73	27.46		14	7	15	6	11	6	11	6	15	6	15	6	11	6		6.96	5.89	5.34	5.38	5.89	5.89	5.34
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.95**	**2.40**	**2.22**	**2.22**	**2.40**	**2.40**	**2.22**	**12.39**	**1.1**	**0.6**	**1.2**	**0.5**	**0.9**	**0.5**	**0.9**	**0.5**	**1.2**	**0.5**	**1.2**	**0.5**	**0.9**	**0.5**	**2.88**	**2.42**	**2.05**	**1.86**	**1.87**	**2.05**	**2.05**	**1.86**
18020125040405	Lower Canyon Creek-South Yuba River	AY	0.84	0.00	0.84	0.84	0.00	0.57	0.84	6,155.50	2	0	0	0	2	0	2	0	0	0	0	0	2	0	1,140.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040405	Lower Canyon Creek-South Yuba River	BS*	0.00	0.00	0.00	18.77	18.77	18.77	0.00	6,155.50	0	0	0	0	0	0	7	7	7	7	7	7	0	0	1,140.51	0.00	0.00	0.00	5.39	5.39	5.39	0.00
18020125040405	Lower Canyon Creek-South Yuba River	BY*	18.77	19.61	18.77	0.00	0.84	0.27	18.77	6,155.50	7	7	9	7	7	7	0	0	2	0	2	0	7	7	1,140.51	5.39	5.39	5.39	0.00	0.00	0.00	5.39
18020125040405	Lower Canyon Creek-South Yuba River	CS*	0.00	0.00	0.00	0.00	0.24	0.00	0.00	6,155.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,140.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040405	Lower Canyon Creek-South Yuba River	FY	0.00	8.87	8.87	8.87	8.63	8.87	8.87	6,155.50	0	0	3	7	3	7	3	7	3	7	3	7	3	7	1,140.51	0.00	1.10	1.10	1.10	1.10	1.10	1.10
18020125040405	Lower Canyon Creek-South Yuba River	HY*	8.32	8.32	8.32	8.32	8.32	8.32	8.32	6,155.50	2	3	2	3	2	3	2	3	2	3	2	3	2	3	1,140.51	0.66	0.66	0.66	0.66	0.66	0.66	0.66
18020125040405	Lower Canyon Creek-South Yuba River	IY	2.02	2.02	2.02	2.02	2.02	2.02	2.02	6,155.50	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,140.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040405	Lower Canyon Creek-South Yuba River	LY*	8.87	0.00	0.00	0.00	0.00	0.00	0.00	6,155.50	3	7	0	0	0	0	0	0	0	0	0	0	0	0	1,140.51	1.10	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		38.82	38.82	38.82	38.82	38.82	38.82	38.82	6155.50	14	18	14	18	14	18	14	18	14	18	14	18	14	18	1140.51	7.15	7.15	7.15	7.15	7.15	7.15	7.15
	*** Value Per SqMi All =**		**4.04**	**4.04**	**4.04**	**4.04**	**4.04**	**4.04**	**4.04**	**9.62**	**1.5**	**1.9**	**1.5**	**1.9**	**1.5**	**1.9**	**1.5**	**1.9**	**1.5**	**1.9**	**1.5**	**1.9**	**1.5**	**1.9**	**1.78**	**4.01**	**4.01**	**4.01**	**4.01**	**4.01**	**4.01**	**4.01**
	*** Sum Open-Motorized, Native Surface Routes =**		35.95	27.93	27.08	27.08	27.93	27.36	27.08		12	17	11	10	9	10	9	10	11	10	11	10	9	10		7.15	6.05	6.05	6.05	6.05	6.05	6.05
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.74**	**2.90**	**2.82**	**2.82**	**2.90**	**2.84**	**2.82**	**9.62**	**1.2**	**1.8**	**1.1**	**1.0**	**0.9**	**1.0**	**0.9**	**1.0**	**1.1**	**1.0**	**1.1**	**1.0**	**0.9**	**1.0**	**1.78**	**4.01**	**3.39**	**3.39**	**3.39**	**3.39**	**3.39**	**3.39**
18020125040501	Upper Poorman Creek	AY	2.34	0.00	2.34	2.34	0.00	0.53	2.34	6,917.18	2	0	0	0	2	0	2	0	0	0	0	0	2	0	1,358.68	0.26	0.00	0.26	0.26	0.00	0.00	0.26
18020125040501	Upper Poorman Creek	BS*	0.00	0.00	0.00	18.43	18.43	18.43	0.00	6,917.18	0	0	0	0	0	0	5	7	5	7	5	7	0	0	1,358.68	0.00	0.00	0.00	3.50	3.50	3.50	0.00
18020125040501	Upper Poorman Creek	BY*	18.43	20.77	18.43	0.00	2.34	1.81	18.43	6,917.18	5	7	7	7	5	7	0	0	2	0	2	0	5	7	1,358.68	3.50	3.76	3.50	0.00	0.26	0.26	3.50
18020125040501	Upper Poorman Creek	CS*	0.00	0.00	0.00	0.00	1.28	0.02	0.00	6,917.18	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1,358.68	0.00	0.00	0.00	0.00	0.08	0.00	0.00
18020125040501	Upper Poorman Creek	CY*	0.00	0.02	0.00	0.00	0.00	0.00	0.00	6,917.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,358.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040501	Upper Poorman Creek	FY	0.00	10.98	11.00	11.00	9.72	10.98	11.00	6,917.18	0	0	0	4	0	4	0	4	0	2	0	4	0	4	1,358.68	0.00	0.90	0.90	0.90	0.82	0.90	0.90
18020125040501	Upper Poorman Creek	GY	7.34	7.34	7.34	7.34	7.34	7.34	7.34	6,917.18	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1,358.68	0.85	0.85	0.85	0.85	0.85	0.85	0.85
18020125040501	Upper Poorman Creek	HY*	23.80	23.80	23.80	23.80	23.80	23.80	23.80	6,917.18	9	4	9	4	9	4	9	4	9	4	9	4	9	4	1,358.68	6.19	6.19	6.19	6.19	6.19	6.19	6.19
18020125040501	Upper Poorman Creek	KY	0.43	0.43	0.43	0.43	0.43	0.43	0.43	6,917.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,358.68	0.15	0.15	0.15	0.15	0.15	0.15	0.15
18020125040501	Upper Poorman Creek	LY*	11.00	0.00	0.00	0.00	0.00	0.00	0.00	6,917.18	0	4	0	0	0	0	0	0	0	0	0	0	0	0	1,358.68	0.90	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		63.34	63.34	61.00	42.58	44.92	44.38	61.00	6917.18	18	16	18	16	18	16	18	16	18	16	18	16	18	16	1358.68	11.85	11.85	11.85	11.85	11.85	11.85	11.85
	*** Value Per SqMi All =**		**5.86**	**5.86**	**5.64**	**3.94**	**4.16**	**4.11**	**5.64**	**10.81**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**2.12**	**5.58**	**5.58**	**5.58**	**5.58**	**5.58**	**5.58**	**5.58**
	*** Sum Open-Motorized, Native Surface Routes =**		53.23	23.82	23.80	23.80	25.09	23.82	23.80		9	8	9	4	9	4	9	4	9	6	9	4	9	4		7.09	6.19	6.19	6.19	6.27	6.19	6.19
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.93**	**2.20**	**2.20**	**2.20**	**2.32**	**2.20**	**2.20**	**10.81**	**0.8**	**0.7**	**0.8**	**0.4**	**0.8**	**0.4**	**0.8**	**0.4**	**0.8**	**0.6**	**0.8**	**0.4**	**0.8**	**0.4**	**2.12**	**3.34**	**2.92**	**2.92**	**2.92**	**2.95**	**2.92**	**2.92**
18020125040502	Lower Poorman Creek	AY	5.73	0.86	5.73	5.73	0.86	5.73	5.73	7,932.15	2	0	1	0	2	0	2	0	1	0	2	0	2	0	1,382.37	1.45	0.44	1.45	1.45	0.44	1.45	1.45
18020125040502	Lower Poorman Creek	BS*	0.00	0.00	0.00	18.19	18.19	18.19	0.00	7,932.15	0	0	0	0	0	0	4	4	4	4	4	4	0	0	1,382.37	0.00	0.00	0.00	1.57	1.57	1.57	0.00
18020125040502	Lower Poorman Creek	BY*	18.19	23.06	18.19	0.00	4.87	0.00	18.19	7,932.15	4	4	5	4	4	4	0	0	1	0	0	0	4	4	1,382.37	1.57	2.58	1.57	0.00	1.00	0.00	1.57
18020125040502	Lower Poorman Creek	CS*	0.00	0.00	0.00	0.02	0.02	0.02	0.00	7,932.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,382.37	0.00	0.00	0.00	0.02	0.02	0.02	0.00
18020125040502	Lower Poorman Creek	CY*	0.00	0.02	0.00	0.00	0.00	0.00	0.00	7,932.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,382.37	0.00	0.02	0.00	0.00	0.00	0.00	0.00
18020125040502	Lower Poorman Creek	FY	0.00	7.55	7.57	7.55	7.55	7.55	7.57	7,932.15	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1,382.37	0.00	0.70	0.72	0.70	0.70	0.70	0.72
18020125040502	Lower Poorman Creek	GY	2.36	2.36	2.36	2.36	2.36	2.36	2.36	7,932.15	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1,382.37	0.05	0.05	0.05	0.05	0.05	0.05	0.05
18020125040502	Lower Poorman Creek	HY*	15.83	15.83	15.83	15.83	15.83	15.83	15.83	7,932.15	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1,382.37	1.55	1.55	1.55	1.55	1.55	1.55	1.55
18020125040502	Lower Poorman Creek	IY	0.40	0.40	0.40	0.40	0.40	0.40	0.40	7,932.15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,382.37	0.40	0.40	0.40	0.40	0.40	0.40	0.40
18020125040502	Lower Poorman Creek	KY	2.46	2.46	2.46	2.46	2.46	2.46	2.46	7,932.15	0	2	0	2	0	2	0	2	0	2	0	2	0	2	1,382.37	0.50	0.50	0.50	0.50	0.50	0.50	0.50
18020125040502	Lower Poorman Creek	LY*	7.57	0.00	0.00	0.00	0.00	0.00	0.00	7,932.15	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1,382.37	0.72	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		52.53	52.53	52.53	52.53	52.53	52.53	52.53	7932.15	11	9	11	9	11	9	11	9	11	9	11	9	11	9	1382.37	6.24	6.24	6.24	6.24	6.23	6.24	6.24
	*** Value Per SqMi All =**		**4.24**	**4.24**	**4.24**	**4.24**	**4.24**	**4.24**	**4.24**	**12.39**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**0.9**	**0.7**	**2.16**	**2.89**	**2.89**	**2.89**	**2.89**	**2.88**	**2.89**	**2.89**
	*** Sum Open-Motorized, Native Surface Routes =**		41.58	38.90	34.01	34.03	38.90	34.03	34.01		7	7	7	6	6	6	6	6	6	7	6	6	6	6		3.84	4.15	3.12	3.14	4.14	3.14	3.12
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.36**	**3.14**	**2.74**	**2.75**	**3.14**	**2.75**	**2.74**	**12.39**	**0.6**	**0.6**	**0.6**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**0.6**	**0.5**	**0.5**	**0.5**	**0.5**	**0.5**	**2.16**	**1.78**	**1.92**	**1.44**	**1.45**	**1.92**	**1.45**	**1.44**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125040503	South Yuba River-Scotchman Creek	AS	3.44	0.00	3.44	3.44	0.00	0.00	3.44	7586.48	0	1	0	0	0	1	0	1	0	0	0	0	0	1	1577.34	0.09	0	0.09	0.09	0	0	0.09
18020125040503	South Yuba River-Scotchman Creek	AY	9.99	1.72	9.99	9.99	1.72	9.66	9.99	7586.48	3	4	1	1	3	4	3	4	1	1	3	4	3	4	1577.34	0.99	0.08	0.99	0.99	0.08	0.99	0.99
18020125040503	South Yuba River-Scotchman Creek	BS*	1.34	4.78	1.34	6.48	10.25	10.25	1.34	7586.48	0	0	0	1	0	0	0	0	0	1	0	1	0	0	1577.34	0	0.1	0	0	0.1	0.1	0
18020125040503	South Yuba River-Scotchman Creek	BY*	5.15	13.42	5.15	0.00	7.94	0.00	5.15	7586.48	0	0	2	3	0	0	0	0	2	3	0	0	0	0	1577.34	0	0.91	0	0	0.91	0	0
18020125040503	South Yuba River-Scotchman Creek	CY*	0.00	0.98	0.00	1.00	0.00	0.00	0.00	7586.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1577.34	0	0.01	0	0	0	0	0
18020125040503	South Yuba River-Scotchman Creek	ES*	0.00	0.00	0.00	2.01	2.91	1.88	0.00	7586.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1577.34	0	0	0	0.18	0.36	0.31	0
18020125040503	South Yuba River-Scotchman Creek	EY*	0.00	1.92	0.00	0.00	0.00	0.00	2.01	7586.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1577.34	0	0.35	0	0	0	0	0.18
18020125040503	South Yuba River-Scotchman Creek	FY	1.39	11.50	14.41	12.40	11.50	12.53	12.40	7586.48	0	1	2	5	2	5	2	5	2	5	2	5	2	5	1577.34	0.14	1.63	1.99	1.81	1.63	1.68	1.81
18020125040503	South Yuba River-Scotchman Creek	GY	8.96	8.96	8.96	8.96	8.96	8.96	8.96	7586.48	4	6	4	6	4	6	4	6	4	6	4	6	4	6	1577.34	4.35	4.35	4.35	4.35	4.35	4.35	4.35
18020125040503	South Yuba River-Scotchman Creek	HY*	8.35	8.35	8.35	8.35	8.35	8.35	8.35	7586.48	4	1	4	1	4	1	4	1	4	1	4	1	4	1	1577.34	1.99	1.99	1.99	1.99	1.99	1.99	1.99
18020125040503	South Yuba River-Scotchman Creek	IY	1.07	1.07	1.07	1.07	1.07	1.07	1.07	7586.48	5	3	5	3	5	3	5	3	5	3	5	3	5	3	1577.34	0.13	0.13	0.13	0.13	0.13	0.13	0.13
18020125040503	South Yuba River-Scotchman Creek	LS*	1.70	0.00	0.00	0.00	0.00	0.00	0.00	7586.48	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1577.34	0.19	0	0	0	0	0	0
18020125040503	South Yuba River-Scotchman Creek	LY*	11.31	0.00	0.00	0.00	0.00	0.00	0.00	7586.48	2	4	0	0	0	0	0	0	0	0	0	0	0	0	1577.34	1.66	0	0	0	0	0	0
	Sum All =		52.70	52.70	52.70	53.70	52.70	52.70	52.70	7586.48	18	20	18	20	18	20	18	20	18	20	18	20	18	20	1577.34	9.54	9.55	9.54	9.54	9.55	9.55	9.54
	*** Value Per SqMi All =**		**4.45**	**4.45**	**4.45**	**4.53**	**4.45**	**4.45**	**4.45**	**11.85**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**1.5**	**1.7**	**2.46**	**3.87**	**3.87**	**3.87**	**3.87**	**3.87**	**3.87**	**3.87**
	*** Sum Open-Motorized, Native Surface Routes =**		27.85	29.44	14.83	17.84	29.44	20.47	16.84		6	5	6	5	4	1	4	1	6	5	4	2	4	1		3.84	3.36	1.99	2.17	3.36	2.40	2.17
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.35**	**2.48**	**1.25**	**1.51**	**2.48**	**1.73**	**1.42**	**11.85**	**0.5**	**0.4**	**0.5**	**0.4**	**0.3**	**0.1**	**0.3**	**0.1**	**0.5**	**0.4**	**0.3**	**0.2**	**0.3**	**0.1**	**2.46**	**1.56**	**1.36**	**0.81**	**0.88**	**1.36**	**0.97**	**0.88**
18020125040601	South Yuba River-Jefferson Creek	AY	5.34	5.34	5.34	5.34	5.34	5.34	5.34	4,673.07	2	3	2	3	2	3	2	3	2	3	2	3	2	3	1,069.00	0.76	0.76	0.76	0.76	0.76	0.76	0.76
18020125040601	South Yuba River-Jefferson Creek	BS*	0.19	0.19	0.19	10.52	10.52	10.52	0.19	4,673.07	0	0	0	0	0	0	2	4	2	4	2	4	0	0	1,069.00	0.00	0.00	0.00	0.60	0.60	0.60	0.00
18020125040601	South Yuba River-Jefferson Creek	BY*	10.33	10.33	10.33	0.00	0.00	0.00	10.33	4,673.07	2	4	2	4	2	4	0	0	0	0	0	0	2	4	1,069.00	0.60	0.60	0.60	0.00	0.00	0.00	0.60
18020125040601	South Yuba River-Jefferson Creek	CS*	0.00	0.00	0.00	0.00	0.60	0.00	0.00	4,673.07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,069.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040601	South Yuba River-Jefferson Creek	FY	0.00	5.67	5.67	5.67	5.06	5.67	5.67	4,673.07	0	0	1	2	1	2	1	2	1	2	1	2	1	2	1,069.00	0.00	0.57	0.57	0.57	0.57	0.57	0.57
18020125040601	South Yuba River-Jefferson Creek	GY	2.73	2.73	2.73	2.73	2.73	2.73	2.73	4,673.07	0	4	0	4	0	4	0	4	0	4	0	4	0	4	1,069.00	0.17	0.17	0.17	0.17	0.17	0.17	0.17
18020125040601	South Yuba River-Jefferson Creek	HY*	7.49	7.49	7.49	7.49	7.49	7.49	7.49	4,673.07	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1,069.00	1.32	1.32	1.32	1.32	1.32	1.32	1.32
18020125040601	South Yuba River-Jefferson Creek	IY	1.95	1.95	1.95	1.95	1.95	1.95	1.95	4,673.07	4	3	4	3	4	3	4	3	4	3	4	3	4	3	1,069.00	0.77	0.77	0.77	0.77	0.77	0.77	0.77
18020125040601	South Yuba River-Jefferson Creek	LY*	5.67	0.00	0.00	0.00	0.00	0.00	0.00	4,673.07	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1,069.00	0.57	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		33.70	33.70	33.70	33.70	33.70	33.70	33.70	4673.07	11	18	11	18	11	18	11	18	11	18	11	18	11	18	1069.00	4.19	4.19	4.19	4.19	4.19	4.19	4.19
	*** Value Per SqMi All =**		**4.62**	**4.62**	**4.62**	**4.62**	**4.62**	**4.62**	**4.62**	**7.30**	**1.5**	**2.5**	**1.5**	**2.5**	**1.5**	**2.5**	**1.5**	**2.5**	**1.5**	**2.5**	**1.5**	**2.5**	**1.5**	**2.5**	**1.67**	**2.51**	**2.51**	**2.51**	**2.51**	**2.51**	**2.51**	**2.51**
	*** Sum Open-Motorized, Native Surface Routes =**		23.67	18.01	18.01	18.01	18.61	18.01	18.01		5	8	4	6	4	6	4	6	4	6	4	6	4	6		2.49	1.92	1.92	1.92	1.92	1.92	1.92
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.24**	**2.47**	**2.47**	**2.47**	**2.55**	**2.47**	**2.47**	**7.30**	**0.7**	**1.1**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**1.67**	**1.49**	**1.15**	**1.15**	**1.15**	**1.15**	**1.15**	**1.15**
18020125040602	South Yuba River-Logan Canyon	AY	4.66	2.79	4.66	4.66	2.79	2.79	4.66	4,493.82	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1,205.30	0.54	0.54	0.54	0.54	0.54	0.54	0.54
18020125040602	South Yuba River-Logan Canyon	BS*	0.71	0.71	0.71	6.93	8.79	8.79	0.71	4,493.82	0	0	0	0	0	0	1	4	1	4	1	4	0	0	1,205.30	0.00	0.00	0.00	0.79	0.79	0.79	0.00
18020125040602	South Yuba River-Logan Canyon	BY*	6.21	8.08	6.21	0.00	0.00	0.00	6.21	4,493.82	1	4	1	4	1	4	0	0	0	0	0	0	1	4	1,205.30	0.79	0.79	0.79	0.00	0.00	0.00	0.79
18020125040602	South Yuba River-Logan Canyon	FY	0.00	9.32	9.32	9.32	9.32	9.32	9.32	4,493.82	0	0	0	4	0	4	0	4	0	4	0	4	0	4	1,205.30	0.00	0.90	0.90	0.90	0.90	0.90	0.90
18020125040602	South Yuba River-Logan Canyon	GY	3.31	3.31	3.31	3.31	3.31	3.31	3.31	4,493.82	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,205.30	0.65	0.65	0.65	0.65	0.65	0.65	0.65
18020125040602	South Yuba River-Logan Canyon	HY*	5.17	5.17	5.17	5.17	5.17	5.17	5.17	4,493.82	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1,205.30	1.16	1.16	1.16	1.16	1.16	1.16	1.16
18020125040602	South Yuba River-Logan Canyon	IY	6.15	6.15	6.15	6.15	6.15	6.15	6.15	4,493.82	4	5	4	5	4	5	4	5	4	5	4	5	4	5	1,205.30	1.87	1.87	1.87	1.87	1.87	1.87	1.87
18020125040602	South Yuba River-Logan Canyon	LS*	5.00	0.00	0.00	0.00	0.00	0.00	0.00	4,493.82	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1,205.30	0.12	0.00	0.00	0.00	0.00	0.00	0.00
18020125040602	South Yuba River-Logan Canyon	LY*	4.32	0.00	0.00	0.00	0.00	0.00	0.00	4,493.82	0	3	0	0	0	0	0	0	0	0	0	0	0	0	1,205.30	0.78	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		35.54	35.54	35.54	35.54	35.54	35.54	35.54	4493.82	8	21	8	21	8	21	8	21	8	21	8	21	8	21	1205.30	5.91	5.91	5.91	5.91	5.91	5.91	5.91
	*** Value Per SqMi All =**		**5.06**	**5.06**	**5.06**	**5.06**	**5.06**	**5.06**	**5.06**	**7.02**	**1.1**	**3.0**	**1.1**	**3.0**	**1.1**	**3.0**	**1.1**	**3.0**	**1.1**	**3.0**	**1.1**	**3.0**	**1.1**	**3.0**	**1.88**	**3.14**	**3.14**	**3.14**	**3.14**	**3.14**	**3.14**	**3.14**
	*** Sum Open-Motorized, Native Surface Routes =**		21.42	13.97	12.10	12.10	13.97	13.97	12.10		2	11	2	7	2	7	2	7	2	7	2	7	2	7		2.85	1.95	1.95	1.95	1.95	1.95	1.95
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.05**	**1.99**	**1.72**	**1.72**	**1.99**	**1.99**	**1.72**	**7.02**	**0.3**	**1.6**	**0.3**	**1.0**	**0.3**	**1.0**	**0.3**	**1.0**	**0.3**	**1.0**	**0.3**	**1.0**	**0.3**	**1.0**	**1.88**	**1.51**	**1.04**	**1.04**	**1.04**	**1.04**	**1.04**	**1.04**
18020125040603	Humbug Creek	AY	0.62	0.00	0.62	0.62	0.00	0.00	0.62	3,027.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	862.38	0.11	0.00	0.11	0.11	0.00	0.00	0.11
18020125040603	Humbug Creek	BS*	5.26	5.26	5.26	7.60	8.22	8.22	5.26	3,027.14	0	1	0	1	0	1	0	3	0	3	0	3	0	1	862.38	0.26	0.26	0.26	0.26	0.38	0.38	0.26
18020125040603	Humbug Creek	BY*	2.34	2.96	2.34	0.00	0.00	0.00	2.34	3,027.14	0	2	0	2	0	2	0	0	0	0	0	0	0	2	862.38	0.00	0.11	0.00	0.00	0.00	0.00	0.00
18020125040603	Humbug Creek	CS*	0.00	0.00	0.00	0.00	1.68	0.00	0.00	3,027.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	862.38	0.00	0.00	0.00	0.00	0.03	0.00	0.00
18020125040603	Humbug Creek	FY	0.00	6.91	6.91	6.91	5.81	6.91	6.91	3,027.14	0	0	1	3	1	3	1	3	1	3	1	3	1	3	862.38	0.00	0.49	0.49	0.49	0.49	0.49	0.49
18020125040603	Humbug Creek	GY	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3,027.14	0	2	0	2	0	2	0	2	0	2	0	2	0	2	862.38	0.35	0.35	0.35	0.35	0.35	0.35	0.35
18020125040603	Humbug Creek	HY*	3.98	3.98	3.98	3.98	3.39	3.98	3.98	3,027.14	1	2	1	2	1	2	1	2	1	2	1	2	1	2	862.38	0.90	0.90	0.90	0.90	0.87	0.90	0.90
18020125040603	Humbug Creek	LS*	5.11	0.00	0.00	0.00	0.00	0.00	0.00	3,027.14	1	3	0	0	0	0	0	0	0	0	0	0	0	0	862.38	0.49	0.00	0.00	0.00	0.00	0.00	0.00
18020125040603	Humbug Creek	LY*	1.80	0.00	0.00	0.00	0.00	0.00	0.00	3,027.14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	862.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		22.90	22.90	22.90	22.90	22.90	22.90	22.90	3027.14	2	10	2	10	2	10	2	10	2	10	2	10	2	10	862.38	2.11	2.11	2.11	2.11	2.12	2.12	2.11
	*** Value Per SqMi All =**		**4.84**	**4.84**	**4.84**	**4.84**	**4.84**	**4.84**	**4.84**	**4.73**	**0.4**	**2.1**	**0.4**	**2.1**	**0.4**	**2.1**	**0.4**	**2.1**	**0.4**	**2.1**	**0.4**	**2.1**	**0.4**	**2.1**	**1.35**	**1.57**	**1.57**	**1.57**	**1.57**	**1.57**	**1.57**	**1.57**
	*** Sum Open-Motorized, Native Surface Routes =**		18.49	12.20	11.58	11.58	13.30	12.20	11.58		2	8	1	5	1	5	1	5	1	5	1	5	1	5		1.65	1.27	1.16	1.16	1.16	1.28	1.28	1.16
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.91**	**2.58**	**2.45**	**2.45**	**2.81**	**2.58**	**2.45**	**4.73**	**0.4**	**1.7**	**0.2**	**1.1**	**0.2**	**1.1**	**0.2**	**1.1**	**0.2**	**1.1**	**0.2**	**1.1**	**0.2**	**1.1**	**1.35**	**1.22**	**0.94**	**0.86**	**0.86**	**0.95**	**0.95**	**0.86**
18020125040604	South Yuba River-New York Canyon	AY	3.67	3.67	3.67	3.67	3.67	3.67	3.67	923.98	2	1	2	1	2	1	2	1	2	1	2	1	2	1	285.05	0.24	0.24	0.24	0.24	0.24	0.24	0.24
18020125040604	South Yuba River-New York Canyon	BS*	3.96	3.96	3.96	3.96	3.96	3.96	3.96	923.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	285.05	0.02	0.02	0.02	0.02	0.02	0.02	0.02
18020125040604	South Yuba River-New York Canyon	CS*	0.00	0.00	0.00	0.00	0.50	0.00	0.00	923.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	285.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040604	South Yuba River-New York Canyon	FY	0.00	4.19	4.19	4.19	3.69	4.19	4.19	923.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	285.05	0.00	0.10	0.10	0.10	0.10	0.10	0.10
18020125040604	South Yuba River-New York Canyon	HY*	1.08	1.08	1.08	1.08	1.08	1.08	1.08	923.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	285.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040604	South Yuba River-New York Canyon	IY	1.71	1.71	1.71	1.71	1.71	1.71	1.71	923.98	0	1	0	1	0	1	0	1	0	1	0	1	0	1	285.05	0.02	0.02	0.02	0.02	0.02	0.02	0.02
18020125040604	South Yuba River-New York Canyon	LS*	4.19	0.00	0.00	0.00	0.00	0.00	0.00	923.98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	285.05	0.10	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		14.60	14.60	14.60	14.60	14.60	14.60	14.60	6467.86	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1995.35	0.38	0.38	0.38	0.38	0.38	0.38	0.38
	*** Value Per SqMi All =**		**10.12**	**10.12**	**10.12**	**10.12**	**10.12**	**10.12**	**10.12**	**1.44**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**0.45**	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**	**0.85**
	*** Sum Open-Motorized, Native Surface Routes =**		9.23	5.04	5.04	5.04	5.54	5.04	5.04		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.12	0.02	0.02	0.02	0.02	0.02	0.02
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.91**	**0.50**	**0.50**	**0.50**	**0.55**	**0.50**	**0.50**	**10.11**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**3.12**	**0.04**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020125040701	Spring Creek	AY	0.02	0.02	0.02	0.02	0.02	0.02	0.02	1,402.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	375.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040701	Spring Creek	BS*	4.66	4.66	4.66	4.66	4.66	4.66	4.66	1,402.82	1	1	1	1	1	1	1	1	1	1	1	1	1	1	375.93	0.62	0.62	0.62	0.62	0.62	0.62	0.62
18020125040701	Spring Creek	FY	0.00	2.16	2.16	2.16	2.16	2.16	2.16	1,402.82	0	0	1	0	1	0	1	0	1	0	1	0	1	0	375.93	0.00	0.20	0.20	0.20	0.20	0.20	0.20
18020125040701	Spring Creek	GY	3.06	3.06	3.06	3.06	3.06	3.06	3.06	1,402.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	375.93	0.28	0.28	0.28	0.28	0.28	0.28	0.28
18020125040701	Spring Creek	HY*	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1,402.82	1	0	1	0	1	0	1	0	1	0	1	0	1	0	375.93	0.42	0.42	0.42	0.42	0.42	0.42	0.42
18020125040701	Spring Creek	LS*	2.16	0.00	0.00	0.00	0.00	0.00	0.00	1,402.82	1	0	0	0	0	0	0	0	0	0	0	0	0	0	375.93	0.20	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		11.09	11.09	11.09	11.09	11.09	11.09	11.09	8416.92	3	1	3	1	3	1	3	1	3	1	3	1	3	1	2255.58	1.52	1.52	1.52	1.52	1.52	1.52	1.52
	*** Value Per SqMi All =**		**5.06**	**5.06**	**5.06**	**5.06**	**5.06**	**5.06**	**5.06**	**2.19**	**1.4**	**0.5**	**1.4**	**0.5**	**1.4**	**0.5**	**1.4**	**0.5**	**1.4**	**0.5**	**1.4**	**0.5**	**1.4**	**0.5**	**0.59**	**2.59**	**2.59**	**2.59**	**2.59**	**2.59**	**2.59**	**2.59**
	*** Sum Open-Motorized, Native Surface Routes =**		8.01	5.85	5.85	5.85	5.85	5.85	5.85		3	1	2	1	2	1	2	1	2	1	2	1	2	1		1.24	1.04	1.04	1.04	1.04	1.04	1.04
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.61**	**0.44**	**0.44**	**0.44**	**0.44**	**0.44**	**0.44**	**13.15**	**0.2**	**0.1**	**0.2**	**0.1**	**0.2**	**0.1**	**0.2**	**0.1**	**0.2**	**0.1**	**0.2**	**0.1**	**0.2**	**0.1**	**3.52**	**0.35**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**
18020125040702	Rock Creek-South Yuba River	AY	4.37	4.37	4.37	4.37	4.37	4.37	4.37	14.08	1	0	1	0	1	0	1	0	1	0	1	0	1	0	237.82	0.63	0.63	0.63	0.63	0.63	0.63	0.63
18020125040702	Rock Creek-South Yuba River	BS*	6.58	6.58	6.58	6.58	6.58	6.58	6.58	14.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	237.82	0.65	0.65	0.65	0.65	0.65	0.65	0.65
18020125040702	Rock Creek-South Yuba River	CS*	0.00	0.00	0.00	0.00	0.07	0.00	0.00	14.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	237.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125040702	Rock Creek-South Yuba River	FY	0.00	6.08	6.08	6.08	6.02	6.08	6.08	14.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	237.82	0.00	0.09	0.09	0.09	0.09	0.09	0.09
18020125040702	Rock Creek-South Yuba River	IY	2.45	2.45	2.45	2.45	2.45	2.45	2.45	14.08	5	0	5	0	5	0	5	0	5	0	5	0	5	0	237.82	0.73	0.73	0.73	0.73	0.73	0.73	0.73
18020125040702	Rock Creek-South Yuba River	LS*	6.08	0.00	0.00	0.00	0.00	0.00	0.00	14.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	237.82	0.09	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		19.48	19.48	19.48	19.48	19.48	19.48	19.48	97.63	6	0	6	0	6	0	6	0	6	0	6	0	6	0	1430.44	2.10	2.10	2.10	2.10	2.10	2.10	2.10
	*** Value Per SqMi All =**		**885.26**	**885.26**	**885.26**	**885.26**	**885.27**	**885.26**	**885.26**	**0.02**	**272.7**	**0.0**	**272.7**	**0.0**	**272.7**	**0.0**	**272.7**	**0.0**	**272.7**	**0.0**	**272.7**	**0.0**	**272.7**	**0.0**	**0.37**	**5.65**	**5.65**	**5.65**	**5.65**	**5.65**	**5.65**	**5.65**
	*** Sum Open-Motorized, Native Surface Routes =**		12.66	6.58	6.58	6.58	6.65	6.58	6.58		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.74	0.65	0.65	0.65	0.65	0.65	0.65
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**83.01**	**43.12**	**43.12**	**43.12**	**43.57**	**43.12**	**43.12**	**0.15**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.24**	**0.33**	**0.29**	**0.29**	**0.29**	**0.29**	**0.29**	**0.29**
18020125060101	Headwaters Deer Creek	AY	7.96	0.41	7.96	7.96	0.41	0.42	7.96	5366.12	3	1	0	0	3	1	3	1	0	0	2	1	3	1	1552.83	0.32	0	0.32	0.32	0	0	0.32
18020125060101	Headwaters Deer Creek	BS*	0.01	0.01	0.01	19.82	25.30	25.30	0.01	5366.12	0	0	0	0	0	0	6	5	6	5	6	5	0	0	1552.83	0.01	0.01	0.01	2.48	2.6	2.6	0.01
18020125060101	Headwaters Deer Creek	BY*	19.81	27.36	19.81	0.00	2.06	2.05	19.81	5366.12	6	5	9	6	6	5	0	0	3	1	1	0	6	5	1552.83	2.48	2.8	2.48	0	0.2	0.2	2.48
18020125060101	Headwaters Deer Creek	CS*	0.00	0.00	0.00	0.70	0.70	0.70	0.00	5366.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1552.83	0	0	0	0.05	0.05	0.05	0
18020125060101	Headwaters Deer Creek	CY*	0.68	0.82	0.68	0.00	0.00	0.00	0.68	5366.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1552.83	0.05	0.12	0.05	0	0	0	0.05
18020125060101	Headwaters Deer Creek	ES*	0.00	0.00	0.00	13.90	18.53	14.58	0.00	5366.12	0	0	0	0	0	0	4	1	4	1	4	1	0	0	1552.83	0	0	0	2.6	2.61	2.6	0
18020125060101	Headwaters Deer Creek	EY*	13.54	18.41	13.54	0.00	0.00	0.00	13.90	5366.12	4	1	4	1	4	1	0	0	0	0	0	0	4	1	1552.83	2.54	2.54	2.54	0	0	0	2.6
18020125060101	Headwaters Deer Creek	FY	0.00	16.33	21.33	20.96	16.33	20.28	20.98	5366.12	0	0	7	3	7	3	7	3	7	3	7	3	7	3	1552.83	0	2.62	2.69	2.63	2.62	2.63	2.63
18020125060101	Headwaters Deer Creek	GY	8.10	8.10	8.10	8.10	8.10	8.10	8.10	5366.12	0	3	0	3	0	3	0	3	0	3	0	3	0	3	1552.83	1.3	1.3	1.3	1.3	1.3	1.3	1.3
18020125060101	Headwaters Deer Creek	HY*	3.47	3.47	3.47	3.47	3.47	3.47	3.47	5366.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1552.83	0	0	0	0	0	0	0
18020125060101	Headwaters Deer Creek	IY	8.50	8.50	8.50	8.50	8.50	8.50	8.50	5366.12	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1552.83	2.07	2.07	2.07	2.07	2.07	2.07	2.07
18020125060101	Headwaters Deer Creek	KY	1.45	1.45	1.45	1.45	1.45	1.45	1.45	5366.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1552.83	0.01	0.01	0.01	0.01	0.01	0.01	0.01
18020125060101	Headwaters Deer Creek	LY*	21.33	0.00	0.00	0.00	0.00	0.00	0.00	5366.12	7	3	0	0	0	0	0	0	0	0	0	0	0	0	1552.83	2.69	0	0	0	0	0	0
	Sum All =		84.85	84.85	84.85	84.85	84.85	84.85	84.85	5366.12	24	17	24	17	24	17	24	17	24	17	24	17	24	17	1552.83	11.47	11.47	11.47	11.46	11.46	11.46	11.47
	*** Value Per SqMi All =**		**10.12**	**10.12**	**10.12**	**10.12**	**10.12**	**10.12**	**10.12**	**8.38**	**2.9**	**2.0**	**2.9**	**2.0**	**2.9**	**2.0**	**2.9**	**2.0**	**2.9**	**2.0**	**2.9**	**2.0**	**2.9**	**2.0**	**2.43**	**4.73**	**4.73**	**4.73**	**4.72**	**4.72**	**4.72**	**4.73**
	*** Sum Open-Motorized, Native Surface Routes =**		58.85	50.07	37.51	37.89	50.07	46.10	37.87		17	9	13	7	10	6	10	6	13	7	11	6	10	6		7.77	5.47	5.08	5.13	5.46	5.45	5.14
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**7.02**	**5.97**	**4.47**	**4.52**	**5.97**	**5.50**	**4.52**	**8.38**	**2.0**	**1.1**	**1.6**	**0.8**	**1.2**	**0.7**	**1.2**	**0.7**	**1.6**	**0.8**	**1.3**	**0.7**	**1.2**	**0.7**	**2.43**	**3.20**	**2.25**	**2.09**	**2.11**	**2.25**	**2.25**	**2.12**
18020125060102	Deer Creek-Scotts Flat Reservoir	AY	0.06	0.06	0.06	0.06	0.06	0.06	0.06	1,862.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	524.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125060102	Deer Creek-Scotts Flat Reservoir	BS*	0.25	0.25	0.25	0.32	0.32	0.32	0.25	1,862.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	524.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125060102	Deer Creek-Scotts Flat Reservoir	BY*	0.07	0.07	0.07	0.00	0.00	0.00	0.07	1,862.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	524.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125060102	Deer Creek-Scotts Flat Reservoir	CS*	0.00	0.00	0.00	0.00	1.72	0.00	0.00	1,862.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	524.55	0.00	0.00	0.00	0.00	0.05	0.00	0.00
18020125060102	Deer Creek-Scotts Flat Reservoir	FY	0.00	5.28	5.28	5.28	3.56	5.28	5.28	1,862.23	0	0	1	1	1	1	1	1	1	1	1	1	1	1	524.55	0.00	0.64	0.64	0.64	0.59	0.64	0.64
18020125060102	Deer Creek-Scotts Flat Reservoir	HY*	7.81	7.81	7.81	7.81	7.81	7.81	7.81	1,862.23	0	3	0	3	0	3	0	3	0	3	0	3	0	3	524.55	0.76	0.76	0.76	0.76	0.76	0.76	0.76
18020125060102	Deer Creek-Scotts Flat Reservoir	IY	0.24	0.24	0.24	0.24	0.24	0.24	0.24	1,862.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	524.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020125060102	Deer Creek-Scotts Flat Reservoir	LS*	4.62	0.00	0.00	0.00	0.00	0.00	0.00	1,862.23	1	1	0	0	0	0	0	0	0	0	0	0	0	0	524.55	0.37	0.00	0.00	0.00	0.00	0.00	0.00
18020125060102	Deer Creek-Scotts Flat Reservoir	LY*	0.66	0.00	0.00	0.00	0.00	0.00	0.00	1,862.23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	524.55	0.27	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		13.71	13.71	13.71	13.71	13.71	13.71	13.71	1862.23	1	4	1	4	1	4	1	4	1	4	1	4	1	4	524.55	1.40	1.40	1.40	1.40	1.40	1.40	1.40
	*** Value Per SqMi All =**		**4.71**	**4.71**	**4.71**	**4.71**	**4.71**	**4.71**	**4.71**	**2.91**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.3**	**1.4**	**0.82**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**
	*** Sum Open-Motorized, Native Surface Routes =**		13.40	8.12	8.12	8.12	9.84	8.12	8.12		1	4	0	3	0	3	0	3	0	3	0	3	0	3		1.40	0.76	0.76	0.76	0.81	0.76	0.76
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.61**	**2.79**	**2.79**	**2.79**	**3.38**	**2.79**	**2.79**	**2.91**	**0.3**	**1.4**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.82**	**1.71**	**0.93**	**0.93**	**0.93**	**0.99**	**0.93**	**0.93**
18020126010101	Headwaters Bear River	AY	0.71	0.00	0.71	0.71	0.00	0.00	0.71	2,494.37	1	0	0	0	1	0	1	0	0	0	0	0	1	0	950.41	0.51	0.00	0.51	0.51	0.00	0.00	0.51
18020126010101	Headwaters Bear River	BS*	0.00	0.00	0.00	1.68	1.68	1.68	0.00	2,494.37	0	0	0	0	0	0	0	1	0	1	0	1	0	0	950.41	0.00	0.00	0.00	0.02	0.02	0.02	0.00
18020126010101	Headwaters Bear River	BY*	1.68	2.39	1.68	0.00	0.71	0.71	1.68	2,494.37	0	1	1	1	0	1	0	0	1	0	1	0	0	1	950.41	0.02	0.53	0.02	0.00	0.51	0.51	0.02
18020126010101	Headwaters Bear River	ES*	0.00	0.00	0.00	0.02	0.02	0.02	0.00	2,494.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	950.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010101	Headwaters Bear River	EY*	0.00	0.02	0.00	0.00	0.00	0.00	0.02	2,494.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	950.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010101	Headwaters Bear River	FY	0.00	6.65	6.66	6.65	6.65	6.65	6.65	2,494.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	950.41	0.00	0.96	0.96	0.96	0.96	0.96	0.96
18020126010101	Headwaters Bear River	GY	6.51	6.51	6.51	6.51	6.51	6.51	6.51	2,494.37	1	2	1	2	1	2	1	2	1	2	1	2	1	2	950.41	0.45	0.45	0.45	0.45	0.45	0.45	0.45
18020126010101	Headwaters Bear River	HY*	4.75	4.75	4.75	4.75	4.75	4.75	4.75	2,494.37	2	0	2	0	2	0	2	0	2	0	2	0	2	0	950.41	1.01	1.01	1.01	1.01	1.01	1.01	1.01
18020126010101	Headwaters Bear River	IY	2.42	2.42	2.42	2.42	2.42	2.42	2.42	2,494.37	1	0	1	0	1	0	1	0	1	0	1	0	1	0	950.41	1.05	1.05	1.05	1.05	1.05	1.05	1.05
18020126010101	Headwaters Bear River	LY*	6.66	0.00	0.00	0.00	0.00	0.00	0.00	2,494.37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	950.41	0.96	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		22.73	22.73	22.73	22.73	22.73	22.73	22.73	2494.37	5	3	5	3	5	3	5	3	5	3	5	3	5	3	950.41	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	*** Value Per SqMi All =**		**5.83**	**5.83**	**5.83**	**5.83**	**5.83**	**5.83**	**5.83**	**3.90**	**1.3**	**0.8**	**1.3**	**0.8**	**1.3**	**0.8**	**1.3**	**0.8**	**1.3**	**0.8**	**1.3**	**0.8**	**1.3**	**0.8**	**1.49**	**2.69**	**2.69**	**2.69**	**2.69**	**2.69**	**2.69**	**2.69**
	*** Sum Open-Motorized, Native Surface Routes =**		13.09	7.15	6.43	6.44	7.15	7.15	6.44		2	1	3	1	2	1	2	1	3	1	3	1	2	1		1.99	1.54	1.03	1.03	1.54	1.54	1.03
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.36**	**1.83**	**1.65**	**1.65**	**1.83**	**1.83**	**1.65**	**3.90**	**0.5**	**0.3**	**0.8**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.8**	**0.3**	**0.8**	**0.3**	**0.5**	**0.3**	**1.49**	**1.34**	**1.04**	**0.69**	**0.69**	**1.04**	**1.04**	**0.69**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020126010102	Bear River-Stump Canyon	AY	1.82	1.82	1.82	1.82	1.82	1.82	1.82	593.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	652.84	0.04	0.04	0.04	0.04	0.04	0.04	0.04
18020126010102	Bear River-Stump Canyon	BS*	0.00	0.00	0.00	0.45	0.45	0.45	0.00	593.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	652.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010102	Bear River-Stump Canyon	BY*	0.45	0.45	0.45	0.00	0.00	0.00	0.45	593.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	652.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010102	Bear River-Stump Canyon	CS*	0.00	0.00	0.00	0.00	0.94	0.00	0.00	593.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	652.84	0.00	0.00	0.00	0.00	0.28	0.00	0.00
18020126010102	Bear River-Stump Canyon	FY	0.00	2.03	2.03	2.03	1.09	2.03	2.03	593.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	652.84	0.00	0.42	0.42	0.42	0.14	0.42	0.42
18020126010102	Bear River-Stump Canyon	GY	0.93	0.93	0.93	0.93	0.93	0.93	0.93	593.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	652.84	0.06	0.06	0.06	0.06	0.06	0.06	0.06
18020126010102	Bear River-Stump Canyon	HY*	0.82	0.82	0.82	0.82	0.82	0.82	0.82	593.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	652.84	0.07	0.07	0.07	0.07	0.07	0.07	0.07
18020126010102	Bear River-Stump Canyon	LS*	0.07	0.00	0.00	0.00	0.00	0.00	0.00	593.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	652.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010102	Bear River-Stump Canyon	LY*	1.96	0.00	0.00	0.00	0.00	0.00	0.00	593.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	652.84	0.42	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		6.05	6.05	6.05	6.05	6.05	6.05	6.05	593.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	652.84	0.59	0.59	0.59	0.59	0.59	0.59	0.59
	*** Value Per SqMi All =**		**6.52**	**6.52**	**6.52**	**6.52**	**6.52**	**6.52**	**6.52**	**0.93**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.02**	**0.58**	**0.58**	**0.58**	**0.58**	**0.58**	**0.58**	**0.58**
	*** Sum Open-Motorized, Native Surface Routes =**		3.30	1.27	1.27	1.27	2.21	1.27	1.27		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.49	0.07	0.07	0.07	0.35	0.07	0.07
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.56**	**1.37**	**1.37**	**1.37**	**2.38**	**1.37**	**1.37**	**0.93**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.02**	**0.48**	**0.07**	**0.07**	**0.07**	**0.34**	**0.07**	**0.07**
18020126010103	Bear River-Squires Canyon	FY	0.00	0.04	0.04	0.04	0.04	0.04	0.04	3.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010103	Bear River-Squires Canyon	GY	0.03	0.03	0.03	0.03	0.03	0.03	0.03	3.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010103	Bear River-Squires Canyon	LS*	0.04	0.00	0.00	0.00	0.00	0.00	0.00	3.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		0.07	0.07	0.07	0.07	0.07	0.07	0.07	3.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi All =**		**11.77**	**11.77**	**11.77**	**11.77**	**11.77**	**11.77**	**11.77**	**0.01**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	*** Sum Open-Motorized, Native Surface Routes =**		0.04	0.00	0.00	0.00	0.00	0.00	0.00	3.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**6.61**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
18020126010201	Upper Steephollow Creek	AS	1.53	0.00	1.53	1.53	0.00	0.00	1.53	4447.45	1	0	0	0	1	0	1	0	0	0	0	0	1	0	1074.34	0	0	0	0	0	0	0
18020126010201	Upper Steephollow Creek	AY	1.21	0.00	1.21	1.21	0.00	0.00	1.21	4447.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1074.34	0.1	0	0.1	0.1	0	0	0.1
18020126010201	Upper Steephollow Creek	BS*	0.00	1.53	0.00	16.14	18.88	18.88	0.00	4447.45	0	0	1	0	0	0	0	5	1	5	1	5	0	0	1074.34	0	0	0	1.28	1.38	1.38	0
18020126010201	Upper Steephollow Creek	BY*	16.14	17.35	16.14	0.00	0.00	0.00	16.14	4447.45	0	5	0	5	0	5	0	0	0	0	0	0	0	5	1074.34	1.28	1.38	1.28	0	0	0	1.28
18020126010201	Upper Steephollow Creek	CS*	0.00	0.00	0.00	0.08	0.08	0.08	0.00	4447.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1074.34	0	0	0	0.06	0.06	0.06	0
18020126010201	Upper Steephollow Creek	CY*	0.08	0.08	0.08	0.00	0.00	0.00	0.08	4447.45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1074.34	0.06	0.06	0.06	0	0	0	0.06
18020126010201	Upper Steephollow Creek	ES*	0.00	0.00	0.00	16.86	16.93	16.86	0.00	4447.45	0	0	0	0	0	0	4	2	4	2	4	2	0	0	1074.34	0	0	0	1.43	1.43	1.43	0
18020126010201	Upper Steephollow Creek	EY*	12.43	16.93	12.43	0.00	0.00	0.00	16.86	4447.45	4	0	4	2	4	0	0	0	0	0	0	0	4	2	1074.34	0.57	1.43	0.57	0	0	0	1.43
18020126010201	Upper Steephollow Creek	FY	0.00	10.26	14.72	10.33	10.26	10.33	10.33	4447.45	0	0	1	1	1	3	1	1	1	1	1	1	1	1	1074.34	0	0.79	1.65	0.79	0.79	0.79	0.79
18020126010201	Upper Steephollow Creek	GY	9.48	9.48	9.48	9.48	9.48	9.48	9.48	4447.45	0	5	0	5	0	5	0	5	0	5	0	5	0	5	1074.34	0.7	0.7	0.7	0.7	0.7	0.7	0.7
18020126010201	Upper Steephollow Creek	HY*	1.82	1.79	1.82	1.79	1.79	1.79	1.79	4447.45	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1074.34	0.79	0.79	0.79	0.79	0.79	0.79	0.79
18020126010201	Upper Steephollow Creek	IY	2.72	2.72	2.72	2.72	2.72	2.72	2.72	4447.45	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1074.34	0.25	0.25	0.25	0.25	0.25	0.25	0.25
18020126010201	Upper Steephollow Creek	LY*	14.72	0.00	0.00	0.00	0.00	0.00	0.00	4447.45	1	3	0	0	0	0	0	0	0	0	0	0	0	0	1074.34	1.65	0	0	0	0	0	0
	Sum All =		60.13	60.13	60.13	60.13	60.13	60.13	60.13	4447.45	8	15	8	15	8	15	8	15	8	15	8	15	8	15	1074.34	5.40	5.40	5.40	5.40	5.40	5.40	5.40
	*** Value Per SqMi All =**		**8.65**	**8.65**	**8.65**	**8.65**	**8.65**	**8.65**	**8.65**	**6.95**	**1.2**	**2.2**	**1.2**	**2.2**	**1.2**	**2.2**	**1.2**	**2.2**	**1.2**	**2.2**	**1.2**	**2.2**	**1.2**	**2.2**	**1.68**	**3.22**	**3.22**	**3.22**	**3.22**	**3.22**	**3.22**	**3.22**
	*** Sum Open-Motorized, Native Surface Routes =**		45.19	37.68	30.47	34.87	37.68	37.61	34.87		7	9	7	8	6	6	6	8	7	8	7	8	6	8		4.35	3.66	2.70	3.56	3.66	3.66	3.56
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**6.50**	**5.42**	**4.38**	**5.02**	**5.42**	**5.41**	**5.02**	**6.95**	**1.0**	**1.3**	**1.0**	**1.2**	**0.9**	**0.9**	**0.9**	**1.2**	**1.0**	**1.2**	**1.0**	**1.2**	**0.9**	**1.2**	**1.68**	**2.59**	**2.18**	**1.61**	**2.12**	**2.18**	**2.18**	**2.12**
18020126010202	Middle Steephollow Creek	AY	0.53	0.00	0.53	0.53	0.00	0.00	0.53	3,102.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	983.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010202	Middle Steephollow Creek	BS*	0.47	0.47	0.47	4.17	4.70	4.70	0.47	3,102.64	0	0	0	0	0	0	2	2	2	2	2	2	0	0	983.54	0.00	0.00	0.00	0.43	0.43	0.43	0.00
18020126010202	Middle Steephollow Creek	BY*	3.69	4.22	3.69	0.00	0.00	0.00	3.69	3,102.64	2	2	2	2	2	2	0	0	0	0	0	0	2	2	983.54	0.43	0.43	0.43	0.00	0.00	0.00	0.43
18020126010202	Middle Steephollow Creek	FY	0.00	0.86	0.86	0.86	0.86	0.86	0.86	3,102.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	983.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010202	Middle Steephollow Creek	GY	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3,102.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	983.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010202	Middle Steephollow Creek	HY*	5.03	5.03	5.03	5.03	5.03	5.03	5.03	3,102.64	1	3	1	3	1	3	1	3	1	3	1	3	1	3	983.54	0.28	0.28	0.28	0.28	0.28	0.28	0.28
18020126010202	Middle Steephollow Creek	LY*	0.86	0.00	0.00	0.00	0.00	0.00	0.00	3,102.64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	983.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		14.25	14.25	14.25	14.25	14.25	14.25	14.25	3102.64	3	5	3	5	3	5	3	5	3	5	3	5	3	5	983.54	0.71	0.71	0.71	0.71	0.71	0.71	0.71
	*** Value Per SqMi All =**		**2.94**	**2.94**	**2.94**	**2.94**	**2.94**	**2.94**	**2.94**	**4.85**	**0.6**	**1.0**	**0.6**	**1.0**	**0.6**	**1.0**	**0.6**	**1.0**	**0.6**	**1.0**	**0.6**	**1.0**	**0.6**	**1.0**	**1.54**	**0.46**	**0.46**	**0.46**	**0.46**	**0.46**	**0.46**	**0.46**
	*** Sum Open-Motorized, Native Surface Routes =**		10.05	9.72	9.19	9.19	9.72	9.72	9.19		3	5	3	5	3	5	3	5	3	5	3	5	3	5		0.71	0.71	0.71	0.71	0.71	0.71	0.71
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.07**	**2.01**	**1.90**	**1.90**	**2.01**	**2.01**	**1.90**	**4.85**	**0.6**	**1.0**	**0.6**	**1.0**	**0.6**	**1.0**	**0.6**	**1.0**	**0.6**	**1.0**	**0.6**	**1.0**	**0.6**	**1.0**	**1.54**	**0.46**	**0.46**	**0.46**	**0.46**	**0.46**	**0.46**	**0.46**
18020126010203	Lower Steephollow Creek	BS*	0.78	0.78	0.78	0.78	0.78	0.78	0.78	1,299.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	422.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010203	Lower Steephollow Creek	FY	0.00	0.05	0.05	0.05	0.05	0.05	0.05	1,299.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	422.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010203	Lower Steephollow Creek	GY	2.40	2.40	2.40	2.40	2.40	2.40	2.40	1,299.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	422.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010203	Lower Steephollow Creek	HY*	4.28	4.28	4.28	4.28	4.28	4.28	4.28	1,299.69	0	2	0	2	0	2	0	2	0	2	0	2	0	2	422.07	0.65	0.65	0.65	0.65	0.65	0.65	0.65
18020126010203	Lower Steephollow Creek	LS*	0.05	0.00	0.00	0.00	0.00	0.00	0.00	1,299.69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	422.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		7.52	7.52	7.52	7.52	7.52	7.52	7.52	1299.69	0	2	0	2	0	2	0	2	0	2	0	2	0	2	422.07	0.65	0.65	0.65	0.65	0.65	0.65	0.65
	*** Value Per SqMi All =**		**3.70**	**3.70**	**3.70**	**3.70**	**3.70**	**3.70**	**3.70**	**2.03**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.66**	**0.99**	**0.99**	**0.99**	**0.99**	**0.99**	**0.99**	**0.99**
	*** Sum Open-Motorized, Native Surface Routes =**		5.12	5.07	5.07	5.07	5.07	5.07	5.07		0	2	0	2	0	2	0	2	0	2	0	2	0	2		0.65	0.65	0.65	0.65	0.65	0.65	0.65
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.52**	**2.50**	**2.50**	**2.50**	**2.50**	**2.50**	**2.50**	**2.03**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.66**	**0.99**	**0.99**	**0.99**	**0.99**	**0.99**	**0.99**	**0.99**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary — **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020126010301	Headwaters Greenhorn Creek	AY	6.04	0.00	6.04	6.04	0.00	0.00	6.04	4,916.87	3	2	0	0	3	2	3	2	0	0	0	0	3	2	1,231.39	1.48	0.00	1.48	1.48	0.00	0.00	1.48
18020126010301	Headwaters Greenhorn Creek	BS*	0.13	0.13	0.13	7.26	13.31	13.31	0.13	4,916.87	0	0	0	0	0	0	0	1	3	3	3	3	0	0	1,231.39	0.00	0.00	0.00	0.17	1.65	1.65	0.00
18020126010301	Headwaters Greenhorn Creek	BY*	7.13	13.18	7.13	0.00	0.00	0.00	7.13	4,916.87	0	1	3	3	0	1	0	0	0	0	0	0	0	1	1,231.39	0.17	1.65	0.17	0.00	0.00	0.00	0.17
18020126010301	Headwaters Greenhorn Creek	CS*	0.00	0.00	0.00	0.00	0.77	0.00	0.00	4,916.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,231.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010301	Headwaters Greenhorn Creek	FY	0.00	5.84	5.84	5.84	5.06	5.84	5.84	4,916.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,231.39	0.00	0.07	0.07	0.07	0.07	0.07	0.07
18020126010301	Headwaters Greenhorn Creek	GY	3.98	3.98	3.98	3.98	3.98	3.98	3.98	4,916.87	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,231.39	0.24	0.24	0.24	0.24	0.24	0.24	0.24
18020126010301	Headwaters Greenhorn Creek	HY*	19.30	19.30	19.30	19.30	19.30	19.30	19.30	4,916.87	6	5	6	5	6	5	6	5	6	5	6	5	6	5	1,231.39	2.92	2.92	2.92	2.92	2.92	2.92	2.92
18020126010301	Headwaters Greenhorn Creek	LS*	0.64	0.00	0.00	0.00	0.00	0.00	0.00	4,916.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,231.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010301	Headwaters Greenhorn Creek	LY*	5.19	0.00	0.00	0.00	0.00	0.00	0.00	4,916.87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,231.39	0.07	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		42.42	42.42	42.42	42.42	42.42	42.42	42.42	4916.87	9	9	9	9	9	9	9	9	9	9	9	9	9	9	1231.39	4.88	4.88	4.88	4.88	4.88	4.88	4.88
	*** Value Per SqMi All =**		**5.52**	**5.52**	**5.52**	**5.52**	**5.52**	**5.52**	**5.52**	**7.68**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.2**	**1.92**	**2.54**	**2.54**	**2.54**	**2.54**	**2.54**	**2.54**	**2.54**
	*** Sum Open-Motorized, Native Surface Routes =**		32.40	32.61	26.57	26.57	33.38	32.61	26.57		6	6	9	8	6	6	6	6	9	8	9	8	6	6		3.16	4.57	3.09	3.09	4.57	4.57	3.09
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.22**	**4.24**	**3.46**	**3.46**	**4.35**	**4.24**	**3.46**	**7.68**	**0.8**	**0.8**	**1.2**	**1.0**	**0.8**	**0.8**	**0.8**	**0.8**	**1.2**	**1.0**	**1.2**	**1.0**	**0.8**	**0.8**	**1.92**	**1.64**	**2.38**	**1.61**	**1.61**	**2.38**	**2.38**	**1.61**
18020126010302	Greenhorn Creek-South Fork Greenhorn Creek	AY	0.01	0.00	0.01	0.01	0.00	0.00	0.01	3,236.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	717.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010302	Greenhorn Creek-South Fork Greenhorn Creek	BS*	2.36	2.36	2.36	2.37	2.38	2.38	2.36	3,236.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	717.60	0.51	0.51	0.51	0.51	0.51	0.51	0.51
18020126010302	Greenhorn Creek-South Fork Greenhorn Creek	BY*	0.00	0.02	0.00	0.00	0.00	0.00	0.00	3,236.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	717.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010302	Greenhorn Creek-South Fork Greenhorn Creek	FY	0.00	5.02	5.02	5.02	5.02	5.02	5.02	3,236.00	0	0	14	3	14	3	14	3	14	3	14	3	14	3	717.60	0.00	2.62	2.62	2.62	2.62	2.62	2.62
18020126010302	Greenhorn Creek-South Fork Greenhorn Creek	GY	3.31	3.31	3.31	3.31	3.31	3.31	3.31	3,236.00	0	1	0	1	0	1	0	1	0	1	0	1	0	1	717.60	0.12	0.12	0.12	0.12	0.12	0.12	0.12
18020126010302	Greenhorn Creek-South Fork Greenhorn Creek	HY*	6.67	6.67	6.67	6.67	6.67	6.67	6.67	3,236.00	3	1	3	1	3	1	3	1	3	1	3	1	3	1	717.60	1.26	1.26	1.26	1.26	1.26	1.26	1.26
18020126010302	Greenhorn Creek-South Fork Greenhorn Creek	LS*	2.57	0.00	0.00	0.00	0.00	0.00	0.00	3,236.00	8	0	0	0	0	0	0	0	0	0	0	0	0	0	717.60	1.43	0.00	0.00	0.00	0.00	0.00	0.00
18020126010302	Greenhorn Creek-South Fork Greenhorn Creek	LY*	2.45	0.00	0.00	0.00	0.00	0.00	0.00	3,236.00	6	3	0	0	0	0	0	0	0	0	0	0	0	0	717.60	1.18	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		17.38	17.38	17.38	17.38	17.38	17.38	17.38	3236.00	17	5	17	5	17	5	17	5	17	5	17	5	17	5	717.60	4.50	4.51	4.51	4.51	4.51	4.51	4.51
	*** Value Per SqMi All =**		**3.44**	**3.44**	**3.44**	**3.44**	**3.44**	**3.44**	**3.44**	**5.06**	**3.4**	**1.0**	**3.4**	**1.0**	**3.4**	**1.0**	**3.4**	**1.0**	**3.4**	**1.0**	**3.4**	**1.0**	**3.4**	**1.0**	**1.12**	**4.01**	**4.02**	**4.02**	**4.02**	**4.02**	**4.02**	**4.02**
	*** Sum Open-Motorized, Native Surface Routes =**		14.06	9.05	9.04	9.04	9.05	9.05	9.04		17	4	3	1	3	1	3	1	3	1	3	1	3	1		4.38	1.77	1.77	1.77	1.77	1.77	1.77
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.78**	**1.79**	**1.79**	**1.79**	**1.79**	**1.79**	**1.79**	**5.06**	**3.4**	**0.8**	**0.6**	**0.2**	**0.6**	**0.2**	**0.6**	**0.2**	**0.6**	**0.2**	**0.6**	**0.2**	**0.6**	**0.2**	**1.12**	**3.91**	**1.58**	**1.58**	**1.58**	**1.58**	**1.58**	**1.58**
18020126010304	Lower Greenhorn Creek	FY	0.00	0.20	0.20	0.20	0.20	0.20	0.20	17.65	0	0	2	0	2	0	2	0	2	0	2	0	2	0	34.67	0.00	0.19	0.19	0.19	0.19	0.19	0.19
18020126010304	Lower Greenhorn Creek	HY*	0.05	0.05	0.05	0.05	0.05	0.05	0.05	17.65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020126010304	Lower Greenhorn Creek	LS*	0.20	0.00	0.00	0.00	0.00	0.00	0.00	17.65	2	0	0	0	0	0	0	0	0	0	0	0	0	0	34.67	0.19	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		0.24	0.24	0.24	0.24	0.24	0.24	0.24	17.65	2	0	2	0	2	0	2	0	2	0	2	0	2	0	34.67	0.19	0.19	0.19	0.19	0.19	0.19	0.19
	*** Value Per SqMi All =**		**8.83**	**8.83**	**8.83**	**8.83**	**8.83**	**8.83**	**8.83**	**0.03**	**72.5**	**0.0**	**72.5**	**0.0**	**72.5**	**0.0**	**72.5**	**0.0**	**72.5**	**0.0**	**72.5**	**0.0**	**72.5**	**0.0**	**0.05**	**3.51**	**3.51**	**3.51**	**3.51**	**3.51**	**3.51**	**3.51**
	*** Sum Open-Motorized, Native Surface Routes =**		0.24	0.05	0.05	0.05	0.05	0.05	0.05		2	0	0	0	0	0	0	0	0	0	0	0	0	0		0.19	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**8.83**	**1.72**	**1.72**	**1.72**	**1.72**	**1.72**	**1.72**	**0.03**	**72.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.05**	**3.51**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
18020128010101	Headwaters Middle Fork American River	JY	9.06	9.06	9.06	9.06	9.06	9.06	9.06	5,701.89	8	1	8	1	8	1	8	1	8	1	8	1	8	1	1,439.49	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	Sum All =		9.06	9.06	9.06	9.06	9.06	9.06	9.06	5701.89	8	1	8	1	8	1	8	1	8	1	8	1	8	1	1439.49	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	*** Value Per SqMi All =**		**1.02**	**1.02**	**1.02**	**1.02**	**1.02**	**1.02**	**1.02**	**8.91**	**0.9**	**0.1**	**0.9**	**0.1**	**0.9**	**0.1**	**0.9**	**0.1**	**0.9**	**0.1**	**0.9**	**0.1**	**0.9**	**0.1**	**2.25**	**1.33**	**1.33**	**1.33**	**1.33**	**1.33**	**1.33**	**1.33**
	*** Sum Open-Motorized, Native Surface Routes =**		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**8.91**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.25**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
18020128010102	Middle Fork American River-Talbot Creek	AY	0.06	0.06	0.06	0.06	0.06	0.06	0.06	4,925.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,002.51	0.06	0.06	0.06	0.06	0.06	0.06	0.06
18020128010102	Middle Fork American River-Talbot Creek	BS*	0.00	0.00	0.00	1.06	1.06	1.06	0.00	4,925.18	0	0	0	0	0	0	5	3	5	3	5	3	0	0	1,002.51	0.00	0.00	0.00	0.69	0.69	0.69	0.00
18020128010102	Middle Fork American River-Talbot Creek	BY*	1.06	1.06	1.06	0.00	0.00	0.00	1.06	4,925.18	5	3	5	3	5	3	0	0	0	0	0	0	5	3	1,002.51	0.69	0.69	0.69	0.00	0.00	0.00	0.69
18020128010102	Middle Fork American River-Talbot Creek	CS*	0.00	0.00	0.00	1.47	2.51	1.47	0.00	4,925.18	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1,002.51	0.00	0.00	0.00	0.20	0.66	0.20	0.00
18020128010102	Middle Fork American River-Talbot Creek	CY*	1.47	1.47	1.47	0.00	0.00	0.00	1.47	4,925.18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,002.51	0.20	0.20	0.20	0.00	0.00	0.00	0.20
18020128010102	Middle Fork American River-Talbot Creek	FY	0.00	1.05	1.05	1.05	0.00	1.05	1.05	4,925.18	0	0	0	1	0	1	0	1	0	0	0	1	0	1	1,002.51	0.00	0.47	0.47	0.47	0.00	0.47	0.47
18020128010102	Middle Fork American River-Talbot Creek	GY	4.13	4.13	4.13	4.13	4.13	4.13	4.13	4,925.18	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1,002.51	1.06	1.06	1.06	1.06	1.06	1.06	1.06
18020128010102	Middle Fork American River-Talbot Creek	HY*	10.10	10.10	10.10	10.10	10.10	10.10	10.10	4,925.18	4	1	4	1	4	1	4	1	4	1	4	1	4	1	1,002.51	4.01	4.01	4.01	4.01	4.01	4.01	4.01
18020128010102	Middle Fork American River-Talbot Creek	JY	3.10	3.10	3.10	3.10	3.10	3.10	3.10	4,925.18	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1,002.51	0.73	0.73	0.73	0.73	0.73	0.73	0.73
18020128010102	Middle Fork American River-Talbot Creek	LY*	1.05	0.00	0.00	0.00	0.00	0.00	0.00	4,925.18	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1,002.51	0.47	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		20.95	20.95	20.95	20.95	20.95	20.95	20.95	4925.18	13	9	13	9	13	9	13	9	13	9	13	9	13	9	1002.51	7.22	7.22	7.22	7.22	7.21	7.22	7.22
	*** Value Per SqMi All =**		**2.72**	**2.72**	**2.72**	**2.72**	**2.72**	**2.72**	**2.72**	**7.70**	**1.7**	**1.2**	**1.7**	**1.2**	**1.7**	**1.2**	**1.7**	**1.2**	**1.7**	**1.2**	**1.7**	**1.2**	**1.7**	**1.2**	**1.57**	**4.61**	**4.61**	**4.61**	**4.61**	**4.60**	**4.61**	**4.61**
	*** Sum Open-Motorized, Native Surface Routes =**		13.67	12.62	12.62	12.62	13.67	12.62	12.62		9	5	9	4	9	4	9	4	9	5	9	4	9	4		5.37	4.90	4.90	4.90	5.36	4.90	4.90
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.78**	**1.64**	**1.64**	**1.64**	**1.78**	**1.64**	**1.64**	**7.70**	**1.2**	**0.6**	**1.2**	**0.5**	**1.2**	**0.5**	**1.2**	**0.5**	**1.2**	**0.6**	**1.2**	**0.5**	**1.2**	**0.5**	**1.57**	**3.43**	**3.13**	**3.13**	**3.13**	**3.42**	**3.13**	**3.13**
18020128010103	Middle Fork American River-Rice Creek	AY	3.28	1.15	3.28	3.28	1.15	1.15	3.28	7,547.43	6	8	5	8	6	8	6	8	5	8	5	8	6	8	1,571.47	0.92	0.66	0.92	0.92	0.66	0.66	0.92
18020128010103	Middle Fork American River-Rice Creek	BS*	0.00	0.00	0.00	13.55	13.55	13.55	0.00	7,547.43	0	0	0	0	0	0	18	6	18	6	18	6	0	0	1,571.47	0.00	0.00	0.00	3.58	3.58	3.58	0.00
18020128010103	Middle Fork American River-Rice Creek	BY*	13.55	15.68	13.55	0.00	2.13	2.13	13.55	7,547.43	18	6	19	6	18	6	0	0	1	0	1	0	18	6	1,571.47	3.58	3.84	3.58	0.00	0.26	0.26	3.58
18020128010103	Middle Fork American River-Rice Creek	CS*	0.00	0.00	0.00	0.42	6.72	0.42	0.00	7,547.43	0	0	0	0	0	0	0	0	3	4	0	0	0	0	1,571.47	0.00	0.00	0.00	0.00	0.90	0.00	0.00
18020128010103	Middle Fork American River-Rice Creek	CY*	0.42	0.42	0.42	0.00	0.00	0.00	0.42	7,547.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,571.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010103	Middle Fork American River-Rice Creek	ES*	0.00	0.00	0.00	0.02	0.02	0.02	0.00	7,547.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,571.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010103	Middle Fork American River-Rice Creek	EY*	0.02	0.02	0.02	0.00	0.00	0.00	0.02	7,547.43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,571.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010103	Middle Fork American River-Rice Creek	FY	0.00	6.89	6.89	6.89	0.60	6.89	6.89	7,547.43	0	0	3	4	3	4	3	4	0	0	3	4	3	4	1,571.47	0.00	1.08	1.08	1.08	0.18	1.08	1.08
18020128010103	Middle Fork American River-Rice Creek	HY*	12.92	12.92	12.92	12.92	12.92	12.92	12.92	7,547.43	4	6	4	6	4	6	4	6	4	6	4	6	4	6	1,571.47	2.91	2.91	2.91	2.91	2.91	2.91	2.91
18020128010103	Middle Fork American River-Rice Creek	LY*	6.89	0.00	0.00	0.00	0.00	0.00	0.00	7,547.43	3	4	0	0	0	0	0	0	0	0	0	0	0	0	1,571.47	1.08	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		37.08	37.08	37.08	37.08	37.08	37.08	37.08	7547.43	31	24	31	24	31	24	31	24	31	24	31	24	31	24	1571.47	8.49	8.49	8.49	8.49	8.49	8.49	8.49
	*** Value Per SqMi All =**		**3.14**	**3.14**	**3.14**	**3.14**	**3.14**	**3.14**	**3.14**	**11.79**	**2.6**	**2.0**	**2.6**	**2.0**	**2.6**	**2.0**	**2.6**	**2.0**	**2.6**	**2.0**	**2.6**	**2.0**	**2.6**	**2.0**	**2.46**	**3.46**	**3.46**	**3.46**	**3.46**	**3.46**	**3.46**	**3.46**
	*** Sum Open-Motorized, Native Surface Routes =**		33.80	29.04	26.91	26.91	35.34	29.04	26.91		25	16	23	12	22	12	22	12	26	16	23	12	22	12	12571.76	7.57	6.75	6.49	6.49	7.65	6.75	6.49
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.87**	**2.46**	**2.28**	**2.28**	**3.00**	**2.46**	**2.28**	**11.79**	**2.1**	**1.4**	**2.0**	**1.0**	**1.9**	**1.0**	**1.9**	**1.0**	**2.2**	**1.4**	**2.0**	**1.0**	**1.9**	**1.0**	**2.46**	**3.08**	**2.75**	**2.64**	**2.64**	**3.12**	**2.75**	**2.64**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020128010104	Middle Fork American River-Dolly Creek	AY	5.12	4.81	5.12	5.12	4.81	4.81	5.12	5,786.60	5	9	5	9	5	9	5	9	5	9	5	9	5	9	865.79	1.08	0.93	1.08	1.08	0.93	0.93	1.08
18020128010104	Middle Fork American River-Dolly Creek	BS*	0.00	0.00	0.00	17.50	17.50	17.50	0.00	5,786.60	0	0	0	0	0	0	10	6	10	6	10	6	0	0	865.79	0.00	0.00	0.00	3.74	3.74	3.74	0.00
18020128010104	Middle Fork American River-Dolly Creek	BY*	17.50	17.81	17.50	0.00	0.30	0.30	17.50	5,786.60	10	6	10	6	10	6	0	0	0	0	0	0	10	6	865.79	3.74	3.88	3.74	0.00	0.15	0.15	3.74
18020128010104	Middle Fork American River-Dolly Creek	CS*	0.00	0.00	0.00	0.00	6.58	0.00	0.00	5,786.60	0	0	0	0	0	0	0	0	3	1	0	0	0	0	865.79	0.00	0.00	0.00	0.00	0.23	0.00	0.00
18020128010104	Middle Fork American River-Dolly Creek	FY	0.00	7.79	7.79	7.79	1.21	7.79	7.79	5,786.60	0	0	3	4	3	4	3	4	0	3	3	4	3	4	865.79	0.00	0.54	0.54	0.54	0.31	0.54	0.54
18020128010104	Middle Fork American River-Dolly Creek	HY*	12.29	12.29	12.29	12.29	12.29	12.29	12.29	5,786.60	6	0	6	0	6	0	6	0	6	0	6	0	6	0	865.79	1.48	1.48	1.48	1.48	1.48	1.48	1.48
18020128010104	Middle Fork American River-Dolly Creek	JY	0.14	0.14	0.14	0.14	0.14	0.14	0.14	5,786.60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	865.79	0.01	0.01	0.01	0.01	0.01	0.01	0.01
18020128010104	Middle Fork American River-Dolly Creek	LY*	7.79	0.00	0.00	0.00	0.00	0.00	0.00	5,786.60	3	4	0	0	0	0	0	0	0	0	0	0	0	0	865.79	0.54	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		42.85	42.85	42.85	42.85	42.85	42.85	42.85	5786.60	24	19	24	19	24	19	24	19	24	19	24	19	24	19	865.79	6.85	6.84	6.85	6.85	6.85	6.85	6.85
	*** Value Per SqMi All =**		**4.74**	**4.74**	**4.74**	**4.74**	**4.74**	**4.74**	**4.74**	**9.04**	**2.7**	**2.1**	**2.7**	**2.1**	**2.7**	**2.1**	**2.7**	**2.1**	**2.7**	**2.1**	**2.7**	**2.1**	**2.7**	**2.1**	**1.35**	**5.06**	**5.06**	**5.06**	**5.06**	**5.06**	**5.06**	**5.06**
	*** Sum Open-Motorized, Native Surface Routes =**		37.59	30.10	29.80	29.80	36.68	30.10	29.80		19	10	16	6	16	6	16	6	19	7	16	6	16	6		5.76	5.36	5.22	5.22	5.60	5.37	5.22
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.16**	**3.33**	**3.30**	**3.30**	**4.06**	**3.33**	**3.30**	**9.04**	**2.1**	**1.1**	**1.8**	**0.7**	**1.8**	**0.7**	**1.8**	**0.7**	**2.1**	**0.8**	**1.8**	**0.7**	**1.8**	**0.7**	**1.35**	**4.26**	**3.96**	**3.86**	**3.86**	**4.14**	**3.97**	**3.86**
18020128010105	French Meadows Reservoir	AY	7.81	7.81	7.81	7.81	7.81	7.81	7.81	5,557.08	5	10	5	10	5	10	5	10	5	10	5	10	5	10	560.03	1.83	1.83	1.83	1.83	1.83	1.83	1.83
18020128010105	French Meadows Reservoir	BS*	0.00	0.00	0.00	14.78	14.78	14.78	0.00	5,557.08	0	0	0	0	0	0	5	16	5	16	5	16	0	0	560.03	0.00	0.00	0.00	1.48	1.48	1.48	0.00
18020128010105	French Meadows Reservoir	BY*	14.78	14.78	14.78	0.00	0.00	0.00	14.78	5,557.08	5	16	5	16	5	16	0	0	0	0	0	0	5	16	560.03	1.48	1.48	1.48	0.00	0.00	0.00	1.48
18020128010105	French Meadows Reservoir	CS*	0.00	0.00	0.00	0.00	5.88	0.00	0.00	5,557.08	0	0	0	0	0	0	0	0	0	3	0	0	0	0	560.03	0.00	0.00	0.00	0.00	0.27	0.00	0.00
18020128010105	French Meadows Reservoir	ES*	0.00	0.00	0.00	0.23	0.23	0.23	0.00	5,557.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	560.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010105	French Meadows Reservoir	EY*	0.23	0.23	0.23	0.00	0.00	0.00	0.23	5,557.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	560.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010105	French Meadows Reservoir	FY	0.00	6.77	6.77	6.77	0.89	6.77	6.77	5,557.08	0	0	0	6	0	6	0	6	0	3	0	6	0	6	560.03	0.00	0.56	0.56	0.56	0.29	0.56	0.56
18020128010105	French Meadows Reservoir	IY	2.73	2.73	2.73	2.73	2.73	2.73	2.73	5,557.08	0	3	0	3	0	3	0	3	0	3	0	3	0	3	560.03	2.31	2.31	2.31	2.31	2.31	2.31	2.31
18020128010105	French Meadows Reservoir	LY*	6.77	0.00	0.00	0.00	0.00	0.00	0.00	5,557.08	0	6	0	0	0	0	0	0	0	0	0	0	0	0	560.03	0.56	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		32.32	32.32	32.32	32.32	32.32	32.32	32.32	5557.08	10	35	10	35	10	35	10	35	10	35	10	35	10	35	560.03	6.18	6.18	6.18	6.18	6.18	6.18	6.18
	*** Value Per SqMi All =**		**3.72**	**3.72**	**3.72**	**3.72**	**3.72**	**3.72**	**3.72**	**8.68**	**1.2**	**4.0**	**1.2**	**4.0**	**1.2**	**4.0**	**1.2**	**4.0**	**1.2**	**4.0**	**1.2**	**4.0**	**1.2**	**4.0**	**0.88**	**7.06**	**7.06**	**7.06**	**7.06**	**7.06**	**7.06**	**7.06**
	*** Sum Open-Motorized, Native Surface Routes =**		21.78	15.01	15.01	15.01	20.89	15.01	15.01		5	22	5	16	5	16	5	16	5	19	5	16	5	16		2.04	1.48	1.48	1.48	1.75	1.48	1.48
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.51**	**1.73**	**1.73**	**1.73**	**2.41**	**1.73**	**1.73**	**8.68**	**0.6**	**2.5**	**0.6**	**1.8**	**0.6**	**1.8**	**0.6**	**1.8**	**0.6**	**2.2**	**0.6**	**1.8**	**0.6**	**1.8**	**0.88**	**2.33**	**1.69**	**1.69**	**1.69**	**2.00**	**1.69**	**1.69**
18020128010106	Middle Fork American River-Chipmunk Creek	AY	6.81	2.31	6.81	6.81	2.31	2.31	6.81	2,741.93	11	10	9	10	11	10	11	10	9	10	9	10	11	10	932.31	0.91	0.42	0.91	0.91	0.42	0.42	0.91
18020128010106	Middle Fork American River-Chipmunk Creek	BS*	0.00	0.00	0.00	3.60	8.10	8.10	0.00	2,741.93	0	0	0	0	0	0	0	5	2	5	2	5	0	0	932.31	0.00	0.00	0.00	0.40	0.89	0.89	0.00
18020128010106	Middle Fork American River-Chipmunk Creek	BY*	3.60	8.10	3.60	0.00	0.00	0.00	3.60	2,741.93	0	5	2	5	0	5	0	0	0	0	0	0	0	5	932.31	0.40	0.89	0.40	0.00	0.00	0.00	0.40
18020128010106	Middle Fork American River-Chipmunk Creek	ES*	0.00	0.00	0.00	0.63	0.63	0.63	0.00	2,741.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	932.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010106	Middle Fork American River-Chipmunk Creek	EY*	0.63	0.63	0.63	0.00	0.00	0.00	0.63	2,741.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	932.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010106	Middle Fork American River-Chipmunk Creek	FY	0.00	7.64	7.64	7.64	7.64	7.64	7.64	2,741.93	0	0	3	1	3	1	3	1	3	1	3	1	3	1	932.31	0.00	0.81	0.81	0.81	0.81	0.81	0.81
18020128010106	Middle Fork American River-Chipmunk Creek	HY*	1.87	1.87	1.87	1.87	1.87	1.87	1.87	2,741.93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	932.31	0.30	0.30	0.30	0.30	0.30	0.30	0.30
18020128010106	Middle Fork American River-Chipmunk Creek	IY	0.39	0.39	0.39	0.39	0.39	0.39	0.39	2,741.93	0	2	0	2	0	2	0	2	0	2	0	2	0	2	932.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010106	Middle Fork American River-Chipmunk Creek	LY*	7.64	0.00	0.00	0.00	0.00	0.00	0.00	2,741.93	3	1	0	0	0	0	0	0	0	0	0	0	0	0	932.31	0.81	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		20.93	20.93	20.93	20.93	20.93	20.93	20.93	2741.93	14	18	14	18	14	18	14	18	14	18	14	18	14	18	932.31	2.42	2.42	2.42	2.42	2.42	2.42	2.42
	*** Value Per SqMi All =**		**4.89**	**4.89**	**4.89**	**4.89**	**4.89**	**4.89**	**4.89**	**4.28**	**3.3**	**4.2**	**3.3**	**4.2**	**3.3**	**4.2**	**3.3**	**4.2**	**3.3**	**4.2**	**3.3**	**4.2**	**3.3**	**4.2**	**1.46**	**1.66**	**1.66**	**1.66**	**1.66**	**1.66**	**1.66**	**1.66**
	*** Sum Open-Motorized, Native Surface Routes =**		13.73	10.59	6.09	6.09	10.59	10.59	6.09		3	6	2	5	0	5	0	5	2	5	2	5	0	5		1.51	1.19	0.70	0.70	1.19	1.19	0.70
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.21**	**2.47**	**1.42**	**1.42**	**2.47**	**2.47**	**1.42**	**4.28**	**0.7**	**1.4**	**0.5**	**1.2**	**0.0**	**1.2**	**0.0**	**1.2**	**0.5**	**1.2**	**0.5**	**1.2**	**0.0**	**1.2**	**1.46**	**1.04**	**0.82**	**0.48**	**0.48**	**0.82**	**0.82**	**0.48**
18020128010201	Upper Duncan Canyon	AY	0.71	0.00	0.71	0.71	0.00	0.00	0.71	7,276.21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,262.92	0.23	0.00	0.23	0.23	0.00	0.00	0.23
18020128010201	Upper Duncan Canyon	BS*	0.00	0.00	0.00	3.40	3.40	3.40	0.00	7,276.21	0	0	0	0	0	0	2	3	2	3	2	3	0	0	1,262.92	0.00	0.00	0.00	1.13	1.13	1.13	0.00
18020128010201	Upper Duncan Canyon	BY*	3.40	4.11	3.40	0.00	0.71	0.71	3.40	7,276.21	2	3	2	3	2	3	0	0	0	0	0	0	2	3	1,262.92	1.13	1.36	1.13	0.00	0.23	0.23	1.13
18020128010201	Upper Duncan Canyon	CS*	0.33	0.33	0.33	4.68	4.68	4.68	0.33	7,276.21	0	0	0	0	0	0	4	0	4	0	4	0	0	0	1,262.92	0.33	0.33	0.33	1.08	1.08	1.08	0.33
18020128010201	Upper Duncan Canyon	CY*	4.33	4.35	4.33	0.00	0.00	0.00	4.33	7,276.21	4	0	4	0	4	0	0	0	0	0	0	0	4	0	1,262.92	0.75	0.75	0.75	0.00	0.00	0.00	0.75
18020128010201	Upper Duncan Canyon	ES*	0.59	0.59	0.59	7.64	7.64	7.64	0.59	7,276.21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,262.92	0.09	0.09	0.09	0.13	0.13	0.13	0.09
18020128010201	Upper Duncan Canyon	EY*	7.06	7.06	7.06	0.00	0.00	0.00	7.06	7,276.21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,262.92	0.04	0.04	0.04	0.00	0.00	0.00	0.04
18020128010201	Upper Duncan Canyon	FY	0.00	5.88	5.91	5.88	5.88	5.88	5.91	7,276.21	0	0	4	3	4	3	4	3	4	3	4	3	4	3	1,262.92	0.00	1.06	1.06	1.06	1.06	1.06	1.06
18020128010201	Upper Duncan Canyon	GY	5.51	5.51	5.51	5.51	5.51	5.51	5.51	7,276.21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,262.92	0.36	0.36	0.36	0.36	0.36	0.36	0.36
18020128010201	Upper Duncan Canyon	IY	2.50	2.50	2.50	2.50	2.50	2.50	2.50	7,276.21	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,262.92	0.32	0.32	0.32	0.32	0.32	0.32	0.32
18020128010201	Upper Duncan Canyon	LY*	5.91	0.00	0.00	0.00	0.00	0.00	0.00	7,276.21	4	3	0	0	0	0	0	0	0	0	0	0	0	0	1,262.92	1.06	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		30.32	30.32	30.32	30.32	30.32	30.32	30.32	7276.21	11	6	11	6	11	6	11	6	11	6	11	6	11	6	1262.92	4.31	4.31	4.31	4.31	4.31	4.31	4.31
	*** Value Per SqMi All =**		**2.67**	**2.67**	**2.67**	**2.67**	**2.67**	**2.67**	**2.67**	**11.37**	**1.0**	**0.5**	**1.0**	**0.5**	**1.0**	**0.5**	**1.0**	**0.5**	**1.0**	**0.5**	**1.0**	**0.5**	**1.0**	**0.5**	**1.97**	**2.18**	**2.18**	**2.18**	**2.18**	**2.18**	**2.18**	**2.18**
	*** Sum Open-Motorized, Native Surface Routes =**		21.60	16.43	15.69	15.72	16.43	16.43	15.69		10	6	6	3	6	3	6	3	6	3	6	3	6	3		3.40	2.57	2.34	2.34	2.57	2.57	2.34
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.90**	**1.45**	**1.38**	**1.38**	**1.45**	**1.45**	**1.38**	**11.37**	**0.9**	**0.5**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**1.97**	**1.72**	**1.30**	**1.19**	**1.19**	**1.30**	**1.30**	**1.19**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020128010202	Lower Duncan Canyon	AY	10.62	8.10	10.62	10.62	8.10	8.10	10.62	7,816.86	11	1	4	1	11	1	11	1	4	1	4	1	11	1	1,796.40	1.59	1.46	1.59	1.59	1.46	1.46	1.59
18020128010202	Lower Duncan Canyon	BS*	5.20	5.20	5.20	32.09	34.61	34.61	5.20	7,816.86	2	0	2	0	2	0	25	5	32	5	32	5	2	0	1,796.40	0.57	0.57	0.57	6.22	6.35	6.35	0.57
18020128010202	Lower Duncan Canyon	BY*	26.89	29.41	26.89	0.00	0.00	0.00	26.89	7,816.86	23	5	30	5	23	5	0	0	0	0	0	0	23	5	1,796.40	5.65	5.78	5.65	0.00	0.00	0.00	5.65
18020128010202	Lower Duncan Canyon	CS*	0.00	0.02	0.00	1.29	3.04	1.29	0.00	7,816.86	0	0	0	0	0	0	4	0	5	0	4	0	0	0	1,796.40	0.00	0.02	0.00	0.08	0.23	0.08	0.00
18020128010202	Lower Duncan Canyon	CY*	1.16	1.30	1.16	0.00	0.00	0.00	1.16	7,816.86	4	0	4	0	4	0	0	0	0	0	0	0	4	0	1,796.40	0.00	0.06	0.00	0.00	0.00	0.00	0.00
18020128010202	Lower Duncan Canyon	ES*	0.00	0.00	0.00	2.26	2.26	2.26	0.00	7,816.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,796.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010202	Lower Duncan Canyon	EY*	2.26	2.26	2.26	0.00	0.00	0.00	2.26	7,816.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,796.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010202	Lower Duncan Canyon	FY	0.00	12.01	12.17	12.04	10.47	12.04	12.17	7,816.86	0	0	4	0	4	0	4	0	4	0	4	0	4	0	1,796.40	0.00	1.37	1.45	1.37	1.30	1.37	1.45
18020128010202	Lower Duncan Canyon	HY*	0.27	0.27	0.27	0.27	0.10	0.27	0.27	7,816.86	2	0	2	0	2	0	2	0	1	0	2	0	2	0	1,796.40	0.15	0.15	0.15	0.15	0.07	0.15	0.15
18020128010202	Lower Duncan Canyon	LS*	2.59	0.00	0.00	0.00	0.00	0.00	0.00	7,816.86	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,796.40	0.32	0.00	0.00	0.00	0.00	0.00	0.00
18020128010202	Lower Duncan Canyon	LY*	9.57	0.00	0.00	0.00	0.00	0.00	0.00	7,816.86	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1,796.40	1.13	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		58.57	58.57	58.57	58.57	58.57	58.57	58.57	7816.86	46	6	46	6	46	6	46	6	46	6	46	6	46	6	1796.40	9.41	9.41	9.41	9.41	9.41	9.41	9.41
	*** Value Per SqMi All =**		**4.80**	**4.80**	**4.80**	**4.80**	**4.80**	**4.80**	**4.80**	**12.21**	**3.8**	**0.5**	**3.8**	**0.5**	**3.8**	**0.5**	**3.8**	**0.5**	**3.8**	**0.5**	**3.8**	**0.5**	**3.8**	**0.5**	**2.81**	**3.35**	**3.35**	**3.35**	**3.35**	**3.35**	**3.35**	**3.35**
	*** Sum Open-Motorized, Native Surface Routes =**		47.95	38.45	35.78	35.91	40.00	38.43	35.78		35	5	38	5	31	5	31	5	38	5	38	5	31	5		7.82	6.58	6.37	6.45	6.65	6.58	6.37
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.93**	**3.15**	**2.93**	**2.94**	**3.28**	**3.15**	**2.93**	**12.21**	**2.9**	**0.4**	**3.1**	**0.4**	**2.5**	**0.4**	**2.5**	**0.4**	**3.1**	**0.4**	**3.1**	**0.4**	**2.5**	**0.4**	**2.81**	**2.79**	**2.34**	**2.27**	**2.30**	**2.37**	**2.34**	**2.27**
18020128010203	Middle Fork American River-Big Mosquito Creek	AY	13.89	9.05	13.89	13.89	9.05	9.05	13.89	5,458.05	16	1	10	1	16	1	16	1	10	1	10	1	16	1	1,927.26	3.45	2.10	3.45	3.45	2.10	2.10	3.45
18020128010203	Middle Fork American River-Big Mosquito Creek	BS*	0.37	0.37	0.37	17.38	22.21	22.21	0.37	5,458.05	0	0	0	0	0	0	6	0	12	0	12	0	0	0	1,927.26	0.00	0.00	0.00	3.01	4.36	4.36	0.00
18020128010203	Middle Fork American River-Big Mosquito Creek	BY*	17.01	21.85	17.01	0.00	0.00	0.00	17.01	5,458.05	6	0	12	0	6	0	0	0	0	0	0	0	6	0	1,927.26	3.01	4.36	3.01	0.00	0.00	0.00	3.01
18020128010203	Middle Fork American River-Big Mosquito Creek	CS*	0.00	0.00	0.00	0.00	0.51	0.00	0.00	5,458.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,927.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010203	Middle Fork American River-Big Mosquito Creek	FY	0.00	8.26	8.26	8.26	7.75	8.26	8.26	5,458.05	0	0	1	0	1	0	1	0	1	0	1	0	1	0	1,927.26	0.00	0.82	0.82	0.82	0.82	0.82	0.82
18020128010203	Middle Fork American River-Big Mosquito Creek	HY*	0.01	0.01	0.01	0.01	0.01	0.01	0.01	5,458.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,927.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010203	Middle Fork American River-Big Mosquito Creek	IY	1.84	1.84	1.84	1.84	1.84	1.84	1.84	5,458.05	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,927.26	0.25	0.25	0.25	0.25	0.25	0.25	0.25
18020128010203	Middle Fork American River-Big Mosquito Creek	LS*	0.57	0.00	0.00	0.00	0.00	0.00	0.00	5,458.05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,927.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010203	Middle Fork American River-Big Mosquito Creek	LY*	7.69	0.00	0.00	0.00	0.00	0.00	0.00	5,458.05	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,927.26	0.82	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		41.38	41.38	41.38	41.38	41.38	41.38	41.38	5458.05	24	1	24	1	24	1	24	1	24	1	24	1	24	1	1927.26	7.53	7.53	7.53	7.53	7.53	7.53	7.53
	*** Value Per SqMi All =**		**4.85**	**4.85**	**4.85**	**4.85**	**4.85**	**4.85**	**4.85**	**8.53**	**2.8**	**0.1**	**2.8**	**0.1**	**2.8**	**0.1**	**2.8**	**0.1**	**2.8**	**0.1**	**2.8**	**0.1**	**2.8**	**0.1**	**3.01**	**2.50**	**2.50**	**2.50**	**2.50**	**2.50**	**2.50**	**2.50**
	*** Sum Open-Motorized, Native Surface Routes =**		25.65	22.23	17.39	17.39	22.74	22.23	17.39		7	0	12	0	6	0	6	0	12	0	12	0	6	0		3.83	4.36	3.01	3.01	4.36	4.36	3.01
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.01**	**2.61**	**2.04**	**2.04**	**2.67**	**2.61**	**2.04**	**8.53**	**0.8**	**0.0**	**1.4**	**0.0**	**0.7**	**0.0**	**0.7**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**0.7**	**0.0**	**3.01**	**1.27**	**1.45**	**1.00**	**1.00**	**1.45**	**1.45**	**1.00**
18020128010204	Middle Fork American River-Brushy Canyon	AY	2.34	2.34	2.34	2.34	2.34	2.34	2.34	2,718.03	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,232.74	0.37	0.37	0.37	0.37	0.37	0.37	0.37
18020128010204	Middle Fork American River-Brushy Canyon	BS*	3.17	3.17	3.17	3.17	3.17	3.17	3.17	2,718.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,232.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010204	Middle Fork American River-Brushy Canyon	CS*	0.85	0.85	0.85	0.85	0.85	0.85	0.85	2,718.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,232.74	0.30	0.30	0.30	0.30	0.30	0.30	0.30
18020128010204	Middle Fork American River-Brushy Canyon	FY	0.00	0.45	0.45	0.45	0.45	0.45	0.45	2,718.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,232.74	0.00	0.01	0.01	0.01	0.01	0.01	0.01
18020128010204	Middle Fork American River-Brushy Canyon	LS*	0.32	0.00	0.00	0.00	0.00	0.00	0.00	2,718.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,232.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128010204	Middle Fork American River-Brushy Canyon	LY*	0.13	0.00	0.00	0.00	0.00	0.00	0.00	2,718.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,232.74	0.01	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		6.80	6.80	6.80	6.80	6.80	6.80	6.80	2718.03	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1232.74	0.68	0.68	0.68	0.68	0.68	0.68	0.68
	*** Value Per SqMi All =**		**1.60**	**1.60**	**1.60**	**1.60**	**1.60**	**1.60**	**1.60**	**4.25**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**1.93**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**	**0.35**
	*** Sum Open-Motorized, Native Surface Routes =**		4.47	4.02	4.02	4.02	4.02	4.02	4.02		0	0	0	0	0	0	0	0	0	0	0	0	0	1		0.31	0.30	0.30	0.30	0.30	0.30	0.30
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.05**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**	**4.25**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.2**	**1.93**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**	**0.16**
18020128020103	Miller Creek	BS*	0.00	0.00	0.00	3.70	3.70	3.70	0.00	2,080.83	0	0	0	0	0	0	2	0	2	0	2	0	0	0	819.44	0.00	0.00	0.00	0.50	0.50	0.50	0.00
18020128020103	Miller Creek	BY*	3.70	3.70	3.70	0.00	0.00	0.00	3.70	2,080.83	2	0	2	0	2	0	0	0	0	0	0	0	2	0	819.44	0.50	0.50	0.50	0.00	0.00	0.00	0.50
18020128020103	Miller Creek	CS*	0.00	0.00	0.00	3.60	3.60	3.60	0.00	2,080.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	819.44	0.00	0.00	0.00	1.71	1.71	1.71	0.00
18020128020103	Miller Creek	CY*	3.60	3.60	3.60	0.00	0.00	0.00	3.60	2,080.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	819.44	1.71	1.71	1.71	0.00	0.00	0.00	1.71
18020128020103	Miller Creek	ES*	0.00	0.00	0.00	1.59	1.59	1.59	0.00	2,080.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	819.44	0.00	0.00	0.00	0.08	0.08	0.08	0.00
18020128020103	Miller Creek	EY*	1.59	1.59	1.59	0.00	0.00	0.00	1.59	2,080.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	819.44	0.08	0.08	0.08	0.00	0.00	0.00	0.08
18020128020103	Miller Creek	FY	0.00	1.02	1.02	1.02	1.02	1.02	1.02	2,080.83	0	0	1	0	1	0	1	0	1	0	1	0	1	0	819.44	0.00	0.44	0.44	0.44	0.44	0.44	0.44
18020128020103	Miller Creek	GY	3.02	3.02	3.02	3.02	3.02	3.02	3.02	2,080.83	3	0	3	0	3	0	3	0	3	0	3	0	3	0	819.44	2.32	2.32	2.32	2.32	2.32	2.32	2.32
18020128020103	Miller Creek	HY*	1.01	1.01	1.01	1.01	1.01	1.01	1.01	2,080.83	1	0	1	0	1	0	1	0	1	0	1	0	1	0	819.44	0.65	0.65	0.65	0.65	0.65	0.65	0.65
18020128020103	Miller Creek	JY	0.54	0.54	0.54	0.54	0.54	0.54	0.54	2,080.83	2	0	2	0	2	0	2	0	2	0	2	0	2	0	819.44	0.20	0.20	0.20	0.20	0.20	0.20	0.20
18020128020103	Miller Creek	LY*	1.02	0.00	0.00	0.00	0.00	0.00	0.00	2,080.83	1	0	0	0	0	0	0	0	0	0	0	0	0	0	819.44	0.44	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		14.47	14.47	14.47	14.47	14.47	14.47	14.47	2080.83	9	0	9	0	9	0	9	0	9	0	9	0	9	0	819.44	5.90	5.90	5.90	5.90	5.90	5.90	5.90
	*** Value Per SqMi All =**		**4.45**	**4.45**	**4.45**	**4.45**	**4.45**	**4.45**	**4.45**	**3.25**	**2.8**	**0.0**	**2.8**	**0.0**	**2.8**	**0.0**	**2.8**	**0.0**	**2.8**	**0.0**	**2.8**	**0.0**	**2.8**	**0.0**	**1.28**	**4.61**	**4.61**	**4.61**	**4.61**	**4.61**	**4.61**	**4.61**
	*** Sum Open-Motorized, Native Surface Routes =**		10.92	9.90	9.90	9.90	9.90	9.90	9.90		4	0	3	0	3	0	3	0	3	0	3	0	3	0		3.38	2.94	2.94	2.94	2.94	2.94	2.94
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.36**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.04**	**3.25**	**1.2**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**0.9**	**0.0**	**1.28**	**2.64**	**2.30**	**2.30**	**2.30**	**2.30**	**2.30**	**2.30**
18020128020105	Rubicon River-Rubicon Reservoir	CS*	0.00	0.00	0.00	0.00	0.91	0.91	0.00	587.48	0	0	0	0	0	0	0	0	0	1	0	1	0	0	181.1	0	0	0	0	0.66	0.66	0
18020128020105	Rubicon River-Rubicon Reservoir	CY*	0.00	0.91	0.00	0.00	0.00	0.00	0.91	587.48	0	0	0	1	0	0	0	0	0	0	0	0	0	1	181.1	0	0.66	0	0	0	0	0.66
18020128020105	Rubicon River-Rubicon Reservoir	FY	0.00	0.10	1.02	1.02	0.10	0.10	0.10	587.48	0	0	0	0	0	1	0	1	0	0	0	0	0	0	181.1	0	0.01	0.68	0.68	0.01	0.01	0.01
18020128020105	Rubicon River-Rubicon Reservoir	GY	1.27	1.27	1.27	1.27	1.27	1.27	1.27	587.48	1	0	1	0	1	0	1	0	1	0	1	0	1	0	181.1	0.16	0.16	0.16	0.16	0.16	0.16	0.16
18020128020105	Rubicon River-Rubicon Reservoir	LY*	1.02	0.00	0.00	0.00	0.00	0.00	0.00	587.48	0	1	0	0	0	0	0	0	0	0	0	0	0	0	181.1	0.68	0	0	0	0	0	0
	Sum All =		2.29	2.29	2.29	2.29	2.29	2.29	2.29	587.48	1	1	1	1	1	1	1	1	1	1	1	1	1	1	181.10	0.84	0.83	0.84	0.84	0.83	0.83	0.83
	*** Value Per SqMi All =**		**2.50**	**2.50**	**2.50**	**2.50**	**2.50**	**2.50**	**2.50**	**0.92**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**1.1**	**0.28**	**2.97**	**2.93**	**2.97**	**2.97**	**2.93**	**2.93**	**2.93**
	*** Sum Open-Motorized, Native Surface Routes =**		1.02	0.91	0.00	0.00	0.91	0.91	0.91		0	1	0	1	0	0	0	0	0	1	0	1	0	1		0.68	0.66	0.00	0.00	0.66	0.66	0.66
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.11**	**1.00**	**0.00**	**0.00**	**1.00**	**1.00**	**1.00**	**0.92**	**0.0**	**1.1**	**0.0**	**1.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.1**	**0.0**	**1.1**	**0.0**	**1.1**	**0.28**	**2.40**	**2.33**	**0.00**	**0.00**	**2.33**	**2.33**	**2.33**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary — **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020128020201	Upper Five Lakes Creek	BS*	0.00	0.00	0.00	0.11	0.11	0.11	0.00	7,930.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,595.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020201	Upper Five Lakes Creek	BY*	0.11	0.11	0.11	0.00	0.00	0.00	0.11	7,930.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,595.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020201	Upper Five Lakes Creek	FY	0.00	1.07	1.07	1.07	1.07	1.07	1.07	7,930.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,595.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020201	Upper Five Lakes Creek	HY*	0.31	0.31	0.31	0.31	0.31	0.31	0.31	7,930.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,595.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020201	Upper Five Lakes Creek	JY	19.98	19.98	19.98	19.98	19.98	19.98	19.98	7,930.78	12	4	12	4	12	4	12	4	12	4	12	4	12	4	1,595.37	6.57	6.57	6.57	6.57	6.57	6.57	6.57
18020128020201	Upper Five Lakes Creek	LY*	1.07	0.00	0.00	0.00	0.00	0.00	0.00	7,930.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,595.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		21.46	21.46	21.46	21.46	21.46	21.46	21.46	7930.78	12	4	12	4	12	4	12	4	12	4	12	4	12	4	1595.37	6.57	6.57	6.57	6.57	6.57	6.57	6.57
	*** Value Per SqMi All =**		**1.73**	**1.73**	**1.73**	**1.73**	**1.73**	**1.73**	**1.73**	**12.39**	**1.0**	**0.3**	**1.0**	**0.3**	**1.0**	**0.3**	**1.0**	**0.3**	**1.0**	**0.3**	**1.0**	**0.3**	**1.0**	**0.3**	**2.49**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**	**2.64**
	*** Sum Open-Motorized, Native Surface Routes =**		1.49	1.49	1.49	1.49	1.49	1.49	1.49		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.12**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**	**12.39**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
18020128020202	Middle Five Lakes Creek	BS*	0.00	0.00	0.00	1.21	1.21	1.21	0.00	6,080.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,123.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020202	Middle Five Lakes Creek	BY*	1.21	1.21	1.21	0.00	0.00	0.00	1.21	6,080.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,123.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020202	Middle Five Lakes Creek	FY	0.00	0.05	0.05	0.05	0.05	0.05	0.05	6,080.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,123.62	0.00	0.01	0.01	0.01	0.01	0.01	0.01
18020128020202	Middle Five Lakes Creek	JY	8.65	8.65	8.65	8.65	8.65	8.65	8.65	6,080.53	11	4	11	4	11	4	11	4	11	4	11	4	11	4	1,123.62	3.58	3.58	3.58	3.58	3.58	3.58	3.58
18020128020202	Middle Five Lakes Creek	LY*	0.05	0.00	0.00	0.00	0.00	0.00	0.00	6,080.53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,123.62	0.01	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		9.92	9.92	9.92	9.92	9.92	9.92	9.92	6080.53	11	4	11	4	11	4	11	4	11	4	11	4	11	4	1123.62	3.59	3.59	3.59	3.59	3.59	3.59	3.59
	*** Value Per SqMi All =**		**1.04**	**1.04**	**1.04**	**1.04**	**1.04**	**1.04**	**1.04**	**9.50**	**1.2**	**0.4**	**1.2**	**0.4**	**1.2**	**0.4**	**1.2**	**0.4**	**1.2**	**0.4**	**1.2**	**0.4**	**1.2**	**0.4**	**1.76**	**2.04**	**2.04**	**2.04**	**2.04**	**2.04**	**2.04**	**2.04**
	*** Sum Open-Motorized, Native Surface Routes =**		1.26	1.21	1.21	1.21	1.21	1.21	1.21		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.01	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.13**	**0.13**	**0.13**	**0.13**	**0.13**	**0.13**	**0.13**	**9.50**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.76**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
18020128020203	Lower Five Lakes Creek	BS*	0.00	0.00	0.00	0.97	0.97	0.97	0.00	4,672.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	794.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020203	Lower Five Lakes Creek	BY*	0.97	0.97	0.97	0.00	0.00	0.00	0.97	4,672.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	794.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020203	Lower Five Lakes Creek	FY	0.00	0.09	0.09	0.09	0.09	0.09	0.09	4,672.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	794.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020203	Lower Five Lakes Creek	HY*	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4,672.67	1	1	1	1	1	1	1	1	1	1	1	1	1	1	794.23	0.47	0.47	0.47	0.47	0.47	0.47	0.47
18020128020203	Lower Five Lakes Creek	JY	5.02	5.02	5.02	5.02	5.02	5.02	5.02	4,672.67	6	3	6	3	6	3	6	3	6	3	6	3	6	3	794.23	2.11	2.11	2.11	2.11	2.11	2.11	2.11
18020128020203	Lower Five Lakes Creek	LY*	0.09	0.00	0.00	0.00	0.00	0.00	0.00	4,672.67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	794.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		10.51	10.51	10.51	10.51	10.51	10.51	10.51	4672.67	7	4	7	4	7	4	7	4	7	4	7	4	7	4	794.23	2.58	2.58	2.58	2.58	2.58	2.58	2.58
	*** Value Per SqMi All =**		**1.44**	**1.44**	**1.44**	**1.44**	**1.44**	**1.44**	**1.44**	**7.30**	**1.0**	**0.5**	**1.0**	**0.5**	**1.0**	**0.5**	**1.0**	**0.5**	**1.0**	**0.5**	**1.0**	**0.5**	**1.0**	**0.5**	**1.24**	**2.08**	**2.08**	**2.08**	**2.08**	**2.08**	**2.08**	**2.08**
	*** Sum Open-Motorized, Native Surface Routes =**		5.49	5.41	5.41	5.41	5.41	5.41	5.41		1	1	1	1	1	1	1	1	1	1	1	1	1	1		0.47	0.47	0.47	0.47	0.47	0.47	0.47
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.75**	**0.74**	**0.74**	**0.74**	**0.74**	**0.74**	**0.74**	**7.30**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**1.24**	**0.38**	**0.38**	**0.38**	**0.38**	**0.38**	**0.38**	**0.38**
18020128020204	Barker Creek	AY	5.28	0.00	5.28	5.28	0.00	0.00	5.28	6,746.52	1	2	0	0	1	2	1	2	0	0	0	0	1	2	1,228.68	0.19	0.00	0.19	0.19	0.00	0.00	0.19
18020128020204	Barker Creek	BS*	0.00	0.00	0.00	10.45	14.01	14.01	0.00	6,746.52	0	0	0	0	0	0	1	1	1	2	1	2	0	0	1,228.68	0.00	0.00	0.00	1.13	1.19	1.19	0.00
18020128020204	Barker Creek	BY*	10.45	15.73	10.45	0.00	1.72	1.72	10.45	6,746.52	1	1	2	3	1	1	0	0	1	1	1	1	1	1	1,228.68	1.13	1.32	1.13	0.00	0.13	0.13	1.13
18020128020204	Barker Creek	CS*	0.00	0.00	0.00	3.64	3.82	3.64	0.00	6,746.52	0	0	0	0	0	0	4	1	5	1	4	1	0	0	1,228.68	0.00	0.00	0.00	1.80	1.97	1.80	0.00
18020128020204	Barker Creek	CY*	3.54	3.64	3.54	0.00	0.00	0.00	3.54	6,746.52	4	1	4	1	4	1	0	0	0	0	0	0	4	1	1,228.68	1.78	1.80	1.78	0.00	0.00	0.00	1.78
18020128020204	Barker Creek	ES*	0.00	0.00	0.00	1.03	1.03	1.03	0.00	6,746.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,228.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020204	Barker Creek	EY*	1.03	1.03	1.03	0.00	0.00	0.00	1.03	6,746.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,228.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020204	Barker Creek	FY	0.00	4.87	4.96	4.87	4.69	4.87	4.96	6,746.52	0	0	1	0	1	0	1	0	0	0	1	0	1	0	1,228.68	0.00	1.62	1.63	1.62	1.45	1.62	1.63
18020128020204	Barker Creek	GY	0.71	0.71	0.71	0.71	0.71	0.71	0.71	6,746.52	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,228.68	0.39	0.39	0.39	0.39	0.39	0.39	0.39
18020128020204	Barker Creek	HY*	0.17	0.17	0.17	0.17	0.17	0.17	0.17	6,746.52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,228.68	0.08	0.08	0.08	0.08	0.08	0.08	0.08
18020128020204	Barker Creek	JY	4.79	4.79	4.79	4.79	4.79	4.79	4.79	6,746.52	4	1	4	1	4	1	4	1	4	1	4	1	4	1	1,228.68	0.56	0.56	0.56	0.56	0.56	0.56	0.56
18020128020204	Barker Creek	LY*	4.96	0.00	0.00	0.00	0.00	0.00	0.00	6,746.52	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,228.68	1.63	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		30.93	30.93	30.93	30.93	30.93	30.93	30.93	6746.52	12	5	12	5	12	5	12	5	12	5	12	5	12	5	1228.68	5.76	5.77	5.76	5.77	5.77	5.77	5.76
	*** Value Per SqMi All =**		**2.93**	**2.93**	**2.93**	**2.93**	**2.93**	**2.93**	**2.93**	**10.54**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.1**	**0.5**	**1.92**	**3.00**	**3.01**	**3.00**	**3.01**	**3.01**	**3.01**	**3.00**
	*** Sum Open-Motorized, Native Surface Routes =**		20.15	20.56	15.19	15.28	20.75	20.56	15.19		6	2	6	4	5	2	5	2	7	4	6	4	5	2		4.62	3.20	2.99	3.01	3.37	3.20	2.99
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.91**	**1.95**	**1.44**	**1.45**	**1.97**	**1.95**	**1.44**	**10.54**	**0.6**	**0.2**	**0.6**	**0.4**	**0.5**	**0.2**	**0.5**	**0.2**	**0.7**	**0.4**	**0.6**	**0.4**	**0.5**	**0.2**	**1.92**	**2.41**	**1.67**	**1.56**	**1.57**	**1.76**	**1.67**	**1.56**
18020128020206	Hell Hole Reservoir-Grayhorse Creek	BS*	0.00	0.00	0.00	4.77	4.77	4.77	0.00	3,739.66	0	0	0	0	0	0	2	0	2	0	2	0	0	0	653.14	0.00	0.00	0.00	0.39	0.39	0.39	0.00
18020128020206	Hell Hole Reservoir-Grayhorse Creek	BY*	4.77	4.77	4.77	0.00	0.00	0.00	4.77	3,739.66	2	0	2	0	2	0	0	0	0	0	0	0	2	0	653.14	0.39	0.39	0.39	0.00	0.00	0.00	0.39
18020128020206	Hell Hole Reservoir-Grayhorse Creek	FY	0.00	0.38	0.38	0.38	0.38	0.38	0.38	3,739.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	653.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020206	Hell Hole Reservoir-Grayhorse Creek	HY*	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3,739.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	653.14	0.22	0.22	0.22	0.22	0.22	0.22	0.22
18020128020206	Hell Hole Reservoir-Grayhorse Creek	JY	2.76	2.76	2.76	2.76	2.76	2.76	2.76	3,739.66	8	4	8	4	8	4	8	4	8	4	8	4	8	4	653.14	1.10	1.10	1.10	1.10	1.10	1.10	1.10
18020128020206	Hell Hole Reservoir-Grayhorse Creek	LY*	0.38	0.00	0.00	0.00	0.00	0.00	0.00	3,739.66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	653.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		11.16	11.16	11.16	11.16	11.16	11.16	11.16	3739.66	10	4	10	4	10	4	10	4	10	4	10	4	10	4	653.14	1.71	1.71	1.71	1.71	1.71	1.71	1.71
	*** Value Per SqMi All =**		**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**1.91**	**5.84**	**1.7**	**0.7**	**1.7**	**0.7**	**1.7**	**0.7**	**1.7**	**0.7**	**1.7**	**0.7**	**1.7**	**0.7**	**1.7**	**0.7**	**1.02**	**1.68**	**1.68**	**1.68**	**1.68**	**1.68**	**1.68**	**1.68**
	*** Sum Open-Motorized, Native Surface Routes =**		8.40	8.02	8.02	8.02	8.02	8.02	8.02		2	0	2	0	2	0	2	0	2	0	2	0	2	0		0.61	0.61	0.61	0.61	0.61	0.61	0.61
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.44**	**1.37**	**1.37**	**1.37**	**1.37**	**1.37**	**1.37**	**5.84**	**0.3**	**0.0**	**0.3**	**0.0**	**0.3**	**0.0**	**0.3**	**0.0**	**0.3**	**0.0**	**0.3**	**0.0**	**0.3**	**0.0**	**1.02**	**0.60**	**0.60**	**0.60**	**0.60**	**0.60**	**0.60**	**0.60**
18020128020207	Hell Hole Reservoir	BS*	0.00	0.00	0.00	2.47	2.47	2.47	0.00	1,128.89	0	0	0	0	0	0	3	0	3	0	3	0	0	0	162.62	0.00	0.00	0.00	0.34	0.34	0.34	0.00
18020128020207	Hell Hole Reservoir	BY*	2.47	2.47	2.47	0.00	0.00	0.00	2.47	1,128.89	3	0	3	0	3	0	0	0	0	0	0	0	3	0	162.62	0.34	0.34	0.34	0.00	0.00	0.00	0.34
18020128020207	Hell Hole Reservoir	CS*	0.00	0.00	0.00	0.00	0.77	0.00	0.00	1,128.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	162.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020207	Hell Hole Reservoir	FY	0.00	0.77	0.77	0.77	0.00	0.77	0.77	1,128.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	162.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020207	Hell Hole Reservoir	LY*	0.77	0.00	0.00	0.00	0.00	0.00	0.00	1,128.89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	162.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		3.24	3.24	3.24	3.24	3.24	3.24	3.24	1128.89	3	0	3	0	3	0	3	0	3	0	3	0	3	0	162.62	0.34	0.34	0.34	0.34	0.34	0.34	0.34
	*** Value Per SqMi All =**		**1.84**	**1.84**	**1.84**	**1.84**	**1.84**	**1.84**	**1.84**	**1.76**	**1.7**	**0.0**	**1.7**	**0.0**	**1.7**	**0.0**	**1.7**	**0.0**	**1.7**	**0.0**	**1.7**	**0.0**	**1.7**	**0.0**	**0.25**	**1.34**	**1.34**	**1.34**	**1.34**	**1.34**	**1.34**	**1.34**
	*** Sum Open-Motorized, Native Surface Routes =**		3.24	2.47	2.47	2.47	3.24	2.47	2.47		3	0	3	0	3	0	3	0	3	0	3	0	3	0		0.34	0.34	0.34	0.34	0.34	0.34	0.34
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.84**	**1.40**	**1.40**	**1.40**	**1.84**	**1.40**	**1.40**	**1.76**	**1.7**	**0.0**	**1.7**	**0.0**	**1.7**	**0.0**	**1.7**	**0.0**	**1.7**	**0.0**	**1.7**	**0.0**	**1.7**	**0.0**	**0.25**	**1.34**	**1.34**	**1.34**	**1.34**	**1.34**	**1.34**	**1.34**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary — Apr. 11, 2008

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020128020501	Upper Long Canyon	BS*	0.00	0.00	0.00	4.26	4.26	4.26	0.00	710.90	0	0	0	0	0	0	3	3	3	3	3	3	0	0	172.38	0.00	0.00	0.00	1.83	1.83	1.83	0.00
18020128020501	Upper Long Canyon	BY*	4.26	4.26	4.26	0.00	0.00	0.00	4.26	710.90	3	3	3	3	3	3	0	0	0	0	0	0	3	3	172.38	1.83	1.83	1.83	0.00	0.00	0.00	1.83
18020128020501	Upper Long Canyon	CS*	0.00	0.00	0.00	0.00	3.76	0.00	0.00	710.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	172.38	0.00	0.00	0.00	0.00	0.11	0.00	0.00
18020128020501	Upper Long Canyon	FY	0.00	4.03	4.03	4.03	0.27	4.03	4.03	710.90	0	0	1	0	1	0	1	0	1	0	1	0	1	0	172.38	0.00	0.26	0.26	0.26	0.15	0.26	0.26
18020128020501	Upper Long Canyon	HY*	0.06	0.06	0.06	0.06	0.06	0.06	0.06	710.90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	172.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128020501	Upper Long Canyon	LY*	4.03	0.00	0.00	0.00	0.00	0.00	0.00	710.90	1	0	0	0	0	0	0	0	0	0	0	0	0	0	172.38	0.26	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		8.35	8.35	8.35	8.35	8.35	8.35	8.35	710.90	4	3	4	3	4	3	4	3	4	3	4	3	4	3	172.38	2.09	2.09	2.09	2.09	2.09	2.09	2.09
	*** Value Per SqMi All =**		**7.52**	**7.52**	**7.52**	**7.52**	**7.52**	**7.52**	**7.52**	**1.11**	**3.6**	**2.7**	**3.6**	**2.7**	**3.6**	**2.7**	**3.6**	**2.7**	**3.6**	**2.7**	**3.6**	**2.7**	**3.6**	**2.7**	**0.27**	**7.76**	**7.76**	**7.76**	**7.76**	**7.76**	**7.76**	**7.76**
	*** Sum Open-Motorized, Native Surface Routes =**		8.35	4.32	4.32	4.32	8.08	4.32	4.32		4	3	3	3	3	3	3	3	3	3	3	3	3	3		2.09	1.83	1.83	1.83	1.94	1.83	1.83
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**7.52**	**3.89**	**3.89**	**3.89**	**7.28**	**3.89**	**3.89**	**1.11**	**3.6**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**2.7**	**0.27**	**7.76**	**6.79**	**6.79**	**6.79**	**7.20**	**6.79**	**6.79**
18020128030101	Screwauger Canyon	AY	3.29	0.15	3.29	3.29	0.15	3.18	3.29	8,537.26	2	0	0	0	2	0	2	0	0	0	2	0	2	0	1,708.98	0.66	0.00	0.66	0.66	0.00	0.64	0.66
18020128030101	Screwauger Canyon	BS*	0.00	0.00	0.00	32.23	32.23	32.23	0.00	8,537.26	0	0	0	0	0	0	4	4	4	4	4	4	0	0	1,708.98	0.00	0.00	0.00	2.42	2.42	2.42	0.00
18020128030101	Screwauger Canyon	BY*	32.23	35.37	32.23	0.00	3.15	0.11	32.23	8,537.26	4	4	6	4	4	4	0	0	2	0	0	0	4	4	1,708.98	2.42	3.08	2.42	0.00	0.66	0.02	2.42
18020128030101	Screwauger Canyon	CS*	0.00	0.00	0.00	0.00	1.11	0.00	0.00	8,537.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,708.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030101	Screwauger Canyon	FY	0.00	11.80	11.80	11.80	10.69	11.80	11.80	8,537.26	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1,708.98	0.00	0.88	0.88	0.88	0.88	0.88	0.88
18020128030101	Screwauger Canyon	GY	1.97	1.97	1.97	1.97	1.97	1.97	1.97	8,537.26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,708.98	0.01	0.01	0.01	0.01	0.01	0.01	0.01
18020128030101	Screwauger Canyon	HY*	5.64	5.64	5.64	5.64	5.64	5.64	5.64	8,537.26	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1,708.98	0.59	0.59	0.59	0.59	0.59	0.59	0.59
18020128030101	Screwauger Canyon	LY*	11.80	0.00	0.00	0.00	0.00	0.00	0.00	8,537.26	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1,708.98	0.88	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		54.93	54.93	54.93	54.93	54.93	54.93	54.93	8537.26	8	6	8	6	8	6	8	6	8	6	8	6	8	6	1708.98	4.56	4.56	4.56	4.56	4.56	4.56	4.56
	*** Value Per SqMi All =**		**4.12**	**4.12**	**4.12**	**4.12**	**4.12**	**4.12**	**4.12**	**13.34**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**0.6**	**0.4**	**2.67**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**	**1.71**
	*** Sum Open-Motorized, Native Surface Routes =**		49.67	41.01	37.87	37.87	42.12	37.98	37.87		6	6	7	5	5	5	5	5	7	5	5	5	5	5		3.89	3.67	3.01	3.01	3.67	3.03	3.01
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.72**	**3.07**	**2.84**	**2.84**	**3.16**	**2.85**	**2.84**	**13.34**	**0.4**	**0.4**	**0.5**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**0.5**	**0.4**	**0.4**	**0.4**	**0.4**	**0.4**	**2.67**	**1.46**	**1.37**	**1.13**	**1.13**	**1.37**	**1.13**	**1.13**
18020128030102	Deep Canyon	AY	11.68	1.02	11.68	11.68	1.02	8.18	11.68	5,342.91	6	1	0	0	6	1	6	1	0	0	6	1	6	1	1,323.45	2.07	0.11	2.07	2.07	0.11	1.73	2.07
18020128030102	Deep Canyon	BS*	0.00	0.00	0.00	29.98	29.98	29.98	0.00	5,342.91	0	0	0	0	0	0	5	3	5	3	5	3	0	0	1,323.45	0.00	0.00	0.00	2.84	2.84	2.84	0.00
18020128030102	Deep Canyon	BY*	29.98	40.65	29.98	0.00	10.67	3.51	29.98	5,342.91	5	3	11	4	5	3	0	0	6	1	0	0	5	3	1,323.45	2.84	4.81	2.84	0.00	1.96	0.34	2.84
18020128030102	Deep Canyon	CS*	0.00	0.00	0.00	0.23	6.14	0.23	0.00	5,342.91	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1,323.45	0.00	0.00	0.00	0.00	1.48	0.00	0.00
18020128030102	Deep Canyon	CY*	0.23	0.23	0.23	0.00	0.00	0.00	0.23	5,342.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,323.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030102	Deep Canyon	ES*	0.00	0.00	0.00	0.85	0.85	0.85	0.00	5,342.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,323.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030102	Deep Canyon	EY*	0.85	0.85	0.85	0.00	0.00	0.00	0.85	5,342.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,323.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030102	Deep Canyon	FY	0.00	7.57	7.57	7.57	1.66	7.57	7.57	5,342.91	0	0	3	0	3	0	3	0	1	0	3	0	3	0	1,323.45	0.00	1.83	1.83	1.83	0.34	1.83	1.83
18020128030102	Deep Canyon	GY	0.31	0.31	0.31	0.31	0.31	0.31	0.31	5,342.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,323.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030102	Deep Canyon	HY*	3.10	3.10	3.10	3.10	3.10	3.10	3.10	5,342.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,323.45	0.25	0.25	0.25	0.25	0.25	0.25	0.25
18020128030102	Deep Canyon	JY	0.10	0.10	0.10	0.10	0.10	0.10	0.10	5,342.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,323.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030102	Deep Canyon	KY	1.05	1.05	1.05	1.05	1.05	1.05	1.05	5,342.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,323.45	0.18	0.18	0.18	0.18	0.18	0.18	0.18
18020128030102	Deep Canyon	LY*	7.57	0.00	0.00	0.00	0.00	0.00	0.00	5,342.91	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1,323.45	1.83	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		54.88	54.88	54.88	54.88	54.88	54.88	54.88	5342.91	14	4	14	4	14	4	14	4	14	4	14	4	14	4	1323.45	7.17	7.18	7.17	7.17	7.16	7.17	7.17
	*** Value Per SqMi All =**		**6.57**	**6.57**	**6.57**	**6.57**	**6.57**	**6.57**	**6.57**	**8.35**	**1.7**	**0.5**	**1.7**	**0.5**	**1.7**	**0.5**	**1.7**	**0.5**	**1.7**	**0.5**	**1.7**	**0.5**	**1.7**	**0.5**	**2.07**	**3.47**	**3.47**	**3.47**	**3.47**	**3.46**	**3.47**	**3.47**
	*** Sum Open-Motorized, Native Surface Routes =**		41.74	44.83	34.16	34.16	50.75	37.67	34.16		8	3	11	4	5	3	5	3	13	4	5	3	5	3		4.92	5.06	3.09	3.09	6.53	3.43	3.09
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**5.00**	**5.37**	**4.09**	**4.09**	**6.08**	**4.51**	**4.09**	**8.35**	**1.0**	**0.4**	**1.3**	**0.5**	**0.6**	**0.4**	**0.6**	**0.4**	**1.6**	**0.5**	**0.6**	**0.4**	**0.6**	**0.4**	**2.07**	**2.38**	**2.45**	**1.49**	**1.49**	**3.16**	**1.66**	**1.49**
18020128030103	Secret Canyon	AY	6.10	5.68	6.10	6.10	5.68	5.68	6.10	6,525.75	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1,357.76	1.15	1.02	1.15	1.15	1.02	1.02	1.15
18020128030103	Secret Canyon	BS*	0.00	0.00	0.00	18.59	19.01	19.01	0.00	6,525.75	0	0	0	0	0	0	1	6	1	6	1	6	0	0	1,357.76	0.00	0.00	0.00	2.03	2.16	2.16	0.00
18020128030103	Secret Canyon	BY*	18.59	19.01	18.59	0.00	0.00	0.00	18.59	6,525.75	1	6	1	6	1	6	0	0	0	0	0	0	1	6	1,357.76	2.03	2.16	2.03	0.00	0.00	0.00	2.03
18020128030103	Secret Canyon	CS*	0.00	0.00	0.00	0.10	0.30	0.30	0.00	6,525.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,357.76	0.00	0.00	0.00	0.01	0.01	0.01	0.00
18020128030103	Secret Canyon	CY*	0.00	0.30	0.00	0.00	0.00	0.00	0.00	6,525.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,357.76	0.00	0.01	0.00	0.00	0.00	0.00	0.00
18020128030103	Secret Canyon	FY	0.00	7.68	7.98	7.88	7.68	7.68	7.98	6,525.75	0	0	1	3	1	3	1	3	1	3	1	3	1	3	1,357.76	0.00	0.88	0.89	0.88	0.88	0.88	0.89
18020128030103	Secret Canyon	GY	7.13	7.13	7.13	7.13	7.13	7.13	7.13	6,525.75	0	2	0	2	0	2	0	2	0	2	0	2	0	2	1,357.76	0.66	0.66	0.66	0.66	0.66	0.66	0.66
18020128030103	Secret Canyon	HY*	5.06	5.06	5.06	5.06	5.06	5.06	5.06	6,525.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,357.76	0.68	0.68	0.68	0.68	0.68	0.68	0.68
18020128030103	Secret Canyon	IY	0.08	0.08	0.08	0.08	0.08	0.08	0.08	6,525.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,357.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030103	Secret Canyon	LY*	7.98	0.00	0.00	0.00	0.00	0.00	0.00	6,525.75	1	3	0	0	0	0	0	0	0	0	0	0	0	0	1,357.76	0.89	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		44.94	44.94	44.94	44.94	44.94	44.94	44.94	6525.75	4	13	4	13	4	13	4	13	4	13	4	13	4	13	1357.76	5.41	5.41	5.41	5.41	5.41	5.41	5.41
	*** Value Per SqMi All =**		**4.41**	**4.41**	**4.41**	**4.41**	**4.41**	**4.41**	**4.41**	**10.20**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**0.4**	**1.3**	**2.12**	**2.55**	**2.55**	**2.55**	**2.55**	**2.55**	**2.55**	**2.55**
	*** Sum Open-Motorized, Native Surface Routes =**		31.63	24.36	23.64	23.75	24.36	24.36	23.64		2	9	1	6	1	6	1	6	1	6	1	6	1	6		3.60	2.85	2.71	2.72	2.85	2.85	2.71
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.10**	**2.39**	**2.32**	**2.33**	**2.39**	**2.39**	**2.32**	**10.20**	**0.2**	**0.9**	**0.1**	**0.6**	**0.1**	**0.6**	**0.1**	**0.6**	**0.1**	**0.6**	**0.1**	**0.6**	**0.1**	**0.6**	**2.12**	**1.70**	**1.34**	**1.28**	**1.28**	**1.34**	**1.34**	**1.28**
18020128030104	Upper North Fork of Middle Fork American River	AY	0.38	0.00	0.38	0.38	0.00	0.38	0.38	3,946.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	860.02	0.05	0.00	0.05	0.05	0.00	0.05	0.05
18020128030104	Upper North Fork of Middle Fork American River	BS*	0.00	0.00	0.00	9.08	9.08	9.08	0.00	3,946.78	0	0	0	0	0	0	1	2	1	2	1	2	0	0	860.02	0.00	0.00	0.00	0.40	0.40	0.40	0.00
18020128030104	Upper North Fork of Middle Fork American River	BY*	9.08	9.45	9.08	0.00	0.38	0.00	9.08	3,946.78	1	2	1	2	1	2	0	0	0	0	0	0	1	2	860.02	0.40	0.44	0.40	0.00	0.05	0.00	0.40
18020128030104	Upper North Fork of Middle Fork American River	CS*	0.00	0.00	0.00	0.00	1.53	0.00	0.00	3,946.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	860.02	0.00	0.00	0.00	0.00	0.02	0.00	0.00
18020128030104	Upper North Fork of Middle Fork American River	FY	0.00	3.94	3.94	3.94	2.41	3.94	3.94	3,946.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	860.02	0.00	0.02	0.02	0.02	0.00	0.02	0.02
18020128030104	Upper North Fork of Middle Fork American River	GY	0.84	0.84	0.84	0.84	0.84	0.84	0.84	3,946.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	860.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030104	Upper North Fork of Middle Fork American River	HY*	10.37	10.37	10.37	10.37	10.37	10.37	10.37	3,946.78	1	1	1	1	1	1	1	1	1	1	1	1	1	1	860.02	0.77	0.77	0.77	0.77	0.77	0.77	0.77
18020128030104	Upper North Fork of Middle Fork American River	LY*	3.94	0.00	0.00	0.00	0.00	0.00	0.00	3,946.78	0	0	0	0	0	0	0	0	0	0	0	0	0	0	860.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		24.60	24.60	24.60	24.60	24.60	24.60	24.60	3946.78	2	3	2	3	2	3	2	3	2	3	2	3	2	3	860.02	1.24	1.23	1.24	1.24	1.24	1.24	1.24
	*** Value Per SqMi All =**		**3.99**	**3.99**	**3.99**	**3.99**	**3.99**	**3.99**	**3.99**	**6.17**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**1.34**	**0.92**	**0.92**	**0.92**	**0.92**	**0.92**	**0.92**	**0.92**
	*** Sum Open-Motorized, Native Surface Routes =**		23.38	19.82	19.44	19.44	21.35	19.44	19.44		2	3	2	3	2	3	2	3	2	3	2	3	2	3		1.19	1.21	1.17	1.17	1.24	1.17	1.17
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.79**	**3.21**	**3.15**	**3.15**	**3.46**	**3.15**	**3.15**	**6.17**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**0.3**	**0.5**	**1.34**	**0.89**	**0.90**	**0.87**	**0.87**	**0.92**	**0.87**	**0.87**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020128030201	North Fork of Middle Fork American River-Bear Wallo	AY	0.63	0.00	0.63	0.63	0.00	0.63	0.63	5,936.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,437.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030201	North Fork of Middle Fork American River-Bear Wallo	BS*	0.16	0.16	0.16	4.38	4.38	4.38	0.16	5,936.82	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,437.38	0.00	0.00	0.00	0.18	0.18	0.18	0.00
18020128030201	North Fork of Middle Fork American River-Bear Wallo	BY*	4.22	4.85	4.22	0.00	0.63	0.00	4.22	5,936.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,437.38	0.18	0.18	0.18	0.00	0.00	0.00	0.18
18020128030201	North Fork of Middle Fork American River-Bear Wallo	CS*	0.00	0.00	0.00	2.58	2.58	2.58	0.00	5,936.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,437.38	0.00	0.00	0.00	1.02	1.02	1.02	0.00
18020128030201	North Fork of Middle Fork American River-Bear Wallo	CY*	2.58	2.58	2.58	0.00	0.00	0.00	2.58	5,936.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,437.38	1.02	1.02	1.02	0.00	0.00	0.00	1.02
18020128030201	North Fork of Middle Fork American River-Bear Wallo	ES*	0.00	0.00	0.00	8.71	8.71	8.71	0.00	5,936.82	0	0	0	0	0	0	10	3	10	3	10	3	0	0	1,437.38	0.00	0.00	0.00	1.62	1.62	1.62	0.00
18020128030201	North Fork of Middle Fork American River-Bear Wallo	EY*	8.71	8.71	8.71	0.00	0.00	0.00	8.71	5,936.82	10	3	10	3	10	3	0	0	0	0	0	0	10	3	1,437.38	1.62	1.62	1.62	0.00	0.00	0.00	1.62
18020128030201	North Fork of Middle Fork American River-Bear Wallo	FY	0.00	11.55	11.55	11.55	11.55	11.55	11.55	5,936.82	0	0	2	2	2	2	2	2	2	2	2	2	2	2	1,437.38	0.00	0.82	0.82	0.82	0.82	0.82	0.82
18020128030201	North Fork of Middle Fork American River-Bear Wallo	GY	1.15	1.15	1.15	1.15	1.15	1.15	1.15	5,936.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,437.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030201	North Fork of Middle Fork American River-Bear Wallo	LY*	11.55	0.00	0.00	0.00	0.00	0.00	0.00	5,936.82	2	2	0	0	0	0	0	0	0	0	0	0	0	0	1,437.38	0.82	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		29.00	29.00	29.00	29.00	29.00	29.00	29.00	5936.82	12	6	12	6	12	6	12	6	12	6	12	6	12	6	1437.38	3.64	3.64	3.64	3.64	3.64	3.64	3.64
	*** Value Per SqMi All =**		**3.13**	**3.13**	**3.13**	**3.13**	**3.13**	**3.13**	**3.13**	**9.28**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**1.3**	**0.6**	**2.25**	**1.62**	**1.62**	**1.62**	**1.62**	**1.62**	**1.62**	**1.62**
	*** Sum Open-Motorized, Native Surface Routes =**		27.22	16.31	15.68	15.68	16.31	15.68	15.68		12	6	10	4	10	4	10	4	10	4	10	4	10	4		3.64	2.82	2.82	2.82	2.82	2.82	2.82
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.93**	**1.76**	**1.69**	**1.69**	**1.76**	**1.69**	**1.69**	**9.28**	**1.3**	**0.6**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**1.1**	**0.4**	**2.25**	**1.62**	**1.26**	**1.26**	**1.26**	**1.26**	**1.26**	**1.26**
18020128030202	Grouse Creek	AY	11.03	1.89	11.03	11.03	1.89	5.63	11.03	5,264.16	16	2	4	1	16	2	16	2	4	1	8	1	16	2	1,345.59	1.60	0.00	1.60	1.60	0.00	0.43	1.60
18020128030202	Grouse Creek	BS*	0.31	0.31	0.31	26.24	31.64	31.64	0.31	5,264.16	0	0	0	0	0	0	9	3	17	4	17	4	0	0	1,345.59	0.00	0.00	0.00	3.95	5.12	5.12	0.00
18020128030202	Grouse Creek	BY*	25.93	35.07	25.93	0.00	3.74	0.00	25.93	5,264.16	9	3	21	4	9	3	0	0	4	0	0	0	9	3	1,345.59	3.95	5.55	3.95	0.00	0.43	0.00	3.95
18020128030202	Grouse Creek	CS*	0.00	0.00	0.00	0.00	4.96	0.00	0.00	5,264.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,345.59	0.00	0.00	0.00	0.00	0.15	0.00	0.00
18020128030202	Grouse Creek	ES*	0.00	0.00	0.00	0.07	0.07	0.07	0.00	5,264.16	0	0	0	0	0	0	2	0	2	0	2	0	0	0	1,345.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030202	Grouse Creek	EY*	0.07	0.07	0.07	0.00	0.00	0.00	0.07	5,264.16	2	0	2	0	2	0	0	0	0	0	0	0	2	0	1,345.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030202	Grouse Creek	FY	0.00	8.48	8.48	8.48	3.52	8.48	8.48	5,264.16	0	0	1	0	1	0	1	0	1	0	1	0	1	0	1,345.59	0.00	0.38	0.38	0.38	0.24	0.38	0.38
18020128030202	Grouse Creek	IY	0.16	0.16	0.16	0.16	0.16	0.16	0.16	5,264.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,345.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030202	Grouse Creek	LS*	0.67	0.00	0.00	0.00	0.00	0.00	0.00	5,264.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,345.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030202	Grouse Creek	LY*	7.81	0.00	0.00	0.00	0.00	0.00	0.00	5,264.16	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,345.59	0.38	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		45.98	45.98	45.98	45.98	45.98	45.98	45.98	5264.16	28	5	28	5	28	5	28	5	28	5	28	5	28	5	1345.59	5.93	5.93	5.93	5.93	5.94	5.93	5.93
	*** Value Per SqMi All =**		**5.59**	**5.59**	**5.59**	**5.59**	**5.59**	**5.59**	**5.59**	**8.23**	**3.4**	**0.6**	**3.4**	**0.6**	**3.4**	**0.6**	**3.4**	**0.6**	**3.4**	**0.6**	**3.4**	**0.6**	**3.4**	**0.6**	**2.10**	**2.82**	**2.82**	**2.82**	**2.82**	**2.83**	**2.82**	**2.82**
	*** Sum Open-Motorized, Native Surface Routes =**		34.79	35.45	26.31	26.31	40.41	31.71	26.31		12	3	23	4	11	3	11	3	23	4	19	4	11	3		4.33	5.55	3.95	3.95	5.70	5.12	3.95
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.23**	**4.31**	**3.20**	**3.20**	**4.91**	**3.85**	**3.20**	**8.23**	**1.5**	**0.4**	**2.8**	**0.5**	**1.3**	**0.4**	**1.3**	**0.4**	**2.8**	**0.5**	**2.3**	**0.5**	**1.3**	**0.4**	**2.10**	**2.06**	**2.64**	**1.88**	**1.88**	**2.71**	**2.44**	**1.88**
18020128030203	Peavine Creek	AY	6.34	2.01	6.34	6.34	2.01	2.01	6.34	5,444.74	12	2	4	1	12	2	12	2	4	1	4	1	12	2	1,349.93	1.26	0.06	1.26	1.26	0.06	0.06	1.26
18020128030203	Peavine Creek	BS*	8.25	8.25	8.25	25.51	29.85	29.85	8.25	5,444.74	0	1	0	1	0	1	8	2	16	3	16	3	0	1	1,349.93	0.23	0.23	0.23	2.40	3.60	3.60	0.23
18020128030203	Peavine Creek	BY*	17.27	21.60	17.27	0.00	0.00	0.00	17.27	5,444.74	8	1	16	2	8	1	0	0	0	0	0	0	8	1	1,349.93	2.18	3.38	2.18	0.00	0.00	0.00	2.18
18020128030203	Peavine Creek	CS*	0.00	0.00	0.00	0.00	12.26	0.00	0.00	5,444.74	0	0	0	0	0	0	0	0	3	1	0	0	0	0	1,349.93	0.00	0.00	0.00	0.00	1.37	0.00	0.00
18020128030203	Peavine Creek	FY	0.00	13.84	13.84	13.84	1.58	13.84	13.84	5,444.74	0	0	3	1	3	1	3	1	0	0	3	1	3	1	1,349.93	0.00	1.50	1.50	1.50	0.13	1.50	1.50
18020128030203	Peavine Creek	LS*	6.56	0.00	0.00	0.00	0.00	0.00	0.00	5,444.74	2	1	0	0	0	0	0	0	0	0	0	0	0	0	1,349.93	0.77	0.00	0.00	0.00	0.00	0.00	0.00
18020128030203	Peavine Creek	LY*	7.28	0.00	0.00	0.00	0.00	0.00	0.00	5,444.74	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,349.93	0.73	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		45.69	45.69	45.69	45.69	45.69	45.69	45.69	5444.74	23	5	23	5	23	5	23	5	23	5	23	5	23	5	1349.93	5.17	5.17	5.17	5.16	5.16	5.16	5.17
	*** Value Per SqMi All =**		**5.37**	**5.37**	**5.37**	**5.37**	**5.37**	**5.37**	**5.37**	**8.51**	**2.7**	**0.6**	**2.7**	**0.6**	**2.7**	**0.6**	**2.7**	**0.6**	**2.7**	**0.6**	**2.7**	**0.6**	**2.7**	**0.6**	**2.11**	**2.45**	**2.45**	**2.45**	**2.45**	**2.45**	**2.45**	**2.45**
	*** Sum Open-Motorized, Native Surface Routes =**		39.35	29.85	25.51	25.51	42.11	29.85	25.51		11	3	16	3	8	2	8	2	19	4	16	3	8	2		3.91	3.61	2.41	2.40	4.97	3.60	2.41
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.63**	**3.51**	**3.00**	**3.00**	**4.95**	**3.51**	**3.00**	**8.51**	**1.3**	**0.4**	**1.9**	**0.4**	**0.9**	**0.2**	**0.9**	**0.2**	**2.2**	**0.5**	**1.9**	**0.4**	**0.9**	**0.2**	**2.11**	**1.85**	**1.71**	**1.14**	**1.14**	**2.36**	**1.71**	**1.14**
18020128030204	East Branch El Dorado Canyon	AY	0.16	0.00	0.16	0.16	0.00	0.00	0.16	6,769.71	1	0	0	0	1	0	1	0	0	0	0	0	1	0	1,454.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030204	East Branch El Dorado Canyon	BS*	0.00	0.00	0.00	9.11	9.11	9.11	0.00	6,769.71	0	0	0	0	0	0	3	0	3	0	3	0	0	0	1,454.04	0.00	0.00	0.00	1.07	1.07	1.07	0.00
18020128030204	East Branch El Dorado Canyon	BY*	9.11	9.27	9.11	0.00	0.16	0.16	9.11	6,769.71	3	0	4	0	3	0	0	0	1	0	1	0	3	0	1,454.04	1.07	1.07	1.07	0.00	0.00	0.00	1.07
18020128030204	East Branch El Dorado Canyon	CS*	0.00	0.00	0.00	1.29	1.29	1.29	0.00	6,769.71	0	0	0	0	0	0	2	1	2	1	2	1	0	0	1,454.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030204	East Branch El Dorado Canyon	CY*	1.29	1.29	1.29	0.00	0.00	0.00	1.29	6,769.71	2	1	2	1	2	1	0	0	0	0	0	0	2	1	1,454.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030204	East Branch El Dorado Canyon	ES*	0.00	0.00	0.00	8.52	8.52	8.52	0.00	6,769.71	0	0	0	0	0	0	8	3	8	3	8	3	0	0	1,454.04	0.00	0.00	0.00	1.13	1.13	1.13	0.00
18020128030204	East Branch El Dorado Canyon	EY*	8.52	8.52	8.52	0.00	0.00	0.00	8.52	6,769.71	8	3	8	3	8	3	0	0	0	0	0	0	8	3	1,454.04	1.13	1.13	1.13	0.00	0.00	0.00	1.13
18020128030204	East Branch El Dorado Canyon	FY	0.00	6.31	6.31	6.31	6.31	6.31	6.31	6,769.71	0	0	1	0	1	0	1	0	1	0	1	0	1	0	1,454.04	0.00	0.37	0.37	0.37	0.37	0.37	0.37
18020128030204	East Branch El Dorado Canyon	GY	8.03	8.03	8.03	8.03	8.03	8.03	8.03	6,769.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,454.04	0.07	0.07	0.07	0.07	0.07	0.07	0.07
18020128030204	East Branch El Dorado Canyon	HY*	11.22	11.22	11.22	11.22	11.22	11.22	11.22	6,769.71	6	0	6	0	6	0	6	0	6	0	6	0	6	0	1,454.04	2.21	2.21	2.21	2.21	2.21	2.21	2.21
18020128030204	East Branch El Dorado Canyon	LY*	6.31	0.00	0.00	0.00	0.00	0.00	0.00	6,769.71	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,454.04	0.37	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		44.63	44.63	44.63	44.63	44.63	44.63	44.63	6769.71	21	4	21	4	21	4	21	4	21	4	21	4	21	4	1454.04	4.85	4.85	4.85	4.85	4.85	4.85	4.85
	*** Value Per SqMi All =**		**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**4.22**	**10.58**	**2.0**	**0.4**	**2.0**	**0.4**	**2.0**	**0.4**	**2.0**	**0.4**	**2.0**	**0.4**	**2.0**	**0.4**	**2.0**	**0.4**	**2.27**	**2.13**	**2.13**	**2.13**	**2.13**	**2.13**	**2.13**	**2.13**
	*** Sum Open-Motorized, Native Surface Routes =**		36.44	30.29	30.13	30.13	30.29	30.29	30.13		20	4	20	4	19	4	19	4	20	4	20	4	19	4		4.78	4.41	4.41	4.41	4.41	4.41	4.41
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.45**	**2.86**	**2.85**	**2.85**	**2.86**	**2.86**	**2.85**	**10.58**	**1.9**	**0.4**	**1.9**	**0.4**	**1.8**	**0.4**	**1.8**	**0.4**	**1.9**	**0.4**	**1.9**	**0.4**	**1.8**	**0.4**	**2.27**	**2.10**	**1.94**	**1.94**	**1.94**	**1.94**	**1.94**	**1.94**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary — Apr. 11, 2008

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020128030205	West Branch El Dorado Canyon	AY	2.77	0.00	2.77	2.77	0.00	0.00	2.77	4,288.71	2	0	0	0	2	0	2	0	0	0	0	0	2	0	989.69	0.45	0.00	0.45	0.45	0.00	0.00	0.45
18020128030205	West Branch El Dorado Canyon	BS*	0.00	0.00	0.00	3.33	3.33	3.33	0.00	4,288.71	0	0	0	0	0	0	2	0	2	0	2	0	0	0	989.69	0.00	0.00	0.00	0.30	0.30	0.30	0.00
18020128030205	West Branch El Dorado Canyon	BY*	3.33	6.09	3.33	0.00	2.77	2.77	3.33	4,288.71	2	0	4	0	2	0	0	0	2	0	2	0	2	0	989.69	0.30	0.75	0.30	0.00	0.45	0.45	0.30
18020128030205	West Branch El Dorado Canyon	CS*	0.00	0.00	0.00	0.95	1.43	0.95	0.00	4,288.71	0	0	0	0	0	0	1	0	1	0	1	0	0	0	989.69	0.00	0.00	0.00	0.13	0.18	0.13	0.00
18020128030205	West Branch El Dorado Canyon	CY*	0.91	0.95	0.91	0.00	0.00	0.00	0.91	4,288.71	1	0	1	0	1	0	0	0	0	0	0	0	1	0	989.69	0.13	0.13	0.13	0.00	0.00	0.00	0.13
18020128030205	West Branch El Dorado Canyon	ES*	0.00	0.00	0.00	3.86	3.86	3.86	0.00	4,288.71	0	0	0	0	0	0	7	2	7	2	7	2	0	0	989.69	0.00	0.00	0.00	0.41	0.41	0.41	0.00
18020128030205	West Branch El Dorado Canyon	EY*	3.86	3.86	3.86	0.00	0.00	0.00	3.86	4,288.71	7	2	7	2	7	2	0	0	0	0	0	0	7	2	989.69	0.41	0.41	0.41	0.00	0.00	0.00	0.41
18020128030205	West Branch El Dorado Canyon	FY	0.00	2.64	2.68	2.64	2.52	2.64	2.68	4,288.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	989.69	0.00	0.18	0.18	0.18	0.17	0.18	0.18
18020128030205	West Branch El Dorado Canyon	GY	5.13	5.13	5.13	5.13	5.13	5.13	5.13	4,288.71	3	0	3	0	3	0	3	0	3	0	3	0	3	0	989.69	0.68	0.68	0.68	0.68	0.68	0.68	0.68
18020128030205	West Branch El Dorado Canyon	HY*	3.72	3.72	3.72	3.72	3.36	3.72	3.72	4,288.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	989.69	0.19	0.19	0.19	0.19	0.14	0.19	0.19
18020128030205	West Branch El Dorado Canyon	IY	0.37	0.37	0.37	0.37	0.37	0.37	0.37	4,288.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	989.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030205	West Branch El Dorado Canyon	LY*	2.68	0.00	0.00	0.00	0.00	0.00	0.00	4,288.71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	989.69	0.18	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		22.76	22.76	22.76	22.76	22.76	22.76	22.76	4288.71	15	2	15	2	15	2	15	2	15	2	15	2	15	2	989.69	2.34	2.34	2.34	2.34	2.33	2.34	2.34
	*** Value Per SqMi All =**		**3.40**	**3.40**	**3.40**	**3.40**	**3.40**	**3.40**	**3.40**	**6.70**	**2.2**	**0.3**	**2.2**	**0.3**	**2.2**	**0.3**	**2.2**	**0.3**	**2.2**	**0.3**	**2.2**	**0.3**	**2.2**	**0.3**	**1.55**	**1.51**	**1.51**	**1.51**	**1.51**	**1.51**	**1.51**	**1.51**
	*** Sum Open-Motorized, Native Surface Routes =**		14.50	14.62	11.82	11.86	14.74	14.62	11.82		10	2	12	2	10	2	10	2	12	2	12	2	10	2		1.21	1.48	1.03	1.03	1.48	1.48	1.03
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.16**	**2.18**	**1.76**	**1.77**	**2.20**	**2.18**	**1.76**	**6.70**	**1.5**	**0.3**	**1.8**	**0.3**	**1.5**	**0.3**	**1.5**	**0.3**	**1.8**	**0.3**	**1.8**	**0.3**	**1.5**	**0.3**	**1.55**	**0.78**	**0.96**	**0.67**	**0.67**	**0.96**	**0.96**	**0.67**
18020128030206	North Fork of Middle Fork American River-El Dorado	AY	9.65	9.65	9.65	9.65	9.65	9.65	9.65	6,100.01	3	4	3	4	3	4	3	4	3	4	3	4	3	4	1,452.39	1.41	1.41	1.41	1.41	1.41	1.41	1.41
18020128030206	North Fork of Middle Fork American River-El Dorado	BS*	2.88	2.88	2.88	3.22	3.22	3.22	2.88	6,100.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,452.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030206	North Fork of Middle Fork American River-El Dorado	BY*	0.34	0.34	0.34	0.00	0.00	0.00	0.34	6,100.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,452.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030206	North Fork of Middle Fork American River-El Dorado	CS*	3.44	3.44	3.44	3.44	5.53	3.44	3.44	6,100.01	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1,452.39	1.68	1.68	1.68	1.68	2.02	1.68	1.68
18020128030206	North Fork of Middle Fork American River-El Dorado	ES*	0.00	0.00	0.00	3.13	3.13	3.13	0.00	6,100.01	0	0	0	0	0	0	3	1	3	1	3	1	0	0	1,452.39	0.00	0.00	0.00	1.03	1.03	1.03	0.00
18020128030206	North Fork of Middle Fork American River-El Dorado	EY*	3.13	3.13	3.13	0.00	0.00	0.00	3.13	6,100.01	3	1	3	1	3	1	0	0	0	0	0	0	3	1	1,452.39	1.03	1.03	1.03	0.00	0.00	0.00	1.03
18020128030206	North Fork of Middle Fork American River-El Dorado	FY	0.00	6.27	6.27	6.27	4.23	6.27	6.27	6,100.01	0	0	3	0	3	0	3	0	2	0	3	0	3	0	1,452.39	0.00	0.53	0.53	0.53	0.20	0.53	0.53
18020128030206	North Fork of Middle Fork American River-El Dorado	GY	4.27	4.27	4.27	4.27	4.27	4.27	4.27	6,100.01	4	2	4	2	4	2	4	2	4	2	4	2	4	2	1,452.39	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18020128030206	North Fork of Middle Fork American River-El Dorado	HY*	1.54	1.54	1.54	1.54	1.48	1.54	1.54	6,100.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,452.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030206	North Fork of Middle Fork American River-El Dorado	JY	0.02	0.02	0.02	0.02	0.02	0.02	0.02	6,100.01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,452.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128030206	North Fork of Middle Fork American River-El Dorado	LS*	0.71	0.00	0.00	0.00	0.00	0.00	0.00	6,100.01	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,452.39	0.06	0.00	0.00	0.00	0.00	0.00	0.00
18020128030206	North Fork of Middle Fork American River-El Dorado	LY*	5.55	0.00	0.00	0.00	0.00	0.00	0.00	6,100.01	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1,452.39	0.47	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		31.55	31.55	31.55	31.55	31.55	31.55	31.55	6100.01	14	8	14	8	14	8	14	8	14	8	14	8	14	8	1452.39	5.65	5.65	5.65	5.65	5.66	5.65	5.65
	*** Value Per SqMi All =**		**3.31**	**3.31**	**3.31**	**3.31**	**3.31**	**3.31**	**3.31**	**9.53**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**2.27**	**2.49**	**2.49**	**2.49**	**2.49**	**2.49**	**2.49**	**2.49**
	*** Sum Open-Motorized, Native Surface Routes =**		17.60	11.33	11.33	11.33	13.37	11.33	11.33		7	2	4	2	4	2	4	2	5	2	4	2	4	2		3.24	2.71	2.71	2.71	3.05	2.71	2.71
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.85**	**1.19**	**1.19**	**1.19**	**1.40**	**1.19**	**1.19**	**9.53**	**0.7**	**0.2**	**0.4**	**0.2**	**0.4**	**0.2**	**0.4**	**0.2**	**0.5**	**0.2**	**0.4**	**0.2**	**0.4**	**0.2**	**2.27**	**1.43**	**1.19**	**1.19**	**1.19**	**1.34**	**1.19**	**1.19**
18020128040101	Middle Fork American River-Horseshoe Bar	AY	4.45	4.45	4.45	4.45	4.45	4.45	4.45	2,385.99	3	2	3	2	3	2	3	2	3	2	3	2	3	2	857.53	1.51	1.51	1.51	1.51	1.51	1.51	1.51
18020128040101	Middle Fork American River-Horseshoe Bar	BS*	0.00	0.00	0.00	2.40	2.40	2.40	0.00	2,385.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	857.53	0.00	0.00	0.00	0.17	0.17	0.17	0.00
18020128040101	Middle Fork American River-Horseshoe Bar	BY*	2.40	2.40	2.40	0.00	0.00	0.00	2.40	2,385.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	857.53	0.17	0.17	0.17	0.00	0.00	0.00	0.17
18020128040101	Middle Fork American River-Horseshoe Bar	FY	0.00	5.99	5.99	5.99	5.99	5.99	5.99	2,385.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	857.53	0.00	0.08	0.08	0.08	0.08	0.08	0.08
18020128040101	Middle Fork American River-Horseshoe Bar	GY	1.52	1.52	1.52	1.52	1.52	1.52	1.52	2,385.99	4	2	4	2	4	2	4	2	4	2	4	2	4	2	857.53	0.16	0.16	0.16	0.16	0.16	0.16	0.16
18020128040101	Middle Fork American River-Horseshoe Bar	HY*	1.72	1.72	1.72	1.72	1.72	1.72	1.72	2,385.99	1	0	1	0	1	0	1	0	1	0	1	0	1	0	857.53	0.69	0.69	0.69	0.69	0.69	0.69	0.69
18020128040101	Middle Fork American River-Horseshoe Bar	LY*	5.99	0.00	0.00	0.00	0.00	0.00	0.00	2,385.99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	857.53	0.08	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		16.07	16.07	16.07	16.07	16.07	16.07	16.07	2385.99	8	4	8	4	8	4	8	4	8	4	8	4	8	4	857.53	2.61	2.61	2.61	2.61	2.61	2.61	2.61
	*** Value Per SqMi All =**		**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**3.73**	**2.1**	**1.1**	**2.1**	**1.1**	**2.1**	**1.1**	**2.1**	**1.1**	**2.1**	**1.1**	**2.1**	**1.1**	**2.1**	**1.1**	**1.34**	**1.95**	**1.95**	**1.95**	**1.95**	**1.95**	**1.95**	**1.95**
	*** Sum Open-Motorized, Native Surface Routes =**		10.10	4.11	4.11	4.11	4.11	4.11	4.11		1	0	1	0	1	0	1	0	1	0	1	0	1	0		0.94	0.86	0.86	0.86	0.86	0.86	0.86
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.71**	**1.10**	**1.10**	**1.10**	**1.10**	**1.10**	**1.10**	**3.73**	**0.3**	**0.0**	**0.3**	**0.0**	**0.3**	**0.0**	**0.3**	**0.0**	**0.3**	**0.0**	**0.3**	**0.0**	**0.3**	**0.0**	**1.34**	**0.70**	**0.64**	**0.64**	**0.64**	**0.64**	**0.64**	**0.64**
18020128040102	Volcano Canyon	AY	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2,370.80	1	1	1	1	1	1	1	1	1	1	1	1	1	1	567.58	0.34	0.34	0.34	0.34	0.34	0.34	0.34
18020128040102	Volcano Canyon	BS*	0.00	0.00	0.00	0.69	0.69	0.69	0.00	2,370.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	567.58	0.00	0.00	0.00	0.27	0.27	0.27	0.00
18020128040102	Volcano Canyon	BY*	0.69	0.69	0.69	0.00	0.00	0.00	0.69	2,370.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	567.58	0.27	0.27	0.27	0.00	0.00	0.00	0.27
18020128040102	Volcano Canyon	CS*	0.00	0.00	0.00	0.00	0.51	0.00	0.00	2,370.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	567.58	0.00	0.00	0.00	0.00	0.09	0.00	0.00
18020128040102	Volcano Canyon	FY	0.44	4.71	4.71	4.71	4.21	4.71	4.71	2,370.80	0	0	5	0	5	0	5	0	5	0	5	0	5	0	567.58	0.00	0.20	0.20	0.20	0.10	0.20	0.20
18020128040102	Volcano Canyon	GY	4.92	4.92	4.92	4.92	4.92	4.92	4.92	2,370.80	1	0	1	0	1	0	1	0	1	0	1	0	1	0	567.58	0.95	0.95	0.95	0.95	0.95	0.95	0.95
18020128040102	Volcano Canyon	HY*	6.53	6.53	6.53	6.53	6.53	6.53	6.53	2,370.80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	567.58	0.08	0.08	0.08	0.08	0.08	0.08	0.08
18020128040102	Volcano Canyon	JY	1.28	1.28	1.28	1.28	1.28	1.28	1.28	2,370.80	1	0	1	0	1	0	1	0	1	0	1	0	1	0	567.58	0.13	0.13	0.13	0.13	0.13	0.13	0.13
18020128040102	Volcano Canyon	LY*	4.27	0.00	0.00	0.00	0.00	0.00	0.00	2,370.80	5	0	0	0	0	0	0	0	0	0	0	0	0	0	567.58	0.20	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		20.50	20.50	20.50	20.50	20.50	20.50	20.50	2370.80	8	1	8	1	8	1	8	1	8	1	8	1	8	1	567.58	1.97	1.97	1.97	1.97	1.96	1.97	1.97
	*** Value Per SqMi All =**		**5.53**	**5.53**	**5.53**	**5.53**	**5.53**	**5.53**	**5.53**	**3.70**	**2.2**	**0.3**	**2.2**	**0.3**	**2.2**	**0.3**	**2.2**	**0.3**	**2.2**	**0.3**	**2.2**	**0.3**	**2.2**	**0.3**	**0.89**	**2.22**	**2.22**	**2.22**	**2.22**	**2.21**	**2.22**	**2.22**
	*** Sum Open-Motorized, Native Surface Routes =**		11.48	7.21	7.21	7.21	7.72	7.21	7.21		5	0	0	0	0	0	0	0	0	0	0	0	0	0		0.55	0.35	0.35	0.35	0.44	0.35	0.35
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.10**	**1.95**	**1.95**	**1.95**	**2.08**	**1.95**	**1.95**	**3.70**	**1.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.89**	**0.62**	**0.39**	**0.39**	**0.39**	**0.50**	**0.39**	**0.39**
18020128040104	Middle Fork American River-Dardanelles Creek	AY	0.33	0.33	0.33	0.33	0.33	0.33	0.33	113.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128040104	Middle Fork American River-Dardanelles Creek	CS*	0.00	0.00	0.00	0.00	0.05	0.00	0.00	113.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.94	0.00	0.00	0.00	0.00	0.05	0.00	0.00
18020128040104	Middle Fork American River-Dardanelles Creek	FY	0.00	0.05	0.05	0.05	0.00	0.05	0.05	113.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.94	0.00	0.05	0.05	0.05	0.00	0.05	0.05
18020128040104	Middle Fork American River-Dardanelles Creek	GY	0.09	0.09	0.09	0.09	0.09	0.09	0.09	113.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128040104	Middle Fork American River-Dardanelles Creek	LY*	0.05	0.00	0.00	0.00	0.00	0.00	0.00	113.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.94	0.05	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		0.46	0.46	0.46	0.46	0.46	0.46	0.46	113.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.94	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	*** Value Per SqMi All =**		**2.62**	**2.62**	**2.62**	**2.62**	**2.62**	**2.62**	**2.62**	**0.18**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.01**	**8.12**	**8.12**	**8.12**	**8.12**	**8.12**	**8.12**	**8.12**
	*** Sum Open-Motorized, Native Surface Routes =**		0.05	0.00	0.00	0.00	0.05	0.00	0.00		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.05	0.00	0.00	0.00	0.05	0.00	0.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.26**	**0.00**	**0.00**	**0.00**	**0.26**	**0.00**	**0.00**	**0.18**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.01**	**8.12**	**0.00**	**0.00**	**0.00**	**8.12**	**0.00**	**0.00**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020128050101	Headwaters North Fork American River	IY	0.45	0.45	0.45	0.45	0.45	0.45	0.45	6,906.85	3	0	3	0	3	0	3	0	3	0	3	0	3	0	2,001.87	0.34	0.34	0.34	0.34	0.34	0.34	0.34
18020128050101	Headwaters North Fork American River	JY	9.65	9.65	9.65	9.65	9.65	9.65	9.65	6,906.85	5	5	5	5	5	5	5	5	5	5	5	5	5	5	2,001.87	4.10	4.10	4.10	4.10	4.10	4.10	4.10
	Sum All =		10.10	10.10	10.10	10.10	10.10	10.10	10.10	6906.85	8	5	8	5	8	5	8	5	8	5	8	5	8	5	2001.87	4.44	4.44	4.44	4.44	4.44	4.44	4.44
	*** Value Per SqMi All =**		**0.94**	**0.94**	**0.94**	**0.94**	**0.94**	**0.94**	**0.94**	**10.79**	**0.7**	**0.5**	**0.7**	**0.5**	**0.7**	**0.5**	**0.7**	**0.5**	**0.7**	**0.5**	**0.7**	**0.5**	**0.7**	**0.5**	**3.13**	**1.42**	**1.42**	**1.42**	**1.42**	**1.42**	**1.42**	**1.42**
	*** Sum Open-Motorized, Native Surface Routes =**		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**10.79**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**3.13**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
18020128050102	North Fork American River-Cedar Creek	BS*	0.00	0.00	0.00	2.49	2.49	2.49	0.00	5749.75	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1108.85	0	0	0	0.51	0.51	0.51	0
18020128050102	North Fork American River-Cedar Creek	BY*	2.49	2.49	2.49	0.00	0.00	0.00	2.49	5749.75	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1108.85	0.51	0.51	0.51	0	0	0	0.51
18020128050102	North Fork American River-Cedar Creek	CS*	0.00	0.00	0.00	0.39	1.49	0.39	0.00	5749.75	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1108.85	0	0	0	0	0.44	0	0
18020128050102	North Fork American River-Cedar Creek	CY*	0.39	1.49	0.39	0.00	0.00	0.00	0.39	5749.75	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1108.85	0	0.44	0	0	0	0	0
18020128050102	North Fork American River-Cedar Creek	FY	0.00	0.00	0.84	0.84	0.00	0.84	0.84	5749.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1108.85	0	0	0.24	0.24	0	0.24	0.24
18020128050102	North Fork American River-Cedar Creek	GY	2.20	2.20	2.20	2.20	2.20	2.20	2.20	5749.75	6	2	6	2	6	2	6	2	6	2	6	2	6	2	1108.85	0.96	0.96	0.96	0.96	0.96	0.96	0.96
18020128050102	North Fork American River-Cedar Creek	HY*	8.31	8.05	8.31	8.31	8.05	8.31	8.31	5749.75	5	2	4	2	5	2	5	2	4	2	5	2	5	2	1108.85	2.36	2.16	2.36	2.36	2.16	2.36	2.36
18020128050102	North Fork American River-Cedar Creek	IY	1.34	1.34	1.34	1.34	1.34	1.34	1.34	5749.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1108.85	0.91	0.91	0.91	0.91	0.91	0.91	0.91
18020128050102	North Fork American River-Cedar Creek	JY	1.09	1.09	1.09	1.09	1.09	1.09	1.09	5749.75	0	2	0	2	0	2	0	2	0	2	0	2	0	2	1108.85	0	0	0	0	0	0	0
18020128050102	North Fork American River-Cedar Creek	LY*	0.84	0.00	0.00	0.00	0.00	0.00	0.00	5749.75	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1108.85	0.24	0	0	0	0	0	0
	Sum All =		16.65	16.65	16.65	16.65	16.65	16.65	16.65	5749.75	12	7	12	7	12	7	12	7	12	7	12	7	12	7	1108.85	4.98	4.98	4.98	4.98	4.98	4.98	4.98
	*** Value Per SqMi All =**		**1.85**	**1.85**	**1.85**	**1.85**	**1.85**	**1.85**	**1.85**	**8.98**	**1.3**	**0.8**	**1.3**	**0.8**	**1.3**	**0.8**	**1.3**	**0.8**	**1.3**	**0.8**	**1.3**	**0.8**	**1.3**	**0.8**	**1.73**	**2.87**	**2.87**	**2.87**	**2.87**	**2.87**	**2.87**	**2.87**
	*** Sum Open-Motorized, Native Surface Routes =**		12.03	12.03	11.20	11.20	12.03	11.20	11.20		6	3	6	3	6	3	6	3	6	3	6	3	6	3		3.11	3.11	2.87	2.87	3.11	2.87	2.87
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.34**	**1.34**	**1.25**	**1.25**	**1.34**	**1.25**	**1.25**	**8.98**	**0.7**	**0.3**	**0.7**	**0.3**	**0.7**	**0.3**	**0.7**	**0.3**	**0.7**	**0.3**	**0.7**	**0.3**	**0.7**	**0.3**	**1.73**	**1.80**	**1.80**	**1.66**	**1.66**	**1.80**	**1.66**	**1.66**
18020128050103	North Fork American River-Onion Creek	BS*	0.00	0.00	0.00	2.41	2.41	2.41	0.00	7,340.96	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1,928.20	0.00	0.00	0.00	0.66	0.66	0.66	0.00
18020128050103	North Fork American River-Onion Creek	BY*	2.41	2.41	2.41	0.00	0.00	0.00	2.41	7,340.96	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1,928.20	0.66	0.66	0.66	0.00	0.00	0.00	0.66
18020128050103	North Fork American River-Onion Creek	CS*	0.00	0.00	0.00	0.05	0.22	0.22	0.00	7,340.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,928.20	0.00	0.00	0.00	0.00	0.18	0.18	0.00
18020128050103	North Fork American River-Onion Creek	CY*	0.00	0.22	0.00	0.00	0.00	0.00	0.00	7,340.96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,928.20	0.00	0.18	0.00	0.00	0.00	0.00	0.00
18020128050103	North Fork American River-Onion Creek	FY	0.00	3.47	3.70	3.65	3.47	3.47	3.70	7,340.96	0	0	4	0	4	0	4	0	4	0	4	0	4	0	1,928.20	0.00	2.27	2.45	2.45	2.27	2.27	2.45
18020128050103	North Fork American River-Onion Creek	GY	10.08	10.08	10.08	10.08	10.08	10.08	10.08	7,340.96	8	2	8	2	8	2	8	2	8	2	8	2	8	2	1,928.20	3.78	3.78	3.78	3.78	3.78	3.78	3.78
18020128050103	North Fork American River-Onion Creek	HY*	24.63	24.63	24.63	24.63	24.63	24.63	24.63	7,340.96	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1,928.20	6.71	6.71	6.71	6.71	6.71	6.71	6.71
18020128050103	North Fork American River-Onion Creek	LY*	3.70	0.00	0.00	0.00	0.00	0.00	0.00	7,340.96	4	0	0	0	0	0	0	0	0	0	0	0	0	0	1,928.20	2.45	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		40.82	40.82	40.82	40.82	40.82	40.82	40.82	7340.96	14	4	14	4	14	4	14	4	14	4	14	4	14	4	1928.20	13.60	13.60	13.60	13.60	13.60	13.60	13.60
	*** Value Per SqMi All =**		**3.56**	**3.56**	**3.56**	**3.56**	**3.56**	**3.56**	**3.56**	**11.47**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**1.2**	**0.3**	**3.01**	**4.51**	**4.51**	**4.51**	**4.51**	**4.51**	**4.51**	**4.51**
	*** Sum Open-Motorized, Native Surface Routes =**		30.74	27.27	27.04	27.09	27.27	27.27	27.04		6	2	2	2	2	2	2	2	2	2	2	2	2	2		9.82	7.55	7.37	7.37	7.55	7.55	7.37
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.68**	**2.38**	**2.36**	**2.36**	**2.38**	**2.38**	**2.36**	**11.47**	**0.5**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**	**3.01**	**3.26**	**2.51**	**2.45**	**2.45**	**2.51**	**2.51**	**2.45**
18020128050104	Palisade Creek	BS*	0.00	0.00	0.00	0.67	0.67	0.67	0.00	6,211.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,465.62	0.00	0.00	0.00	0.12	0.12	0.12	0.00
18020128050104	Palisade Creek	BY*	0.67	0.67	0.67	0.00	0.00	0.00	0.67	6,211.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,465.62	0.12	0.12	0.12	0.00	0.00	0.00	0.12
18020128050104	Palisade Creek	CS*	0.00	0.00	0.00	1.62	1.62	1.62	0.00	6,211.83	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1,465.62	0.00	0.00	0.00	0.42	0.42	0.42	0.00
18020128050104	Palisade Creek	CY*	1.62	1.62	1.62	0.00	0.00	0.00	1.62	6,211.83	1	0	1	0	1	0	0	0	0	0	0	0	1	0	1,465.62	0.42	0.42	0.42	0.00	0.00	0.00	0.42
18020128050104	Palisade Creek	FY	0.00	1.60	1.60	1.60	1.60	1.60	1.60	6,211.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,465.62	0.00	0.32	0.32	0.32	0.32	0.32	0.32
18020128050104	Palisade Creek	GY	3.57	3.57	3.57	3.57	3.57	3.57	3.57	6,211.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,465.62	1.72	1.72	1.72	1.72	1.72	1.72	1.72
18020128050104	Palisade Creek	HY*	8.00	8.00	8.00	8.00	8.00	8.00	8.00	6,211.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,465.62	1.06	1.06	1.06	1.06	1.06	1.06	1.06
18020128050104	Palisade Creek	IY	4.74	4.74	4.74	4.74	4.74	4.74	4.74	6,211.83	3	0	3	0	3	0	3	0	3	0	3	0	3	0	1,465.62	2.01	2.01	2.01	2.01	2.01	2.01	2.01
18020128050104	Palisade Creek	LY*	1.60	0.00	0.00	0.00	0.00	0.00	0.00	6,211.83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,465.62	0.32	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		20.20	20.20	20.20	20.20	20.20	20.20	20.20	6211.83	4	0	4	0	4	0	4	0	4	0	4	0	4	0	1465.62	5.65	5.65	5.65	5.65	5.65	5.65	5.65
	*** Value Per SqMi All =**		**2.08**	**2.08**	**2.08**	**2.08**	**2.08**	**2.08**	**2.08**	**9.71**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**2.29**	**2.47**	**2.47**	**2.47**	**2.47**	**2.47**	**2.47**	**2.47**
	*** Sum Open-Motorized, Native Surface Routes =**		11.90	10.30	10.30	10.30	10.30	10.30	10.30		1	0	1	0	1	0	1	0	1	0	1	0	1	0		1.92	1.60	1.60	1.60	1.60	1.60	1.60
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.23**	**1.06**	**1.06**	**1.06**	**1.06**	**1.06**	**1.06**	**9.71**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**2.29**	**0.84**	**0.70**	**0.70**	**0.70**	**0.70**	**0.70**	**0.70**
18020128050105	North Fork American River-Wabena Creek	BS*	0.00	0.00	0.00	3.16	3.16	3.16	0.00	8,418.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,354.90	0.00	0.00	0.00	0.42	0.42	0.42	0.00
18020128050105	North Fork American River-Wabena Creek	BY*	3.16	3.16	3.16	0.00	0.00	0.00	3.16	8,418.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,354.90	0.42	0.42	0.42	0.00	0.00	0.00	0.42
18020128050105	North Fork American River-Wabena Creek	CS*	0.00	0.00	0.00	2.99	2.99	2.99	0.00	8,418.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,354.90	0.00	0.00	0.00	0.02	0.02	0.02	0.00
18020128050105	North Fork American River-Wabena Creek	CY*	2.98	2.99	2.98	0.00	0.00	0.00	2.98	8,418.88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,354.90	0.00	0.02	0.00	0.00	0.00	0.00	0.00
18020128050105	North Fork American River-Wabena Creek	FY	0.00	3.89	3.91	3.89	3.89	3.89	3.91	8,418.88	0	0	3	0	3	0	3	0	3	0	3	0	3	0	1,354.90	0.00	1.31	1.33	1.31	1.31	1.31	1.33
18020128050105	North Fork American River-Wabena Creek	GY	6.15	6.15	6.15	6.15	6.15	6.15	6.15	8,418.88	9	2	9	2	9	2	9	2	9	2	9	2	9	2	1,354.90	2.17	2.17	2.17	2.17	2.17	2.17	2.17
18020128050105	North Fork American River-Wabena Creek	HY*	12.58	12.58	12.58	12.58	12.58	12.58	12.58	8,418.88	4	1	4	1	4	1	4	1	4	1	4	1	4	1	1,354.90	2.81	2.81	2.81	2.81	2.81	2.81	2.81
18020128050105	North Fork American River-Wabena Creek	IY	4.45	4.45	4.45	4.45	4.45	4.45	4.45	8,418.88	3	0	3	0	3	0	3	0	3	0	3	0	3	0	1,354.90	1.02	1.02	1.02	1.02	1.02	1.02	1.02
18020128050105	North Fork American River-Wabena Creek	LY*	3.91	0.00	0.00	0.00	0.00	0.00	0.00	8,418.88	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1,354.90	1.33	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		33.22	33.23	33.22	33.23	33.23	33.23	33.22	8418.88	19	3	19	3	19	3	19	3	19	3	19	3	19	3	1354.90	7.75	7.75	7.75	7.75	7.75	7.75	7.75
	*** Value Per SqMi All =**		**2.53**	**2.53**	**2.53**	**2.53**	**2.53**	**2.53**	**2.53**	**13.15**	**1.4**	**0.2**	**1.4**	**0.2**	**1.4**	**0.2**	**1.4**	**0.2**	**1.4**	**0.2**	**1.4**	**0.2**	**1.4**	**0.2**	**2.12**	**3.66**	**3.66**	**3.66**	**3.66**	**3.66**	**3.66**	**3.66**
	*** Sum Open-Motorized, Native Surface Routes =**		22.63	18.74	18.72	18.74	18.74	18.74	18.72		7	1	4	1	4	1	4	1	4	1	4	1	4	1		4.56	3.25	3.23	3.25	3.25	3.25	3.23
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.72**	**1.42**	**1.42**	**1.42**	**1.42**	**1.42**	**1.42**	**13.15**	**0.5**	**0.1**	**0.3**	**0.1**	**0.3**	**0.1**	**0.3**	**0.1**	**0.3**	**0.1**	**0.3**	**0.1**	**0.3**	**0.1**	**2.12**	**2.15**	**1.54**	**1.53**	**1.54**	**1.54**	**1.54**	**1.53**
18020128050201	North Fork American River-Wildcat Canyon	BS*	0.00	0.00	0.00	1.73	1.73	1.73	0.00	6,482.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,047.07	0.00	0.00	0.00	0.07	0.07	0.07	0.00
18020128050201	North Fork American River-Wildcat Canyon	BY*	1.73	1.73	1.73	0.00	0.00	0.00	1.73	6,482.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,047.07	0.07	0.07	0.07	0.00	0.00	0.00	0.07
18020128050201	North Fork American River-Wildcat Canyon	GY	0.93	0.93	0.93	0.93	0.93	0.93	0.93	6,482.59	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,047.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050201	North Fork American River-Wildcat Canyon	HY*	1.31	1.31	1.31	1.31	1.31	1.31	1.31	6,482.59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,047.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		3.96	3.96	3.96	3.96	3.96	3.96	3.96	6482.59	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1047.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07
	*** Value Per SqMi All =**		**0.39**	**0.39**	**0.39**	**0.39**	**0.39**	**0.39**	**0.39**	**10.13**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**0.1**	**0.0**	**1.64**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**
	*** Sum Open-Motorized, Native Surface Routes =**		3.04	3.04	3.04	3.04	3.04	3.04	3.04		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.07	0.07	0.07	0.07	0.07	0.07	0.07
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	**0.30**	**10.13**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**1.64**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**	**0.04**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020128050202	North Fork American River-Sailor Canyon	BS*	0.00	0.00	0.00	2.92	2.92	2.92	0.00	7330.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1582.83	0	0	0	0.25	0.25	0.25	0
18020128050202	North Fork American River-Sailor Canyon	BY*	2.92	2.92	2.92	0.00	0.00	0.00	2.92	7330.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1582.83	0.25	0.25	0.25	0	0	0	0.25
18020128050202	North Fork American River-Sailor Canyon	CS*	0.00	0.00	0.00	0.05	2.54	0.58	0.00	7330.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1582.83	0	0	0	0	0.17	0	0
18020128050202	North Fork American River-Sailor Canyon	CY*	0.00	0.58	0.00	0.00	0.00	0.00	0.53	7330.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1582.83	0	0	0	0	0	0	0
18020128050202	North Fork American River-Sailor Canyon	FY	0.00	4.67	5.25	5.20	2.71	4.67	4.72	7330.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1582.83	0	0.41	0.41	0.41	0.25	0.41	0.41
18020128050202	North Fork American River-Sailor Canyon	GY	1.46	1.46	1.46	1.46	1.46	1.46	1.46	7330.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1582.83	0	0	0	0	0	0	0
18020128050202	North Fork American River-Sailor Canyon	IY	5.47	5.47	5.47	5.47	5.47	5.47	5.47	7330.41	4	2	4	2	4	2	4	2	4	2	4	2	4	2	1582.83	3.38	3.38	3.38	3.38	3.38	3.38	3.38
18020128050202	North Fork American River-Sailor Canyon	LY*	5.25	0.00	0.00	0.00	0.00	0.00	0.00	7330.41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1582.83	0.41	0	0	0	0	0	0
	Sum All =		15.10	15.10	15.10	15.10	15.10	15.10	15.10	7330.41	4	2	4	2	4	2	4	2	4	2	4	2	4	2	1582.83	4.04	4.04	4.04	4.04	4.05	4.04	4.04
	*** Value Per SqMi All =**		**1.32**	**1.32**	**1.32**	**1.32**	**1.32**	**1.32**	**1.32**	**11.45**	**0.3**	**0.2**	**0.3**	**0.2**	**0.3**	**0.2**	**0.3**	**0.2**	**0.3**	**0.2**	**0.3**	**0.2**	**0.3**	**0.2**	**2.47**	**1.63**	**1.63**	**1.63**	**1.63**	**1.64**	**1.63**	**1.63**
	*** Sum Open-Motorized, Native Surface Routes =**		8.17	3.49	2.92	2.96	5.46	3.49	3.44		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.66	0.25	0.25	0.25	0.42	0.25	0.25
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.71**	**0.30**	**0.25**	**0.26**	**0.48**	**0.30**	**0.30**	**11.45**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.47**	**0.27**	**0.10**	**0.10**	**0.10**	**0.17**	**0.10**	**0.10**
18020128050203	Upper Big Granite Creek	CS*	0.00	0.00	0.00	0.23	0.23	0.23	0.00	7,138.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,626.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050203	Upper Big Granite Creek	CY*	0.23	0.23	0.23	0.00	0.00	0.00	0.23	7,138.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,626.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050203	Upper Big Granite Creek	FY	0.00	0.92	0.92	0.92	0.92	0.92	0.92	7,138.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,626.24	0.00	0.05	0.05	0.05	0.05	0.05	0.05
18020128050203	Upper Big Granite Creek	GY	3.84	3.84	3.84	3.84	3.84	3.84	3.84	7,138.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,626.24	1.81	1.81	1.81	1.81	1.81	1.81	1.81
18020128050203	Upper Big Granite Creek	HY*	3.32	3.32	3.32	3.32	3.32	3.32	3.32	7,138.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,626.24	2.03	2.03	2.03	2.03	2.03	2.03	2.03
18020128050203	Upper Big Granite Creek	LY*	0.92	0.00	0.00	0.00	0.00	0.00	0.00	7,138.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,626.24	0.05	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		8.31	8.31	8.31	8.31	8.31	8.31	8.31	7138.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1626.24	3.89	3.89	3.89	3.89	3.89	3.89	3.89
	*** Value Per SqMi All =**		**0.74**	**0.74**	**0.74**	**0.74**	**0.74**	**0.74**	**0.74**	**11.15**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.54**	**1.53**	**1.53**	**1.53**	**1.53**	**1.53**	**1.53**	**1.53**
	*** Sum Open-Motorized, Native Surface Routes =**		4.47	3.55	3.55	3.55	3.55	3.55	3.55		0	0	0	0	0	0	0	0	0	0	0	0	0	0		2.08	2.03	2.03	2.03	2.03	2.03	2.03
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.40**	**0.32**	**0.32**	**0.32**	**0.32**	**0.32**	**0.32**	**11.15**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.54**	**0.82**	**0.80**	**0.80**	**0.80**	**0.80**	**0.80**	**0.80**
18020128050204	North Fork American River-Lower Big Granite Creek	BS*	0.00	0.00	0.00	2.34	2.34	2.34	0.00	6,199.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,391.52	0.00	0.00	0.00	0.14	0.14	0.14	0.00
18020128050204	North Fork American River-Lower Big Granite Creek	BY*	2.34	2.34	2.34	0.00	0.00	0.00	2.34	6,199.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,391.52	0.14	0.14	0.14	0.00	0.00	0.00	0.14
18020128050204	North Fork American River-Lower Big Granite Creek	CS*	0.00	0.00	0.00	0.00	0.50	0.00	0.00	6,199.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,391.52	0.00	0.00	0.00	0.00	0.39	0.00	0.00
18020128050204	North Fork American River-Lower Big Granite Creek	FY	0.00	0.89	0.89	0.89	0.60	0.89	0.89	6,199.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,391.52	0.00	0.24	0.24	0.24	0.00	0.24	0.24
18020128050204	North Fork American River-Lower Big Granite Creek	HY*	0.72	0.72	0.72	0.72	0.51	0.72	0.72	6,199.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,391.52	0.34	0.34	0.34	0.34	0.20	0.34	0.34
18020128050204	North Fork American River-Lower Big Granite Creek	IY	11.27	11.27	11.27	11.27	11.27	11.27	11.27	6,199.72	8	5	8	5	8	5	8	5	8	5	8	5	8	5	1,391.52	6.62	6.62	6.62	6.62	6.62	6.62	6.62
18020128050204	North Fork American River-Lower Big Granite Creek	LY*	0.89	0.00	0.00	0.00	0.00	0.00	0.00	6,199.72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,391.52	0.24	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		15.21	15.21	15.21	15.21	15.21	15.21	15.21	6199.72	8	5	8	5	8	5	8	5	8	5	8	5	8	5	1391.52	7.34	7.34	7.34	7.34	7.35	7.34	7.34
	*** Value Per SqMi All =**		**1.57**	**1.57**	**1.57**	**1.57**	**1.57**	**1.57**	**1.57**	**9.69**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**0.8**	**0.5**	**2.17**	**3.38**	**3.38**	**3.38**	**3.38**	**3.38**	**3.38**	**3.38**
	*** Sum Open-Motorized, Native Surface Routes =**		3.94	3.05	3.05	3.05	3.35	3.05	3.05		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.72	0.48	0.48	0.48	0.73	0.48	0.48
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.41**	**0.31**	**0.31**	**0.31**	**0.35**	**0.31**	**0.31**	**9.69**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.17**	**0.33**	**0.22**	**0.22**	**0.22**	**0.34**	**0.22**	**0.22**
18020128050205	Big Valley Canyon	AY	3.55	0.50	3.55	3.55	0.50	0.50	3.55	5,455.51	4	3	4	2	4	3	4	3	4	2	4	2	4	3	1,165.90	0.15	0.00	0.15	0.15	0.00	0.00	0.15
18020128050205	Big Valley Canyon	BS*	0.00	0.00	0.00	11.75	11.75	11.75	0.00	5,455.51	0	0	0	0	0	0	2	4	2	4	2	4	0	0	1,165.90	0.00	0.00	0.00	1.93	1.93	1.93	0.00
18020128050205	Big Valley Canyon	BY*	11.75	14.80	11.75	0.00	3.05	3.05	11.75	5,455.51	2	4	2	5	2	4	0	0	0	1	0	1	2	4	1,165.90	1.93	2.08	1.93	0.00	0.15	0.15	1.93
18020128050205	Big Valley Canyon	CS*	0.00	0.00	0.00	0.00	1.40	0.00	0.00	5,455.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,165.90	0.00	0.00	0.00	0.00	0.12	0.00	0.00
18020128050205	Big Valley Canyon	FY	0.00	3.91	3.91	3.91	2.98	3.91	3.91	5,455.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,165.90	0.00	0.18	0.18	0.18	0.18	0.18	0.18
18020128050205	Big Valley Canyon	HY*	2.36	2.36	2.36	2.36	1.90	2.36	2.36	5,455.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,165.90	0.63	0.63	0.63	0.63	0.51	0.63	0.63
18020128050205	Big Valley Canyon	IY	0.36	0.36	0.36	0.36	0.36	0.36	0.36	5,455.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,165.90	0.18	0.18	0.18	0.18	0.18	0.18	0.18
18020128050205	Big Valley Canyon	LY*	3.91	0.00	0.00	0.00	0.00	0.00	0.00	5,455.51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,165.90	0.18	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		21.94	21.94	21.94	21.94	21.94	21.94	21.94	5455.51	6	7	6	7	6	7	6	7	6	7	6	7	6	7	1165.90	3.07	3.07	3.07	3.07	3.07	3.07	3.07
	*** Value Per SqMi All =**		**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**2.57**	**8.52**	**0.7**	**0.8**	**0.7**	**0.8**	**0.7**	**0.8**	**0.7**	**0.8**	**0.7**	**0.8**	**0.7**	**0.8**	**0.7**	**0.8**	**1.82**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**	**1.69**
	*** Sum Open-Motorized, Native Surface Routes =**		18.03	17.17	14.12	14.12	18.10	17.17	14.12		2	4	2	5	2	4	2	4	2	5	2	5	2	4		2.74	2.71	2.56	2.56	2.71	2.71	2.56
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.12**	**2.01**	**1.66**	**1.66**	**2.12**	**2.01**	**1.66**	**8.52**	**0.2**	**0.5**	**0.2**	**0.6**	**0.2**	**0.5**	**0.2**	**0.5**	**0.2**	**0.6**	**0.2**	**0.6**	**0.2**	**0.5**	**1.82**	**1.50**	**1.49**	**1.41**	**1.41**	**1.49**	**1.49**	**1.41**
18020128050301	North Fork American River-Tadpole Creek	AY	1.64	1.41	1.64	1.64	1.41	1.41	1.64	9159.17	4	2	4	2	4	2	4	2	4	2	4	2	4	2	1544.52	0	0	0	0	0	0	0
18020128050301	North Fork American River-Tadpole Creek	BS*	0.00	0.00	0.00	6.57	6.79	6.79	0.00	9159.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1544.52	0	0	0	1.04	1.04	1.04	0
18020128050301	North Fork American River-Tadpole Creek	BY*	6.57	6.79	6.57	0.00	0.00	0.00	6.57	9159.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1544.52	1.04	1.04	1.04	0	0	0	1.04
18020128050301	North Fork American River-Tadpole Creek	CS*	0.00	0.00	0.00	0.00	0.25	0.25	0.00	9159.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1544.52	0	0	0	0	0	0	0
18020128050301	North Fork American River-Tadpole Creek	CY*	0.00	0.25	0.00	0.00	0.00	0.00	0.25	9159.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1544.52	0	0	0	0	0	0	0
18020128050301	North Fork American River-Tadpole Creek	FY	0.00	5.32	5.57	5.57	5.32	5.32	5.32	9159.17	0	0	0	1	0	1	0	1	0	1	0	1	0	1	1544.52	0	0.52	0.52	0.52	0.52	0.52	0.52
18020128050301	North Fork American River-Tadpole Creek	GY	1.73	1.73	1.73	1.73	1.73	1.73	1.73	9159.17	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1544.52	0.26	0.26	0.26	0.26	0.26	0.26	0.26
18020128050301	North Fork American River-Tadpole Creek	HY*	3.06	3.06	3.06	3.06	3.06	3.06	3.06	9159.17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1544.52	0.19	0.19	0.19	0.19	0.19	0.19	0.19
18020128050301	North Fork American River-Tadpole Creek	IY	11.08	11.08	11.08	11.08	11.08	11.08	11.08	9159.17	5	3	5	3	5	3	5	3	5	3	5	3	5	3	1544.52	3.59	3.59	3.59	3.59	3.59	3.59	3.59
18020128050301	North Fork American River-Tadpole Creek	LY*	5.57	0.00	0.00	0.00	0.00	0.00	0.00	9159.17	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1544.52	0.52	0	0	0	0	0	0
	Sum All =		29.65	29.65	29.65	29.65	29.65	29.65	29.65	9159.17	9	7	9	7	9	7	9	7	9	7	9	7	9	7	1544.52	5.60	5.60	5.60	5.60	5.60	5.60	5.60
	*** Value Per SqMi All =**		**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	**14.31**	**0.6**	**0.5**	**0.6**	**0.5**	**0.6**	**0.5**	**0.6**	**0.5**	**0.6**	**0.5**	**0.6**	**0.5**	**0.6**	**0.5**	**2.41**	**2.32**	**2.32**	**2.32**	**2.32**	**2.32**	**2.32**	**2.32**
	*** Sum Open-Motorized, Native Surface Routes =**		15.20	10.11	9.63	9.63	10.11	10.11	9.88		0	1	0	0	0	0	0	0	0	0	0	0	0	0		1.75	1.23	1.23	1.23	1.23	1.23	1.23
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**1.06**	**0.71**	**0.67**	**0.67**	**0.71**	**0.71**	**0.69**	**14.31**	**0.0**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.41**	**0.73**	**0.51**	**0.51**	**0.51**	**0.51**	**0.51**	**0.51**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020128050302	Humbug Canyon	BS*	0.03	0.23	0.23	15.92	15.92	15.92	0.03	6100.19	0	2	0	3	0	3	3	3	3	3	3	3	0	2	1132.47	0	0.06	0.06	1.03	1.03	1.03	0
18020128050302	Humbug Canyon	BY*	15.89	15.69	15.69	0.00	0.00	0.00	15.89	6100.19	3	1	3	0	3	0	0	0	0	0	0	0	3	1	1132.47	1.03	0.97	0.97	0	0	0	1.03
18020128050302	Humbug Canyon	CS*	0.00	0.00	0.00	11.62	11.62	11.62	0.00	6100.19	0	0	0	0	0	0	5	1	5	1	5	1	0	0	1132.47	0	0	0	1.23	1.23	1.23	0
18020128050302	Humbug Canyon	CY*	10.75	11.62	10.75	0.00	0.00	0.00	11.57	6100.19	5	1	5	1	5	1	0	0	0	0	0	0	5	1	1132.47	1.23	1.23	1.23	0	0	0	1.23
18020128050302	Humbug Canyon	ES*	0.00	0.00	0.00	0.73	0.73	0.73	0.00	6100.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1132.47	0	0	0	0	0	0	0
18020128050302	Humbug Canyon	EY*	0.29	0.73	0.29	0.00	0.00	0.00	0.73	6100.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1132.47	0	0	0	0	0	0	0
18020128050302	Humbug Canyon	FY	0.00	4.77	6.06	4.77	4.77	4.77	4.82	6100.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1132.47	0	0.66	0.66	0.66	0.66	0.66	0.66
18020128050302	Humbug Canyon	GY	2.12	2.12	2.12	2.12	2.12	2.12	2.12	6100.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1132.47	0	0	0	0	0	0	0
18020128050302	Humbug Canyon	HY*	3.69	3.66	3.69	3.66	3.66	3.66	3.66	6100.19	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1132.47	0.05	0.05	0.05	0.05	0.05	0.05	0.05
18020128050302	Humbug Canyon	IY	0.17	0.17	0.17	0.17	0.17	0.17	0.17	6100.19	2	0	2	0	2	0	2	0	2	0	2	0	2	0	1132.47	0.08	0.08	0.08	0.08	0.08	0.08	0.08
18020128050302	Humbug Canyon	LS*	0.79	0.00	0.00	0.00	0.00	0.00	0.00	6100.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1132.47	0.34	0	0	0	0	0	0
18020128050302	Humbug Canyon	LY*	5.27	0.00	0.00	0.00	0.00	0.00	0.00	6100.19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1132.47	0.32	0	0	0	0	0	0
	Sum All =		38.99	38.99	38.99	38.99	38.99	38.99	38.99	6100.19	11	4	11	4	11	4	11	4	11	4	11	4	11	4	1132.47	3.05	3.05	3.05	3.05	3.05	3.05	3.05
	*** Value Per SqMi All =**		**4.09**	**4.09**	**4.09**	**4.09**	**4.09**	**4.09**	**4.09**	**9.53**	**1.2**	**0.4**	**1.2**	**0.4**	**1.2**	**0.4**	**1.2**	**0.4**	**1.2**	**0.4**	**1.2**	**0.4**	**1.2**	**0.4**	**1.77**	**1.72**	**1.72**	**1.72**	**1.72**	**1.72**	**1.72**	**1.72**
	*** Sum Open-Motorized, Native Surface Routes =**		36.70	31.93	30.64	31.93	31.93	31.93	31.89		9	4	9	4	9	4	9	4	9	4	9	4	9	4		2.97	2.31	2.31	2.31	2.31	2.31	2.31
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.85**	**3.35**	**3.22**	**3.35**	**3.35**	**3.35**	**3.35**	**9.53**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**1.77**	**1.68**	**1.31**	**1.31**	**1.31**	**1.31**	**1.31**	**1.31**
18020128050303	North Fork American River-Humbug Bar	AY	0.08	0.00	0.08	0.08	0.00	0.00	0.08	8,053.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,625.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050303	North Fork American River-Humbug Bar	BS*	1.56	1.56	1.56	3.11	3.19	3.19	1.56	8,053.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,625.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050303	North Fork American River-Humbug Bar	BY*	1.55	1.63	1.55	0.00	0.00	0.00	1.55	8,053.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,625.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050303	North Fork American River-Humbug Bar	CS*	0.00	0.00	0.00	0.00	0.03	0.00	0.00	8,053.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,625.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050303	North Fork American River-Humbug Bar	FY	0.00	1.32	1.32	1.32	1.29	1.32	1.32	8,053.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,625.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050303	North Fork American River-Humbug Bar	HY*	0.17	0.17	0.17	0.17	0.17	0.17	0.17	8,053.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,625.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050303	North Fork American River-Humbug Bar	IY	5.21	5.21	5.21	5.21	5.21	5.21	5.21	8,053.30	5	0	5	0	5	0	5	0	5	0	5	0	5	0	1,625.80	2.96	2.96	2.96	2.96	2.96	2.96	2.96
18020128050303	North Fork American River-Humbug Bar	LS*	1.02	0.00	0.00	0.00	0.00	0.00	0.00	8,053.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,625.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050303	North Fork American River-Humbug Bar	LY*	0.31	0.00	0.00	0.00	0.00	0.00	0.00	8,053.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,625.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		9.90	9.90	9.90	9.90	9.90	9.90	9.90	8053.30	5	0	5	0	5	0	5	0	5	0	5	0	5	0	1625.80	2.96	2.96	2.96	2.96	2.96	2.96	2.96
	*** Value Per SqMi All =**		**0.79**	**0.79**	**0.79**	**0.79**	**0.79**	**0.79**	**0.79**	**12.58**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**0.4**	**0.0**	**2.54**	**1.17**	**1.17**	**1.17**	**1.17**	**1.17**	**1.17**	**1.17**
	*** Sum Open-Motorized, Native Surface Routes =**		4.60	3.36	3.28	3.28	3.36	3.36	3.28		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.37**	**0.27**	**0.26**	**0.26**	**0.27**	**0.27**	**0.26**	**12.58**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**2.54**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
18020128050401	Headwaters North Fork of North Fork American River	AY	8.02	2.28	8.02	8.02	2.28	5.32	8.02	9,351.12	5	4	4	2	5	4	5	4	4	2	4	3	5	4	2,033.30	2.88	0.26	2.88	2.88	0.26	1.88	2.88
18020128050401	Headwaters North Fork of North Fork American River	BS*	0.00	0.00	0.00	11.04	11.04	11.04	0.00	9,351.12	0	0	0	0	0	0	1	5	1	5	1	5	0	0	2,033.30	0.00	0.00	0.00	2.68	2.68	2.68	0.00
18020128050401	Headwaters North Fork of North Fork American River	BY*	11.04	16.78	11.04	0.00	5.74	2.70	11.04	9,351.12	1	5	2	7	1	5	0	0	1	2	1	1	1	5	2,033.30	2.68	5.29	2.68	0.00	2.61	1.00	2.68
18020128050401	Headwaters North Fork of North Fork American River	CS*	0.00	0.00	0.00	0.12	1.62	0.12	0.00	9,351.12	0	0	0	0	0	0	0	1	1	1	0	1	0	0	2,033.30	0.00	0.00	0.00	0.01	0.28	0.01	0.00
18020128050401	Headwaters North Fork of North Fork American River	CY*	0.12	0.12	0.12	0.00	0.00	0.00	0.12	9,351.12	0	1	0	1	0	1	0	0	0	0	0	0	0	1	2,033.30	0.01	0.01	0.01	0.00	0.00	0.00	0.01
18020128050401	Headwaters North Fork of North Fork American River	FY	0.00	7.40	7.40	7.40	6.42	7.40	7.40	9,351.12	0	0	3	3	3	3	3	3	2	3	3	3	3	3	2,033.30	0.00	1.36	1.36	1.36	1.32	1.36	1.36
18020128050401	Headwaters North Fork of North Fork American River	GY	4.58	4.58	4.58	4.58	4.58	4.58	4.58	9,351.12	4	3	4	3	4	3	4	3	4	3	4	3	4	3	2,033.30	2.64	2.64	2.64	2.64	2.64	2.64	2.64
18020128050401	Headwaters North Fork of North Fork American River	HY*	20.08	20.08	20.08	20.08	19.56	20.08	20.08	9,351.12	11	1	11	1	11	1	11	1	11	1	11	1	11	1	2,033.30	5.75	5.75	5.75	5.75	5.52	5.75	5.75
18020128050401	Headwaters North Fork of North Fork American River	IY	1.57	1.57	1.57	1.57	1.57	1.57	1.57	9,351.12	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2,033.30	0.71	0.71	0.71	0.71	0.71	0.71	0.71
18020128050401	Headwaters North Fork of North Fork American River	KY	0.37	0.37	0.37	0.37	0.37	0.37	0.37	9,351.12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,033.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050401	Headwaters North Fork of North Fork American River	LY*	7.40	0.00	0.00	0.00	0.00	0.00	0.00	9,351.12	3	3	0	0	0	0	0	0	0	0	0	0	0	0	2,033.30	1.36	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		53.18	53.18	53.18	53.18	53.18	53.18	53.18	9351.12	25	18	25	18	25	18	25	18	25	18	25	18	25	18	2033.30	16.03	16.02	16.03	16.03	16.02	16.03	16.03
	*** Value Per SqMi All =**		**3.64**	**3.64**	**3.64**	**3.64**	**3.64**	**3.64**	**3.64**	**14.61**	**1.7**	**1.2**	**1.7**	**1.2**	**1.7**	**1.2**	**1.7**	**1.2**	**1.7**	**1.2**	**1.7**	**1.2**	**1.7**	**1.2**	**3.18**	**5.05**	**5.04**	**5.05**	**5.05**	**5.04**	**5.05**	**5.05**
	*** Sum Open-Motorized, Native Surface Routes =**		38.64	36.99	31.24	31.24	37.96	33.94	31.24		15	10	13	9	12	7	12	7	14	9	13	8	12	7		9.80	11.05	8.44	8.44	11.09	9.44	8.44
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.64**	**2.53**	**2.14**	**2.14**	**2.60**	**2.32**	**2.14**	**14.61**	**1.0**	**0.7**	**0.9**	**0.6**	**0.8**	**0.5**	**0.8**	**0.5**	**1.0**	**0.6**	**0.9**	**0.5**	**0.8**	**0.5**	**3.18**	**3.08**	**3.48**	**2.66**	**2.66**	**3.49**	**2.97**	**2.66**
18020128050402	Upper East Fork North Fork of North Fork American River	AY	9.13	3.17	9.13	9.13	3.17	3.17	9.13	6,650.82	8	5	4	2	8	5	8	5	4	2	4	2	8	5	1,598.11	1.68	0.39	1.68	1.68	0.39	0.39	1.68
18020128050402	Upper East Fork North Fork of North Fork American River	BS*	0.00	0.00	0.00	10.39	10.76	10.76	0.00	6,650.82	0	0	0	0	0	0	2	0	3	0	3	0	0	0	1,598.11	0.00	0.00	0.00	1.95	1.95	1.95	0.00
18020128050402	Upper East Fork North Fork of North Fork American River	BY*	10.39	16.34	10.39	0.00	5.58	5.58	10.39	6,650.82	2	0	6	3	2	0	0	0	3	3	3	3	2	0	1,598.11	1.95	3.23	1.95	0.00	1.29	1.29	1.95
18020128050402	Upper East Fork North Fork of North Fork American River	CS*	0.00	0.00	0.00	1.66	4.69	1.66	0.00	6,650.82	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1,598.11	0.00	0.00	0.00	0.71	1.37	0.71	0.00
18020128050402	Upper East Fork North Fork of North Fork American River	CY*	1.66	1.66	1.66	0.00	0.00	0.00	1.66	6,650.82	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1,598.11	0.71	0.71	0.71	0.00	0.00	0.00	0.71
18020128050402	Upper East Fork North Fork of North Fork American River	FY	0.00	17.14	17.14	17.14	14.12	17.14	17.14	6,650.82	0	0	8	2	8	2	8	2	8	2	8	2	8	2	1,598.11	0.00	3.56	3.56	3.56	2.90	3.56	3.56
18020128050402	Upper East Fork North Fork of North Fork American River	HY*	3.46	3.46	3.46	3.46	3.46	3.46	3.46	6,650.82	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,598.11	0.75	0.75	0.75	0.75	0.75	0.75	0.75
18020128050402	Upper East Fork North Fork of North Fork American River	IY	2.72	2.72	2.72	2.72	2.72	2.72	2.72	6,650.82	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1,598.11	1.13	1.13	1.13	1.13	1.13	1.13	1.13
18020128050402	Upper East Fork North Fork of North Fork American River	KY	0.30	0.30	0.30	0.30	0.30	0.30	0.30	6,650.82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,598.11	0.08	0.08	0.08	0.08	0.08	0.08	0.08
18020128050402	Upper East Fork North Fork of North Fork American River	LY*	17.14	0.00	0.00	0.00	0.00	0.00	0.00	6,650.82	8	2	0	0	0	0	0	0	0	0	0	0	0	0	1,598.11	3.56	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		44.80	44.80	44.80	44.80	44.80	44.80	44.80	6650.82	21	10	21	10	21	10	21	10	21	10	21	10	21	10	1598.11	9.86	9.85	9.86	9.86	9.86	9.86	9.86
	*** Value Per SqMi All =**		**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**4.31**	**10.39**	**2.0**	**1.0**	**2.0**	**1.0**	**2.0**	**1.0**	**2.0**	**1.0**	**2.0**	**1.0**	**2.0**	**1.0**	**2.0**	**1.0**	**2.50**	**3.95**	**3.94**	**3.95**	**3.95**	**3.95**	**3.95**	**3.95**
	*** Sum Open-Motorized, Native Surface Routes =**		32.66	21.47	15.51	15.51	24.50	21.47	15.51		11	3	7	4	3	1	3	1	7	4	7	4	3	1		6.97	4.69	3.41	3.41	5.36	4.70	3.41
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.14**	**2.07**	**1.49**	**1.49**	**2.36**	**2.07**	**1.49**	**10.39**	**1.1**	**0.3**	**0.7**	**0.4**	**0.3**	**0.1**	**0.3**	**0.1**	**0.7**	**0.4**	**0.7**	**0.4**	**0.3**	**0.1**	**2.50**	**2.79**	**1.88**	**1.37**	**1.37**	**2.15**	**1.88**	**1.37**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020128050403	Lower East Fork North Fork of North Fork American River	AY	9.28	2.05	9.28	9.28	2.05	2.05	9.28	5,044.10	6	4	4	2	6	4	6	4	4	2	4	2	6	4	1,063.48	2.13	1.07	2.13	2.13	1.07	1.07	2.13
18020128050403	Lower East Fork North Fork of North Fork American River	BS*	0.00	0.00	0.00	10.31	16.72	16.72	0.00	5,044.10	0	0	0	0	0	0	0	2	1	2	1	2	0	0	1,063.48	0.00	0.00	0.00	1.33	2.23	2.23	0.00
18020128050403	Lower East Fork North Fork of North Fork American River	BY*	10.31	17.55	10.31	0.00	0.83	0.83	10.31	5,044.10	0	2	2	4	0	2	0	0	1	2	1	2	0	2	1,063.48	1.33	2.39	1.33	0.00	0.16	0.16	1.33
18020128050403	Lower East Fork North Fork of North Fork American River	CS*	0.00	0.00	0.00	0.69	1.65	0.69	0.00	5,044.10	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1,063.48	0.00	0.00	0.00	0.18	0.36	0.18	0.00
18020128050403	Lower East Fork North Fork of North Fork American River	CY*	0.69	0.69	0.69	0.00	0.00	0.00	0.69	5,044.10	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1,063.48	0.18	0.18	0.18	0.00	0.00	0.00	0.18
18020128050403	Lower East Fork North Fork of North Fork American River	FY	0.00	7.50	7.50	7.50	6.54	7.50	7.50	5,044.10	0	0	1	2	1	2	1	2	1	2	1	2	1	2	1,063.48	0.00	1.30	1.30	1.30	1.11	1.30	1.30
18020128050403	Lower East Fork North Fork of North Fork American River	GY	0.08	0.08	0.08	0.08	0.08	0.08	0.08	5,044.10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,063.48	0.04	0.04	0.04	0.04	0.04	0.04	0.04
18020128050403	Lower East Fork North Fork of North Fork American River	HY*	2.13	2.13	2.13	2.13	2.13	2.13	2.13	5,044.10	3	1	3	1	3	1	3	1	3	1	3	1	3	1	1,063.48	0.85	0.85	0.85	0.85	0.85	0.85	0.85
18020128050403	Lower East Fork North Fork of North Fork American River	KY	1.76	1.76	1.76	1.76	1.76	1.76	1.76	5,044.10	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,063.48	0.22	0.22	0.22	0.22	0.22	0.22	0.22
18020128050403	Lower East Fork North Fork of North Fork American River	LY*	7.50	0.00	0.00	0.00	0.00	0.00	0.00	5,044.10	1	2	0	0	0	0	0	0	0	0	0	0	0	0	1,063.48	1.30	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		31.76	31.76	31.76	31.76	31.76	31.76	31.76	5044.10	10	11	10	11	10	11	10	11	10	11	10	11	10	11	1063.48	6.05	6.05	6.05	6.05	6.04	6.05	6.05
	*** Value Per SqMi All =**		**4.03**	**4.03**	**4.03**	**4.03**	**4.03**	**4.03**	**4.03**	**7.88**	**1.3**	**1.4**	**1.3**	**1.4**	**1.3**	**1.4**	**1.3**	**1.4**	**1.3**	**1.4**	**1.3**	**1.4**	**1.3**	**1.4**	**1.66**	**3.64**	**3.64**	**3.64**	**3.64**	**3.63**	**3.64**	**3.64**
	*** Sum Open-Motorized, Native Surface Routes =**		20.64	20.38	13.14	13.14	21.34	20.38	13.14		4	6	5	6	3	4	3	4	5	6	5	6	3	4		3.66	3.42	2.36	2.36	3.60	3.42	2.36
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.62**	**2.59**	**1.67**	**1.67**	**2.71**	**2.59**	**1.67**	**7.88**	**0.5**	**0.8**	**0.6**	**0.8**	**0.4**	**0.5**	**0.4**	**0.5**	**0.6**	**0.8**	**0.6**	**0.8**	**0.4**	**0.5**	**1.66**	**2.20**	**2.06**	**1.42**	**1.42**	**2.17**	**2.06**	**1.42**
18020128050404	Fulda Creek	AY	2.99	2.99	2.99	2.99	2.99	2.99	2.99	4,041.09	4	3	4	3	4	3	4	3	4	3	4	3	4	3	848.06	0.59	0.59	0.59	0.59	0.59	0.59	0.59
18020128050404	Fulda Creek	BS*	0.00	0.00	0.00	9.94	9.94	9.94	0.00	4,041.09	0	0	0	0	0	0	0	4	0	4	0	4	0	0	848.06	0.00	0.00	0.00	0.91	0.91	0.91	0.00
18020128050404	Fulda Creek	BY*	9.94	9.94	9.94	0.00	0.00	0.00	9.94	4,041.09	0	4	0	4	0	4	0	0	0	0	0	0	0	4	848.06	0.91	0.91	0.91	0.00	0.00	0.00	0.91
18020128050404	Fulda Creek	CS*	0.00	0.00	0.00	0.00	1.31	0.00	0.00	4,041.09	0	0	0	0	0	0	0	0	0	1	0	0	0	0	848.06	0.00	0.00	0.00	0.00	0.29	0.00	0.00
18020128050404	Fulda Creek	FY	0.00	3.84	3.84	3.84	3.74	3.84	3.84	4,041.09	0	0	1	1	1	1	1	1	1	1	1	1	1	1	848.06	0.00	1.21	1.21	1.21	1.21	1.21	1.21
18020128050404	Fulda Creek	GY	14.17	14.17	14.17	14.17	14.17	14.17	14.17	4,041.09	0	0	0	0	0	0	0	0	0	0	0	0	0	0	848.06	1.05	1.05	1.05	1.05	1.05	1.05	1.05
18020128050404	Fulda Creek	HY*	5.39	5.39	5.39	5.39	4.19	5.39	5.39	4,041.09	0	2	0	2	0	2	0	2	0	1	0	2	0	2	848.06	1.13	1.13	1.13	1.13	0.84	1.13	1.13
18020128050404	Fulda Creek	LY*	3.84	0.00	0.00	0.00	0.00	0.00	0.00	4,041.09	1	1	0	0	0	0	0	0	0	0	0	0	0	0	848.06	1.21	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		36.34	36.34	36.34	36.34	36.34	36.34	36.34	4041.09	5	10	5	10	5	10	5	10	5	10	5	10	5	10	848.06	4.89	4.89	4.89	4.89	4.89	4.89	4.89
	*** Value Per SqMi All =**		**5.76**	**5.76**	**5.76**	**5.76**	**5.76**	**5.76**	**5.76**	**6.31**	**0.8**	**1.6**	**0.8**	**1.6**	**0.8**	**1.6**	**0.8**	**1.6**	**0.8**	**1.6**	**0.8**	**1.6**	**0.8**	**1.6**	**1.33**	**3.69**	**3.69**	**3.69**	**3.69**	**3.69**	**3.69**	**3.69**
	*** Sum Open-Motorized, Native Surface Routes =**		19.18	15.34	15.34	15.34	15.44	15.34	15.34		1	7	0	6	0	6	0	6	0	6	0	6	0	6		3.25	2.04	2.04	2.04	2.04	2.04	2.04
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.04**	**2.43**	**2.43**	**2.43**	**2.45**	**2.43**	**2.43**	**6.31**	**0.2**	**1.1**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**0.0**	**1.0**	**1.33**	**2.45**	**1.54**	**1.54**	**1.54**	**1.54**	**1.54**	**1.54**
18020128050405	North Fork of North Fork American River-Blue Canyon	BS*	1.26	1.26	1.26	2.25	2.25	2.25	1.26	4,358.91	0	2	0	2	0	2	0	2	0	2	0	2	0	2	1,542.07	0.14	0.14	0.14	0.14	0.14	0.14	0.14
18020128050405	North Fork of North Fork American River-Blue Canyon	BY*	0.99	0.99	0.99	0.00	0.00	0.00	0.99	4,358.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,542.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050405	North Fork of North Fork American River-Blue Canyon	FY	0.00	3.17	3.17	3.17	3.17	3.17	3.17	4,358.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,542.07	0.00	0.07	0.07	0.07	0.07	0.07	0.07
18020128050405	North Fork of North Fork American River-Blue Canyon	GY	4.98	4.98	4.98	4.98	4.98	4.98	4.98	4,358.91	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,542.07	1.00	1.00	1.00	1.00	1.00	1.00	1.00
18020128050405	North Fork of North Fork American River-Blue Canyon	HY*	13.71	13.71	13.71	13.71	13.71	13.71	13.71	4,358.91	5	1	5	1	5	1	5	1	5	1	5	1	5	1	1,542.07	2.35	2.35	2.35	2.35	2.35	2.35	2.35
18020128050405	North Fork of North Fork American River-Blue Canyon	LS*	0.05	0.00	0.00	0.00	0.00	0.00	0.00	4,358.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,542.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050405	North Fork of North Fork American River-Blue Canyon	LY*	3.11	0.00	0.00	0.00	0.00	0.00	0.00	4,358.91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,542.07	0.07	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		24.11	24.11	24.11	24.11	24.11	24.11	24.11	4358.91	6	3	6	3	6	3	6	3	6	3	6	3	6	3	1542.07	3.56	3.56	3.56	3.56	3.56	3.56	3.56
	*** Value Per SqMi All =**		**3.54**	**3.54**	**3.54**	**3.54**	**3.54**	**3.54**	**3.54**	**6.81**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**0.9**	**0.4**	**2.41**	**1.48**	**1.48**	**1.48**	**1.48**	**1.48**	**1.48**	**1.48**
	*** Sum Open-Motorized, Native Surface Routes =**		19.13	15.97	15.97	15.97	15.97	15.97	15.97		5	3	5	3	5	3	5	3	5	3	5	3	5	3		2.56	2.49	2.49	2.49	2.49	2.49	2.49
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.81**	**2.34**	**2.34**	**2.34**	**2.34**	**2.34**	**2.34**	**6.81**	**0.7**	**0.4**	**0.7**	**0.4**	**0.7**	**0.4**	**0.7**	**0.4**	**0.7**	**0.4**	**0.7**	**0.4**	**0.7**	**0.4**	**2.41**	**1.06**	**1.03**	**1.03**	**1.03**	**1.03**	**1.03**	**1.03**
18020128050501	North Fork American River-Giant Gap Gulch	AY	0.15	0.15	0.15	0.15	0.15	0.15	0.15	3,953.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,186.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050501	North Fork American River-Giant Gap Gulch	BS*	3.46	3.46	3.46	3.46	3.46	3.46	3.38	3,953.95	0	3	0	3	0	3	0	3	0	3	0	3	0	3	1,186.13	0.54	0.54	0.54	0.54	0.54	0.54	0.54
18020128050501	North Fork American River-Giant Gap Gulch	BY*	0.00	0.00	0.00	0.00	0.00	0.00	0.08	3,953.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,186.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050501	North Fork American River-Giant Gap Gulch	CS*	0.00	0.00	0.00	0.00	0.32	0.00	0.00	3,953.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,186.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050501	North Fork American River-Giant Gap Gulch	FY	0.00	7.02	7.02	7.02	6.70	7.02	7.02	3,953.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,186.13	0.00	0.81	0.81	0.81	0.81	0.81	0.81
18020128050501	North Fork American River-Giant Gap Gulch	GY	2.10	2.10	2.10	2.10	2.10	2.10	2.10	3,953.95	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1,186.13	0.20	0.20	0.20	0.20	0.20	0.20	0.20
18020128050501	North Fork American River-Giant Gap Gulch	HY*	3.15	3.15	3.15	3.15	3.15	3.15	3.15	3,953.95	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1,186.13	0.39	0.39	0.39	0.39	0.39	0.39	0.39
18020128050501	North Fork American River-Giant Gap Gulch	IY	3.64	3.64	3.64	3.64	3.64	3.64	3.64	3,953.95	3	0	3	0	3	0	3	0	3	0	3	0	3	0	1,186.13	0.55	0.55	0.55	0.55	0.55	0.55	0.55
18020128050501	North Fork American River-Giant Gap Gulch	LS*	6.99	0.00	0.00	0.00	0.00	0.00	0.00	3,953.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,186.13	0.81	0.00	0.00	0.00	0.00	0.00	0.00
18020128050501	North Fork American River-Giant Gap Gulch	LY*	0.03	0.00	0.00	0.00	0.00	0.00	0.00	3,953.95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,186.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		19.53	19.53	19.53	19.53	19.53	19.53	19.53	3953.95	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1186.13	2.49	2.49	2.49	2.49	2.49	2.49	2.49
	*** Value Per SqMi All =**		**3.16**	**3.16**	**3.16**	**3.16**	**3.16**	**3.16**	**3.16**	**6.18**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**0.6**	**1.85**	**1.34**	**1.34**	**1.34**	**1.34**	**1.34**	**1.34**	**1.34**
	*** Sum Open-Motorized, Native Surface Routes =**		13.63	6.62	6.62	6.62	6.93	6.62	6.62		1	3	1	3	1	3	1	3	1	3	1	3	1	3		1.74	0.93	0.93	0.93	0.93	0.93	0.93
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**2.21**	**1.07**	**1.07**	**1.07**	**1.12**	**1.07**	**1.07**	**6.18**	**0.2**	**0.5**	**0.2**	**0.5**	**0.2**	**0.5**	**0.2**	**0.5**	**0.2**	**0.5**	**0.2**	**0.5**	**0.2**	**0.5**	**1.85**	**0.94**	**0.50**	**0.50**	**0.50**	**0.50**	**0.50**	**0.50**
18020128050502	Canyon Creek	FY	0.00	0.08	0.08	0.08	0.08	0.08	0.08	6.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050502	Canyon Creek	LS*	0.08	0.00	0.00	0.00	0.00	0.00	0.00	6.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		0.08	0.08	0.08	0.08	0.08	0.08	0.08	6.57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	43.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi All =**		**7.65**	**7.65**	**7.65**	**7.65**	**7.65**	**7.65**	**7.65**	**0.01**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.07**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	*** Sum Open-Motorized, Native Surface Routes =**		0.08	0.00	0.00	0.00	0.00	0.00	0.00		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**7.65**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.07**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary — **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
18020128050504	Indian Creek	BS*	1.34	1.34	1.34	1.95	1.95	1.95	1.34	442.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	179.99	0.47	0.47	0.47	0.47	0.47	0.47	0.47
18020128050504	Indian Creek	BY*	0.62	0.62	0.62	0.00	0.00	0.00	0.62	442.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	179.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050504	Indian Creek	FY	0.00	1.09	1.09	1.09	1.09	1.09	1.09	442.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	179.99	0.00	0.07	0.07	0.07	0.07	0.07	0.07
18020128050504	Indian Creek	GY	0.06	0.06	0.06	0.06	0.06	0.06	0.06	442.02	1	0	1	0	1	0	1	0	1	0	1	0	1	0	179.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050504	Indian Creek	LS*	0.31	0.00	0.00	0.00	0.00	0.00	0.00	442.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	179.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18020128050504	Indian Creek	LY*	0.79	0.00	0.00	0.00	0.00	0.00	0.00	442.02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	179.99	0.07	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		3.11	3.11	3.11	3.11	3.11	3.11	3.11	442.02	1	0	1	0	1	0	1	0	1	0	1	0	1	0	179.99	0.54	0.54	0.54	0.54	0.54	0.54	0.54
	*** Value Per SqMi All =**		**4.50**	**4.50**	**4.50**	**4.50**	**4.50**	**4.50**	**4.50**	**0.69**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**1.4**	**0.0**	**0.28**	**1.92**	**1.92**	**1.92**	**1.92**	**1.92**	**1.92**	**1.92**
	*** Sum Open-Motorized, Native Surface Routes =**		3.04	1.95	1.95	1.95	1.95	1.95	1.95		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.54	0.47	0.47	0.47	0.47	0.47	0.47
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**4.41**	**2.83**	**2.83**	**2.83**	**2.83**	**2.83**	**2.83**	**0.69**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.28**	**1.92**	**1.67**	**1.67**	**1.67**	**1.67**	**1.67**	**1.67**
18020128060101	Upper North Shirttail Canyon	AY	5.77	5.77	5.77	5.77	5.77	5.77	5.77	5902.47	4	3	4	3	4	3	4	3	4	3	4	3	4	3	1253.08	2.63	2.63	2.63	2.63	2.63	2.63	2.63
18020128060101	Upper North Shirttail Canyon	BS*	9.23	9.23	9.23	19.99	19.99	19.99	9.23	5902.47	1	4	1	4	1	4	3	5	3	5	3	5	1	4	1253.08	3.14	3.14	3.14	5.18	5.18	5.18	3.14
18020128060101	Upper North Shirttail Canyon	BY*	10.76	10.76	10.76	0.00	0.00	0.00	10.76	5902.47	2	1	2	1	2	1	0	0	0	0	0	0	2	1	1253.08	2.04	2.04	2.04	0	0	0	2.04
18020128060101	Upper North Shirttail Canyon	CS*	0.00	0.00	0.00	2.72	3.55	3.24	0.00	5902.47	0	0	0	0	0	0	2	0	2	0	2	0	0	0	1253.08	0	0	0	0.49	0.56	0.56	0
18020128060101	Upper North Shirttail Canyon	CY*	2.72	3.24	2.72	0.00	0.00	0.00	3.24	5902.47	2	0	2	0	2	0	0	0	0	0	0	0	2	0	1253.08	0.49	0.56	0.49	0	0	0	0.56
18020128060101	Upper North Shirttail Canyon	DS*	0.00	0.00	0.00	10.66	10.66	10.66	0.00	5902.47	0	0	0	0	0	0	5	0	5	0	5	0	0	0	1253.08	0	0	0	1.72	1.72	1.72	0
18020128060101	Upper North Shirttail Canyon	DY*	10.66	10.66	10.66	0.00	0.00	0.00	10.66	5902.47	5	0	5	0	5	0	0	0	0	0	0	0	5	0	1253.08	1.72	1.72	1.72	0	0	0	1.72
18020128060101	Upper North Shirttail Canyon	ES*	0.00	0.00	0.00	2.34	2.34	2.34	0.00	5902.47	0	0	0	0	0	0	2	1	2	1	2	1	0	0	1253.08	0	0	0	0.56	0.56	0.56	0
18020128060101	Upper North Shirttail Canyon	EY*	2.00	2.34	2.00	0.00	0.00	0.00	2.34	5902.47	2	1	2	1	2	1	0	0	0	0	0	0	2	1	1253.08	0.56	0.56	0.56	0	0	0	0.56
18020128060101	Upper North Shirttail Canyon	FY	0.00	12.57	13.43	13.09	12.26	12.57	12.57	5902.47	0	0	5	4	5	4	5	4	5	4	5	4	5	4	1253.08	0	3.81	3.87	3.87	3.81	3.81	3.81
18020128060101	Upper North Shirttail Canyon	GY	1.75	1.75	1.75	1.75	1.75	1.75	1.75	5902.47	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1253.08	0.03	0.03	0.03	0.03	0.03	0.03	0.03
18020128060101	Upper North Shirttail Canyon	HY*	2.96	2.96	2.96	2.96	2.96	2.96	2.96	5902.47	2	1	2	1	2	1	2	1	2	1	2	1	2	1	1253.08	0.32	0.32	0.32	0.32	0.32	0.32	0.32
18020128060101	Upper North Shirttail Canyon	IY	4.02	4.02	4.02	4.02	4.02	4.02	4.02	5902.47	3	1	3	1	3	1	3	1	3	1	3	1	3	1	1253.08	3.9	3.9	3.9	3.9	3.9	3.9	3.9
18020128060101	Upper North Shirttail Canyon	LS*	4.97	0.00	0.00	0.00	0.00	0.00	0.00	5902.47	2	3	0	0	0	0	0	0	0	0	0	0	0	0	1253.08	1.66	0	0	0	0	0	0
18020128060101	Upper North Shirttail Canyon	LY*	8.46	0.00	0.00	0.00	0.00	0.00	0.00	5902.47	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1253.08	2.22	0	0	0	0	0	0
	Sum All =		63.29	63.29	63.29	63.29	63.29	63.29	63.29	5902.47	27	15	27	15	27	15	27	15	27	15	27	15	27	15	1253.08	18.71	18.71	18.70	18.70	18.71	18.71	18.71
	*** Value Per SqMi All =**		**6.86**	**6.86**	**6.86**	**6.86**	**6.86**	**6.86**	**6.86**	**9.22**	**2.9**	**1.6**	**2.9**	**1.6**	**2.9**	**1.6**	**2.9**	**1.6**	**2.9**	**1.6**	**2.9**	**1.6**	**2.9**	**1.6**	**1.96**	**9.56**	**9.56**	**9.55**	**9.55**	**9.56**	**9.56**	**9.56**
	*** Sum Open-Motorized, Native Surface Routes =**		51.75	39.18	38.32	38.66	39.49	39.18	39.18		19	11	14	7	14	7	14	7	14	7	14	7	14	7		12.15	8.34	8.27	8.27	8.34	8.34	8.34
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**5.61**	**4.25**	**4.16**	**4.19**	**4.28**	**4.25**	**4.25**	**9.22**	**2.1**	**1.2**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**1.5**	**0.8**	**1.96**	**6.21**	**4.26**	**4.22**	**4.22**	**4.26**	**4.26**	**4.26**
18020128060102	Lower North Shirttail Canyon	AY	5.32	5.19	5.32	5.32	5.19	5.19	5.32	3756.11	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1016.91	1.01	0.98	1.01	1.01	0.98	0.98	1.01
18020128060102	Lower North Shirttail Canyon	BS*	0.00	0.00	0.00	10.60	10.60	10.60	0.00	3756.11	0	0	0	0	0	0	1	3	1	3	1	3	0	0	1016.91	0	0	0	3.36	3.36	3.36	0
18020128060102	Lower North Shirttail Canyon	BY*	10.60	10.73	10.60	0.00	0.13	0.13	10.60	3756.11	1	3	1	3	1	3	0	0	0	0	0	0	1	3	1016.91	3.36	3.39	3.36	0	0.03	0.03	3.36
18020128060102	Lower North Shirttail Canyon	CS*	0.00	0.00	0.00	0.00	0.41	0.00	0.00	3756.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1016.91	0	0	0	0	0	0	0
18020128060102	Lower North Shirttail Canyon	DS*	0.00	0.00	0.00	7.90	7.90	7.90	0.00	3756.11	0	0	0	0	0	0	1	4	1	4	1	4	0	0	1016.91	0	0	0	0.61	0.61	0.61	0
18020128060102	Lower North Shirttail Canyon	DY*	5.12	7.90	5.12	0.00	0.00	0.00	7.90	3756.11	1	3	1	4	1	3	0	0	0	0	0	0	1	4	1016.91	0.39	0.61	0.39	0	0	0	0.61
18020128060102	Lower North Shirttail Canyon	ES*	0.00	0.00	0.00	2.81	2.81	2.81	0.00	3756.11	0	0	0	0	0	0	4	1	4	1	4	1	0	0	1016.91	0	0	0	0.51	0.51	0.51	0
18020128060102	Lower North Shirttail Canyon	EY*	2.81	2.81	2.81	0.00	0.00	0.00	2.81	3756.11	4	1	4	1	4	1	0	0	0	0	0	0	4	1	1016.91	0.51	0.51	0.51	0	0	0	0.51
18020128060102	Lower North Shirttail Canyon	FY	0.00	14.75	17.52	14.75	14.42	14.75	14.75	3756.11	0	0	6	6	6	7	6	6	6	6	6	6	6	6	1016.91	0	2.56	2.79	2.56	2.56	2.56	2.56
18020128060102	Lower North Shirttail Canyon	GY	6.70	6.70	6.70	6.70	6.70	6.70	6.70	3756.11	4	2	4	2	4	2	4	2	4	2	4	2	4	2	1016.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
18020128060102	Lower North Shirttail Canyon	HY*	0.84	0.84	0.84	0.84	0.76	0.84	0.84	3756.11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1016.91	0.16	0.16	0.16	0.16	0.16	0.16	0.16
18020128060102	Lower North Shirttail Canyon	LY*	17.52	0.00	0.00	0.00	0.00	0.00	0.00	3756.11	6	7	0	0	0	0	0	0	0	0	0	0	0	0	1016.91	2.79	0	0	0	0	0	0
	Sum All =		48.91	48.91	48.91	48.91	48.91	48.91	48.91	3756.11	17	19	17	19	17	19	17	19	17	19	17	19	17	19	1016.91	9.13	9.12	9.13	9.12	9.12	9.12	9.12
	*** Value Per SqMi All =**		**8.33**	**8.33**	**8.33**	**8.33**	**8.33**	**8.33**	**8.33**	**5.87**	**2.9**	**3.2**	**2.9**	**3.2**	**2.9**	**3.2**	**2.9**	**3.2**	**2.9**	**3.2**	**2.9**	**3.2**	**2.9**	**3.2**	**1.59**	**5.75**	**5.74**	**5.75**	**5.74**	**5.74**	**5.74**	**5.74**
	*** Sum Open-Motorized, Native Surface Routes =**		36.90	22.27	19.38	22.15	22.61	22.27	22.15		12	14	6	8	6	7	6	8	6	8	6	8	6	8		7.21	4.67	4.42	4.64	4.67	4.67	4.64
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**6.29**	**3.80**	**3.30**	**3.77**	**3.85**	**3.80**	**3.77**	**5.87**	**2.0**	**2.4**	**1.0**	**1.4**	**1.0**	**1.2**	**1.0**	**1.4**	**1.0**	**1.4**	**1.0**	**1.4**	**1.0**	**1.4**	**1.59**	**4.54**	**2.94**	**2.78**	**2.92**	**2.94**	**2.94**	**2.92**
18020128060103	Upper Shirttail Canyon	AY	4.06	2.40	4.06	4.06	2.40	2.40	4.06	5965.45	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1607.97	0.16	0.09	0.16	0.16	0.09	0.09	0.16
18020128060103	Upper Shirttail Canyon	BS*	0.00	0.00	0.00	7.97	7.97	7.97	0.00	5965.45	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1607.97	0	0	0	1.51	1.51	1.51	0
18020128060103	Upper Shirttail Canyon	BY*	7.97	9.62	7.97	0.00	1.65	1.65	7.97	5965.45	1	0	1	0	1	0	0	0	0	0	0	0	1	0	1607.97	1.51	1.58	1.51	0	0.07	0.07	1.51
18020128060103	Upper Shirttail Canyon	DS*	0.00	0.00	0.00	1.00	1.00	1.00	0.00	5965.45	0	0	0	0	0	0	0	2	0	2	0	2	0	0	1607.97	0	0	0	0.16	0.16	0.16	0
18020128060103	Upper Shirttail Canyon	DY*	0.85	1.00	0.85	0.00	0.00	0.00	1.00	5965.45	0	2	0	2	0	2	0	0	0	0	0	0	0	2	1607.97	0.16	0.16	0.16	0	0	0	0.16
18020128060103	Upper Shirttail Canyon	ES*	0.00	0.00	0.00	11.23	11.23	11.23	0.00	5965.45	0	0	0	0	0	0	5	2	5	2	5	2	0	0	1607.97	0	0	0	2.75	2.75	2.75	0
18020128060103	Upper Shirttail Canyon	EY*	11.23	11.23	11.23	0.00	0.00	0.00	11.23	5965.45	5	2	5	2	5	2	0	0	0	0	0	0	5	2	1607.97	2.75	2.75	2.75	0	0	0	2.75
18020128060103	Upper Shirttail Canyon	FY	4.73	9.11	9.26	9.11	9.11	9.11	9.11	5965.45	1	0	3	0	3	0	3	0	3	0	3	0	3	0	1607.97	0.67	1.96	1.96	1.96	1.96	1.96	1.96
18020128060103	Upper Shirttail Canyon	GY	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5965.45	5	0	5	0	5	0	5	0	5	0	5	0	5	0	1607.97	1.16	1.16	1.16	1.16	1.16	1.16	1.16
18020128060103	Upper Shirttail Canyon	HY*	12.45	12.45	12.45	12.45	12.45	12.45	12.45	5965.45	5	8	5	8	5	8	5	8	5	8	5	8	5	8	1607.97	4.1	4.1	4.1	4.1	4.1	4.1	4.1
18020128060103	Upper Shirttail Canyon	LY*	4.53	0.00	0.00	0.00	0.00	0.00	0.00	5965.45	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1607.97	1.29	0	0	0	0	0	0
	Sum All =		51.76	51.76	51.76	51.76	51.76	51.76	51.76	5965.45	19	13	19	13	19	13	19	13	19	13	19	13	19	13	1607.97	11.80	11.80	11.80	11.80	11.80	11.80	11.80
	*** Value Per SqMi All =**		**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**9.32**	**2.0**	**1.4**	**2.0**	**1.4**	**2.0**	**1.4**	**2.0**	**1.4**	**2.0**	**1.4**	**2.0**	**1.4**	**2.0**	**1.4**	**2.51**	**4.70**	**4.70**	**4.70**	**4.70**	**4.70**	**4.70**	**4.70**
	*** Sum Open-Motorized, Native Surface Routes =**		37.04	34.31	32.50	32.65	34.31	34.31	32.65		13	12	11	12	11	12	11	12	11	12	11	12	11	12		9.81	8.59	8.52	8.52	8.59	8.59	8.52
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**3.97**	**3.68**	**3.49**	**3.50**	**3.68**	**3.68**	**3.50**	**9.32**	**1.4**	**1.3**	**1.2**	**1.3**	**1.2**	**1.3**	**1.2**	**1.3**	**1.2**	**1.3**	**1.2**	**1.3**	**1.2**	**1.3**	**2.51**	**3.90**	**3.42**	**3.39**	**3.39**	**3.42**	**3.42**	**3.39**
18020128060106	Lower Shirttail Canyon	AY	0.17	0.17	0.17	0.17	0.17	0.17	0.17	11.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		0.17	0.17	0.17	0.17	0.17	0.17	0.17	11.86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi All =**		**11.46**	**11.46**	**11.46**	**11.46**	**11.46**	**11.46**	**11.46**	**0.01**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
	*** Sum Open-Motorized, Native Surface Routes =**		0.00	0.00	0.00	0.00	0.00	0.00	0.00		0	0	0	0	0	0	0	0	0	0	0	0	0	0		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.02**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.03**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Route Miles, Density, Stream Crossings and Aquatic Data By HUC 7 Watersheds Within the TNF Boundary **Apr. 11, 2008**

HUC 7 ID#	Watershed Name	Route Code	Alt. 1 Miles	Alt. 2 Miles	Alt. 3 Miles	Alt. 4 Miles	Alt. 5 Miles	Alt. 6 Miles	Alt. 7 Miles	Huc7 Acres in TNF	A1 Perennial Crossings	A1 Interm Crossings	A2 Perennial Crossings	A2 Interm Crossings	A3 Perennial Crossings	A3 Interm Crossings	A4 Perennial Crossings	A4 Interm Crossings	A5 Perennial Crossings	A5 Interm Crossings	A6 Perennial Crossings	A6 Interm Crossings	A7 Perennial Crossings	A7 Interm Crossings	Huc7 Aquatic Acres in TNF	Alt. 1 Aquatic Miles	Alt. 2 Aquatic Miles	Alt. 3 Aquatic Miles	Alt. 4 Aquatic Miles	Alt. 5 Aquatic Miles	Alt. 6 Aquatic Miles	Alt. 7 Aquatic Miles
99999999999999	misc pieces	AY	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5	3	2	1	5	3	5	3	2	1	2	1	5	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99999999999999	misc pieces	BS*	0.00	0.00	0.00	4.20	4.20	4.20	0.00	0.00	0	0	0	0	0	0	1	12	4	14	4	14	0	0	0.00	0.00	0.00	0.00	1.04	1.04	1.04	0.00
99999999999999	misc pieces	BY*	4.20	4.20	4.20	0.00	0.00	0.00	4.20	0.00	1	12	4	14	1	12	0	0	0	0	0	0	1	12	0.00	1.04	1.04	1.04	0.00	0.00	0.00	1.04
99999999999999	misc pieces	CS*	0.00	0.23	0.00	0.65	1.81	1.44	0.23	0.00	0	0	0	1	0	0	4	4	4	4	4	4	0	1	0.00	0.00	0.09	0.00	0.12	0.12	0.12	0.09
99999999999999	misc pieces	CY*	0.03	1.22	0.03	0.00	0.00	0.00	1.02	0.00	4	3	4	3	4	3	0	0	0	0	0	0	4	3	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.03
99999999999999	misc pieces	DS*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99999999999999	misc pieces	ES*	0.00	0.00	0.00	0.02	0.02	0.02	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99999999999999	misc pieces	EY*	0.02	0.02	0.02	0.00	0.00	0.00	0.02	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99999999999999	misc pieces	FY	1.54	6.65	8.07	7.45	6.28	6.65	6.85	0.00	0	0	5	2	5	3	5	2	5	2	5	2	5	2	0.00	0.00	1.05	1.14	1.05	1.05	1.05	1.05
99999999999999	misc pieces	GY	3.64	3.64	3.64	3.64	3.64	3.64	3.64	0.00	6	10	6	10	6	10	6	10	6	10	6	10	6	10	0.00	1.46	1.46	1.46	1.46	1.46	1.46	1.46
99999999999999	misc pieces	HY*	44.83	44.83	44.83	44.83	44.83	44.83	44.83	0.00	0	4	0	4	0	4	0	4	0	4	0	4	0	4	0.00	17.03	17.03	17.03	17.03	17.03	17.03	17.03
99999999999999	misc pieces	IY	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.00	1	2	1	2	1	2	1	2	1	2	1	2	1	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
99999999999999	misc pieces	JY	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.00	3	0	3	0	3	0	3	0	3	0	3	0	3	0	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02
99999999999999	misc pieces	LS*	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00
99999999999999	misc pieces	LY*	6.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0.00	1.05	0.00	0.00	0.00	0.00	0.00	0.00
	Sum All =		61.23	61.23	61.23	61.23	61.23	61.23	61.23	0.00	25	37	25	37	25	37	25	37	25	37	25	37	25	37	0.00	20.72	20.72	20.72	20.72	20.72	20.72	20.72
	*** Value Per SqMi All =**		**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**0.00**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**0.00**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
	*** Sum Open-Motorized, Native Surface Routes =**		55.61	50.50	49.08	49.70	50.87	50.50	50.30		10	22	8	22	5	19	5	20	8	22	8	22	5	20		19.24	18.19	18.10	18.19	18.19	18.19	18.19
	*** Value Per SqMi Open-Motorized, Native Surface Routes =**		**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**0.00**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**0.00**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

Route Code	Route Type	Season_Use
AS	1-FS Sys Rd ML3+	Seasonal Closure
AY	1-FS Sys Rd ML3+	Open Year Around
BS	2-FS Sys Rd ML2	Seasonal Closure
BY	2-FS Sys Rd ML2	Open Year Around
CS	3-FS Sys Trail Motorized-Jeep	Seasonal Closure
CY	3-FS Sys Trail Motorized-Jeep	Open Year Around
DS	3b-FS Sys Trail Motorized-ATV	Seasonal Closure
DY	3b-FS Sys Trail Motorized-ATV	Open Year Around
ES	3c-FS Sys Trail Motorized-MC	Seasonal Closure
EY	3c-FS Sys Trail Motorized-MC	Open Year Around
FY	7-Closed FS Sys Rd	Seasonal Closure
GY	8-Other Sys Rd	Open Year Around
HY	6-Unclassified Other Owner	Open Year Around
IY	4-FS Sys Trail NonMotorized	Open Year Around
JY	5-FS Sys Trail Wilderness	Open Year Around
KY	7d-Closed FS Sys Rd-Decommissioned	Closed
LS	6-Unclassified/7-Closed FS Sys Rd	Seasonal Closure
LY	6-Unclassified/7-Closed FS Sys Rd	Open Year Around

Appendix E: Distribution List

The lists that follow show tribes, federal, state, and local government agencies, elected officials, libraries and individuals who were on the mailing list to receive the Environmental Impact Statement (EIS) as of December 2007. Over 1,000 people and organizations on regional and forest mailing lists were notified how they could receive a printed or electronic copy of the Draft EIS.

California and Nevada Tribes

Rancheria (Tribe)	Local Office Name	Last Name	First Name	Title
United Auburn Indian Community of the Auburn Rancheria	Tribal Office	Tribal Preservation		
Colfax-Todd Valley Consolidated Tribe		Suehead	Levina	Chair
Todd Valley Miwok-Maidu Cultural Foundation		Brigette	Zellner	President
T'si-Akim Maidu		Donald E.	Ryberg	Chair
T'si-Akim Maidu		Grayson	Coney	Cultural Director
Washoe Tribal Council		Waldo W.	Walker	Chair
Washoe Tribe of Nevada and California	Washoe Tribal Council	William	Dancing Feather	THPO
Washiw Wagayay Manal		Lynda	Shoshone	
Wadatkuht Band of the Northern Paiutes of the Honey Lake Valley		Harold	Dixon	
Greenville Rancheria		Lorie	Jaimes	Chair
Greenville Rancheria		Michael	DeSpain	Environmental Issues Coordinator
California Indian Basketmakers Association		Shannon	Brawley	Executive Director
Washoe Tribal Council	Washoe Environmental Protection Department	Barry	Marie	

Federal Government Agencies

Advisory Council on Historic Preservation, Director, Planning and Review
Army Corp of Engineers
CESPD-CMP, U.S. Army Engineer Division, South Pacific
Environmental Protection Agency, Region 9, EIS Review Coordinator
Federal Aviation Administration, Regional Administrator, Western Pacific Region
Federal Highway Administration, Director, Project Development and Environment
National Marine Fisheries Service, Habitat Conservationists Division, SW Region
National Oceanic and Atmospheric Adfministration, Office of Policy and Strategic Planning
Natural Resources Conservation Service, National Environmental Coordinator
U.S. Coast Guard (USCG), Environmental Management CG-443
U.S. Department of Energy, Director, Office of NEPA Policy and Compliance
USDA APHIS PPD/EAD
USDA National Agricultural Library, Head, Acquisitions & Serials Branch
USDA Office of Civil Rights
USDI Bureau of Land Management
USDI Fish and Wildlife Service

California State Government Agencies

Agency	Department/Board/Office
California Environmental Protection Agency	Air Resources Board
	Office of Environmental Health Hazard Assessment
	Water Resources Control Board
Resources Agency	Department of Conservation
	Department of Fish and Game
	California Board of Forestry
	Department of Forestry and Fire Protection
	Mining and Geology Board
	Department of Parks and Recreation
	California Tahoe Conservancy
	Department of Water Resources
	Wildlife Conservation Board (Depart. of Fish & Game)
Lahontan Water Quality Control Board	
Tahoe Regional Planning Agency	
CDF and Tahoe Regreen	
League to Save Lake Tahoe	
Tahoe Resource Conservation District	

Nevada State Government Agencies

Nevada Division of Environmental Protection
Nevada Division of State Parks/ Dist. II HQ
Nevada Department of Conservation & Natural Resources
Nevada Department of Parks & Recreation

County Board of Supervisors

County	Organization
Nevada County	Board of Supervisors
Placer County	Board of Supervisors
Plumas County	Board of Supervisors
Sierra County	Board of Supervisors
Yuba County	Board of Supervisors

Other California County Government

County	Organization
Nevada County	Engineer / Public Works
Placer County	Planning Department
Sierra County	Planning Department
Yuba County	Planning Department / Community Development

Federal Elected Officials

Last Name	First Name	Last Name	First Name
U.S. Senators		**U.S. House of Representatives**	
Boxer	Barbara	Doolittle	John
Feinstein	Diane	Herger	Wally

California State Elected Officials

Last Name	First Name	Last Name	First Name
State Assembly		**State Senate**	
Gaines	Ted	Aanestad	Sam
Keene	Rick	Cox	Dave

Libraries

Name	City	State
El Dorado County Library	Placerville	CA
Nevada County Library	Nevada City	CA
Nevada County Library	Truckee	CA
Sierra County Library	Loyalton	CA
Placer County Library	Auburn	CA
Placer County Library	Foresthill	CA
Placer County Library	Rocklin	CA
Sacramento County Library, Central	Sacramento	CA
Sierra College Library	Grass Valley	CA
Washoe County Library	Reno	NV
Washoe County Library	Incline Village	NV

Organizations

Organization	Last Name	First Name	Title
Wilderness Society	Dietz	Matt	Conservation Ecologist
Western States Endurance Run Fdn	Rossman	Tony	Counsellor
Trout Unlimited	Lass	David	N. Cal. Field Coordinator
Truckee Donner Land Trust	Taddo	Sara	Land Conservation Director
Sierra Access Coalition	Lazzarino	Mike	Director
Off Road Business Association	Dart	Bill	
Nevada County Woods Riders	Cochran	Joseph	President
High Sierra Motorcycle Club	Davis	Steve	
Blue Ribbon Coalition, Inc.	Amador	Don	Western Representative
Rubicon Trail Foundation	Barr	Doug	
Forest Issues Group	Benner	Stephen	
Forest Issues Group	Rivenes	Don	
Public Lands for the People	Hobbs	Gerald	
Ca. Wilderness Coalition and others	Schoradt	Brent	
Truckee Donner Land Trust	Sara	Taddo	

Individuals

Acton, Aero
Atkinson, Steve and Geri
Alvarado, Kim
Andrews, Robert W.
Araujo, Rick
Auth, William J. Jr.
Baack, Jim
Backhaus, Curt
Ball, Claudia
Barker, Rick
Baron, Heather
Barr, Doug
Batastini, Troy
Batchelder, Adam
Beasley, Thomas R.
Beine, Dave
Bennett, Max
Berkner, Mark
Bianchini, David Sr.
Borovicka, Cory
Boswell, Harold
Boudier, Eric
Britto, Ray
Brock, Elmar
Brock, Richard K.
Brown, Bruce
Brown, Frank
Brusin, Willie
Brumit, Robert
Buck, Donald
Bunting, Bryan
Burleson, Randy
Burns, Mary
Burrill, Todd
Butler, Ray
Byers, Rick
Cacy, Tim
Calkins, Lawrence
Castro, Peter
Cella, George
Chilcote, John
Clark, Justin
Clarke, Ken
Collin, Nick
Coppedge, Brandon
Countryman, Gordon
Cox, Karen
Crabb, David Eric
Damaso, Michael
Dangberg, John
Dart, Bill
Davis, Joshua
Davis, Steve
De Marco, Carla
Degan, Jeff
Deutscher, Wayne
DiCarlantonio, Gayle
Dickson, Andrew
Dietz, Matthew S.
Drake, William
Dunbar, Sean
Dupuis, Curtis
Eshleman, Caroline D.
Esteve, Gregory
Feddersen, Mike
Ferdon, Richard
Fernandez, Adam
Fine, Michael
Flatter, Mark
Foottit, John
Forberg, Erik
Frolli, Tom
Fulii, Laura
Gillmore, John
Giraffe, Frank
Gould, Ron
Granat, Amy
Grimm, Wayne
Guidice, Tom
Guinn, Timothy
Gustafson, Carl R.
Hackbarth, Randy
Hansen, Robert
Harney, Ken
Harris, Justin
Harris, Ron
Havlik, Frank
Hedden, Donald
Hendrick, Kevin
Hendrick, Steve
Hendrickson, Bruce
Hendrix, Rick
Hennig, Jeannine
Herr, Joseph R.
Hill, Jason
Hill, Jeffrey
Hipkiss, Ron
Hirst, Charles
Houston, John
Huckins, Robert
Hughes, Adam
Humber, Erik A.
Hunter, Steven
Jespersen, Soren B.
Jiannalone, Chase
Johnson, Sue
Jones, Mark
Kassar, Chris
Kee, Tony
Kelly, Bob
Kempenaar, Cornell
Kerrigan, Michael
Kleinasser, Arlen
Klusman, Don
Knerr, Wiliam
Kostelny, Dave
Krause, Rick
Kump, Ron
Kyra
Lander, Margaret
Lapham, Ellen
Larrieu, Wendy
Lasko, Tim
Lewis, James
Lewis, Jim
Lewis, Tim
Libkind, Marcus
Likins, Jim
Liles, John Kevin
Lunsford, Dewitt
Maddalena, Rick
Mahaffey, Michele

Martinson, Duane
Mayer, Dennis
McDermott, Brent and Helen
McDonald. John
McDougall, Robert
McGuire, William
Micsan, Bill
Middleton, Fred
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Minor, Sean
Moore, John K.
Moser, David
Mudd, Brian
Murphy, Edward
Nelson, Jess
Nevins, Brad
Newell, Pete
Odelberg, Bruce
Olson, Steve
O'Neill, Merryan
Parker, Mark
Pearson, Clark
Pellizzer, John D.
Peterson, Michael
Petzak, Jamaka
Pickett, Dave
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Prichard, Peter N.
Proctor, Kim
Purcell, Nina
Rabeneau, Scott
Ratcliff, Philip
Ratzburg, Keith
Raymond, Robert
Reed, Catherine
Rewinkle, Andrew
Rewinkle, Gerry
Reynolds, Glenn
Ricci, Debra
Rodrigues, Louis
Rosenberg, Kurt
Rossman, Antonio
Sawhill, Bob
Schilling, David and Roxanne
Schoradt, Brent
Schwarz, Hank
Scott
Sharp, Timothy
Sierra Access Coalition
Silvernail, Lois Jane
Smith, Eric T.
Soles, Kevin C.
Sonsteng, Richard
Stark, John A.
Stark, Lisa
Sterling, Todd
Sullivan, David
Suter, Robert
Taddo, Sara
Tamerius, Terry
The Mountain Messenger
Theisen, Jacquelyne
Thomas, Robert
Thompson, Jerry
Thompson, Jim
Titmus, Keni
Toms, Steve
Tower, Hugh
Trout Unlimited
UAIC Tribal Preservation Committee
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Waller, David
Wangsgard, Neil
Ward, Martin
Wear, Larry
West, Dick
West, Roy
Westling, Ann
Whitcher, Bruce
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Williams, Alice
Williams, Greg
Williams, Stephanie and Keith
Wood, David
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Yanni, Larry
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Appendix F: Trail Use Survey

Introduction

In 2006, the Tahoe National Forest (TNF), in partnership with the University of California at Davis, conducted an on-line survey that targeted trail users to help the TNF better understand trail user preferences and characterizations. The survey was posted on the TNF public website (www.fs.fed.us/r5/tahoe/) during the months of April and May, and was open to anybody who desired to provide their input. Eight hundred and seventeen people responded to the survey.

Results

The results of the survey are summarized in the following tables.

Question: About how often do you recreate in the Tahoe National Forest?

	Count	%
Unchecked	7	1
Every day	44	5
Once a week	167	21
Once a month	436	54
Once a year	155	19

Question: Which is your favorite type of recreation on the Tahoe National Forest?

	Count	%
Unchecked	5	1
Hiking	206	25
Off-road	292	36
Horseback	13	2
Motorcycle	102	13
Bicycle	127	16
ATV	22	3
Other	42	5

Question: When occupied with your favorite recreation on the Tahoe National Forest, which of the following qualities of the trail system do you think are the most important?

First Choice	Count	%
Unchecked	51	6
Trail steepness	68	8
Trail maintenance	139	17
Side-slope steepness	14	2
Trail width	37	5
Trail loop back	79	10
Trail curves	79	10
Trail length	156	19
Facilities & accessibility	72	9
Other factors	114	14

Question: When occupied with your favorite recreation on the Tahoe National Forest, which of the following qualities of the trail system do you think are the most important?

Second Choice	Count	%
Unchecked	42	6
Trail steepness	78	10
Trail maintenance	130	16
Side-slope steepness	52	6
Trail width	88	11
Trail loop back	74	9
Trail curves	84	10
Trail length	134	17
Facilities & accessibility	81	10
Other factors	46	6

Question: How would you rank your recreational experience in the Forest?

	Count	%
Unchecked	10	1
Excellent	266	33
Good	422	52
Fair	97	12
Poor	10	1
Very Poor	4	0

Question: What is your age?

	Count	%
Unchecked	12	1
Under 18	4	0
18 - 34	245	30
35 - 49	343	42
Over 49	205	25

Question: What is your gender?

	Count	%
Unchecked	17	2
Male	657	81
Female	135	17

Summary

Of the 817 respondents, most were males (81%), and most were between the ages of 18 and 49 (72%), with the 50+ age group comprising 25% (age groups include both males and females). There was almost an even split between those who identified themselves as motorized trail users (52%) and those who identified themselves as non-motorized users (43% non-motorized, plus 5% other). Most respondents (85%) characterized their previous trail experiences on the Tahoe National Forest as good or excellent. The trail users identified trail length and trail maintenance (or trail condition) as being the trail characteristics that are most important to them; with trail loop opportunities, trail curves, facilities (restrooms, camping, parking) and trail steepness all ranking about the same as the next most important factors.

Respondents had the opportunity to list other factors that were important to them while enjoying, or in order to enjoy, their trail experiences. A common theme for hikers was that they did not want to share the trails with other users types, especially motorized vehicles. For example, one hiker respondent wrote, “Least disturbance to area - most natural. No horses, bikes, or motors.” Another wrote, “pristine nature & NO BIKES!” A common theme for motorized users was having a challenge. One off-roader wrote, “Trail difficulty for myself and my vehicle.” A common response for all user types often was “remoteness” or “primitive settings.”

Appendix G: Off-Highway Vehicle Monitoring

Monitoring Strategy

Introduction

All of the action alternatives have a two tiered monitoring strategy. The first Tier is a 100% sample of all routes to be added to the National Forest Transportation System in each alternative which have resource concerns or mitigation measures identified which require monitoring. The second Tier is a stratified random sample of all remaining roads and motorized trails in the National Forest Transportation System. The number of roads and trails monitored in Tier 2 will be based upon available funding.

Tier 1 Monitoring

Tier 1 is a one 100% sample of all routes with significant resource concerns identified during field reviews. Each of these routes will be surveyed annually for the specific resource concern associate with that route if included in the selected alternative. Those routes and their specific resource concerns that will be monitored annually are identified in Table G-1.

Table G-1. Tier 1 Routes Identified for Annual Monitoring

Route ID	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Resource Category	Monitoring Requirement
TKN-J3	1		1	1	1	1	Botany	The Forest Service needs to routinely survey and treat for noxious weeds, including musk thistle.
TKN-J4	1			1	1	1	Botany	Monitor closure of end of route.
TKN-J5	1			1	1	1	Botany	Monitor meadow encroachment.
Subtotal	**3**	**0**	**1**	**3**	**3**	**3**	**All Botany Resources**	
491-3_P				1	1		Heritage	Monitor Site 05175300337 per the Motorized PA protocols.
Boca Reservoir	1						Heritage	Monitor heritage Sites 05175700303, 05175700305, 05175700307 and 05175700240.per Motorized PA protocols.
Eureka Diggings	1						Heritage	Monitor heritage Sites 05175300004, 05175300023 and 05175300230 per Motorized PA protocols.
Prosser Reservoir	1						Heritage	Monitor heritage Sites 05175700609 and 05175700608/CA-NEV-64 per Motorized PA protocols.
Stampede Reservoir	1						Heritage	Monitor heritage Sites 05175700004/SIE-S44, 05175700535, 05175700540 per Motorized PA protocols.
SV-007	1			1			Heritage	Monitor Site 05175600581 per the Motorized PA protocols.
SV-P14	1		1	1	1	1	Heritage	Monitor heritage Sites 05175600571 per Motorized PA protocols.
SV-P5	1			1	1	1	Heritage	Monitor Site 05175600574 per Motorized PA protocols.

Route ID	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Resource Category	Monitoring Requirement
TKN-003	1			1	1		Heritage	Monitor Sites 05175700564 and 05175700563 per the Motorized PA protocols.
TKN-J11	1			1	1		Heritage	Monitor Site 05175700096 per the Motorized PA protocols.
TKN-J6	1			1	1	1	Heritage	Monitor Site 05175700374 per the Motorized PA protocols.
TKN-M2	1			1	1		Heritage	Monitor Sites 05175700397, 05175700395 and 05175700734 per the Motorized PA protocols.
TKN-Q1	1			1	1		Heritage	Monitor Site 05175700087 per the Motorized PA protocols.
TKS-11	1			1	1	1	Heritage	Monitor Site 05175700736 per the Motorized PA protocols.
TKS-M9	1		1	1	1	1	Heritage	Monitor Site 05175700450 per the Motorized PA protocols.
YRN-004	1			1			Heritage	Monitor Site 05175700676 per the Motorized PA protocols.
YRN-007	1			1	1		Heritage	Monitor Site 05175300426 per the Motorized PA protocols.
YRN-008	1			1	1		Heritage	Monitor Site 05175300369 per the Motorized PA protocols.
YRN-1	1			1	1	1	Heritage	Monitor Site 05175300881 per the Motorized PA protocols.
YRN-2	1			1	1	1	Heritage	Monitor Sites 05175300499, 05175300545, 05175300546 per the Motorized PA protocols.
YRN-4	1			1	1	1	Heritage	Monitor Site 05175300386 per the Motorized PA protocols.
YRN-509	1			1	1		Heritage	Monitor Sites 05175300198 and 05175300205 per the Motorized PA protocols.
YRN-7	1			1	1	1	Heritage	Monitor Site 05175300674 per the Motorized PA protocols.
YRN-M2	1			1			Heritage	Monitor Sites 05175300671, 05175300675, 05175300890 per the Motorized PA protocols.
YRS-SF5	1		1	1	1	1	Heritage	Monitor Site 05175500272 per the Motorized PA protocols.
Subtotal	**24**	**0**	**3**	**20**	**17**	**10**	**All Heritage Resources**	
YRN-509	1			1	1		Lands	Monitor potential vandalism of electronic facilities.
Subtotal	**1**	**0**	**0**	**1**	**1**	**0**	**All Lands Resources**	
ARM-13	1			1	1	1	Watershed	Monitor watershed mitigations for several years.
ARM-2	1			1	1	1	Watershed	Drainage control work will be monitored since this trail is in a watershed that supplies water for domestic use.
SV-005	1			1			Watershed	Monitor water bar function and seep for impacts from motorized vehicles.
SV-P14	1		1	1	1	1	Watershed	Monitor stream crossing to make sure route and stream are separated.
SV-P5	1			1	1	1	Watershed	Monitor watershed mitigations at perennial crossing.

Route ID	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Resource Category	Monitoring Requirement
SV-P8	1			1	1	1	Watershed	Monitor watershed mitigations and sediment into Little Truckee River.
TKN-J5	1			1	1	1	Watershed	Monitor route for erosion and crossings for sedimentation and widening.
TKN-J6	1			1	1	1	Watershed	Monitor watershed closure of shoreline.
TKS-11	1			1	1	1	Watershed	Monitor closure and drainage.
TKS-6	1			1			Watershed	Monitor watershed mitigations.
TKS-M9	1		1	1	1	1	Watershed	Due to loose soils, need to monitor for incising.
YRN-008	1			1	1		Watershed	Monitor closure of adjacent Brandy City Diggins for water quality impacts.
YRN-1	1			1	1	1	Watershed	Monitor hill climb closure on 93-2 road.
YRN-2	1			1	1	1	Watershed	Monitor the installation and effectiveness of hardened crossing.
YRN-2	1			1	1	1	Watershed	Monitor route drainage (especially at intersection with access road to Monarch Mine).
YRN-509	1			1	1		Watershed	Monitor gully repair.
YRN-7	1			1	1	1	Watershed	Monitor watershed mitigations.
YRS-AF	1		1	1	1	1	Watershed	Monitor effects on water quality at campsites near lake.
YRS-F1	1			1	1	1	Watershed	Monitor annually for watershed effects.
YRS-G3	1			1	1	1	Watershed	Monitor route for erosion.
YRS-SF4	1			1	1		Watershed	Monitor need for additional waterbars.
YRS-SF5	1		1	1	1	1	Watershed	Monitor crossings and gullies.
Subtotal	**22**	**0**	**4**	**22**	**20**	**17**	**All Watershed Resources**	
Boca Reservoir	1						Wildlife	Continue annual bald eagle nest monitoring.
Prosser Reservoir	1						Wildlife	Continue annual bald eagle monitoring.
Stampede Reservoir	1						Wildlife	Continue annual bald eagle monitoring.
Subtotal	**3**	**0**	**0**	**0**	**0**	**0**	**All Wildlife Resources**	
Grand Total	**53**	**0**	**8**	**46**	**41**	**30**	**Total All Resources**	

Tier 2 Monitoring

Tier 2 will consist of a random sample of all other roads and trails in the National Forest Transportation System. The sample size will be determined based on available funding. The Tier 2 monitoring will be conducted using the following Region 5 BMPEP protocol:

Developing the Sample Pool

The sample pool will include all OHV motorized trails and maintenance level 2 roads within 200 feet of perennial streams and 100 feet of non-perennial streams. Segments less than 1,000 feet in length will not be included in the sample pool.

Conducting the Monitoring

- Monitoring will be conducted by a team that includes both watershed and fisheries expertise.

Timing of the Monitoring

- All motorized trails will have gone through at least one winter season following construction, reconstruction or maintenance.
- Monitoring will be done when evidence of erosion is the most visible. Typically this will be done in the spring as soon as soon as there is access to the site(s), or after a large rainfall event(s). In general, monitoring will not be done in the driest part of the year because evidence of erosion is less visible.

Conducting the Monitoring

Sample site and sample points

- Monitoring will be conducted starting at the center of route selected, for a distance of 500 feet in each direction. This segment of the OHV trail - 1,000 feet in length - will be monitored. Segments less than 1,000 feet in length will not be evaluated.
- For route segments containing more than one stream channel crossing, only one stream channel crossing will be monitored. The stream channel crossing to be monitored will be randomly selected.

Sampling protocols

- The entire segment selected for monitoring will be walked looking for evidence of soil and water movement. Evidence of erosion **on** the OHV trail will include such indicators as trail entrenchment, widening of trail, rills/gullies on the trail, tread loss on the trail, etc. Sediment plumes and rills/gullies that extend **off** of the OHV trail, will be tracked from the evidence of erosion to its destination.
- The presence of rills, gullies or sediment deposited at the edge of a stream channel will be recorded as evidence that sediment has entered the stream channel. Depositions of sediment in the stream channel will be recorded.
- A determination will be made if it is the OHV trail use has caused the stream channel at the crossing to be wider and/or deeper than the stream channel immediately above and/or below the crossing. A rating of “significant vertical/lateral erosion of stream channel at crossing” will be recorded only if OHV use has made the stream channel crossing more than 25% wider than immediately above and/or below the crossing.

Annual Reporting of Tier 1 and Tier 2 Monitoring Results

Results of the Tier 1 and Tier 2 OHV monitoring will be incorporated in the annual Forest Plan Monitoring and evaluation report. This report will be made available on an annual basis.

Appendix H: References

Airola, D.A. 1988. *A guide for the Calif. Wildlife Habitat Relationships (CWHR) System*. Calif. Dept. Fish and Game. Wildlife Investigations Lab. Rancho Cordova, CA.

Allen, A. W. 1982. Habitat suitability index models: marten. U.S. Fish and Wildlife Service, FWS/OBS-82/10.11. 9 pp.

Allen, A.W. 1987. The relationship between habitat and furbearers. Pages 164-179 In Wild furbearer management and conservation in North America. Novak, M., J.A. Baker, M.E. Obbard and B. Malloch, eds. Ontario Ministry of Natural Resources, Canada. 1150 pp.

Alt, K.L. 1980. Ecology of the nesting bald eagle and osprey in the Grand Teton-Yellowstone National Parks Complex. M.S. Thesis, Montana State Univ., Bozeman. 95 pp.

American Association of State Highway and Transportation Officials (AASHTO) green book. 2001. A Policy on Geometric Design of Highways and Streets. 4th ed.

Andren, H. 1994. Effects of habitat fragmentation on birds and mammals in landscapes with different proportions of suitable habitat: a review. Oikos 71:355-366.

Andrew J.M. and J. A. Mosher. 1982. Bald eagle nest site selection and nesting habitat in Maryland. J. Wildl. Manage. 46:383-390.

Anthony, R.G. and F.B. Isaacs. 1989. Characteristics of bald eagle nest sites in Oregon. J. of Wildl. Manage. 53:148-159.

Anthony, R.G., R.L. Knight, G.T. Allen, B.R. McClelland and J.I. Hodges. 1982. Habitat use by nesting and roosting bald eagles in the Pacific Northwest. Trans. A. Am. Wildl. Natural Res Conf. 47:332-342.

Apodaca, Marjorie. 2006. Road Definitions – email to Melissa Hallas.

Arora, D. 1984. *Mushrooms Demystified: A Comprehensive Guide to the Fleshy Fungi*. Second Edition. Ten Speed Press. Berkeley, CA. 959 pages.

Aubrey, K.B. 2008. Wolverine den sites. Personal Communication. March 21.

Aubry K. B., McKelvey K. S., Copeland J. P. 2007. Distribution and broadscale habitat relations of the wolverine in the contiguous United States. Journal of Wildlife Management. 71: 2147–2158

Aubry, K.B. and J.C Lewis. 2003 (In press). Extirpation and reintroduction of fishers (*Martes pennanti*) in Oregon: implications for their conservation in the Pacific states. Biological Conservation 114 (2003) 79-90.

Austin, K.A. 1991. Habitat use of northern goshawk in Southern Cascades. M.S. Thesis. Oregon State University, Corvallis, Oregon. In prep.

Avise, J.C., and F.J. Ayala. 1976. Genetic differentiation in species versus *depauperate phylads*: Evidence from the California minnows. Evolution 30: 46-58.

Ayres, W.O. 1854. Remarks on some fish of the cyprinoid family. Daily Placer Times and Transcripts, 30 May 1854:1.

Bald and Golden Eagle Protection Act. 1940. P.L. 76-567, Ch. 278, 54 Stat. 250, as amended; 16 U.S.C. 668 (note), 668, 668a-d). June 8.

Baltz, D.M. and P.B. Moyle. 1993. Invasion resistance by an assemblage of native California stream fishes. Ecol. Applic. 3:246-255.

Banci, V. A. 1994. Wolverine. Pages 99-127 in L. F. Ruggiero, K. B. Aubry, S. W. Buskirk, L. J. Lyon, and W. J. Zielinski, eds. The scientific basis for conserving forest carnivores, American marten, fisher, lynx and wolverine in the western United States. USDA For. Serv. Rocky Mt. For. and Range Exp. Stn., Gen. Tech. Rep. RM-254, Fort Collins, Colo.

Bancroft, D.C. 1990. Use of wildlife enforcement decoys for wildlife enforcement in northern Arizona: preliminary results. In Krausman, P.R. and N.S. Smith, eds. Proceedings of Managing Wildlife in the Southwest. Tucson, AZ. Oct. 1990. Univ. of Arizona, Tucson. 262 pp. IN Habitat Fragmentation and the Effects of Roads on Wildlife and Habitats. Background and literature review, Conservation Services Division of the New Mexico Department of Game and Fish. 18 pages. Watson, Mark L. compiler 2005.

Barbour, R.W. and W.H. Davis. 1969. Bats of America. University Press of Kentucky. 283 pp.

Bard, Erin C., Roger L. Sheley, Jeff S. Jacobsen, and John J. Borkowski. Using ecological theory to guide the implementation of augmentative restoration. Weed Technology, 18 (5), pages 1246-1249.

Barneby, R. C. 1964. Atlas of North American *Astragalus*. Memoirs of the New York Botanical Garden. 13:1-1188.

Bart, J. 1995. Amount of suitable habitat and viability of northern spotted owls. Conservation Biology 9:945-946.

Bartoleme, J. W. and R. B. Standiford. 1992. Ecology and Management of Californian Oak Woodlands. *In:* Ecology and management of oak and associated woodlands; perspectives in the southwestern United States and northern Mexico. Gen. Tech. Rep. RM-218, 224 pages.

Bateman, M.C. 1986. Winter habitat use, food habits and home range size of the marten, *Martes americana*, in western Newfoundland. Canadian Field Naturalist 100: 58-62.

Beck, T.W. 1985. Interim direction for management of great gray owl. USDA Forest Service, Stanislaus National Forest. Sonora, CA. 24pp.

Beedy, E. C. and Peter Brussard. 2002. Nevada County Natural Resources Report. A Scientific Assessment of Watersheds and Ecosystems. An unpublished report prepared for Nevada County Planning Department.

Beesley, D. 1996. Reconstructing the Landscape: An Environmental History, 1820-1960. Pages 3-24 In *Sierra Nevada Ecosystem Project: Final Report to Congress*, Vol. II. Centers for Water and Wildland Resources. Univ. Calif., Davis. 95616.

Behnke, R.J. 1979. Monograph of the native trouts of the genus *Salmo* of western North America. U.S. Department of Agriculture, Forest Service, Lakewood, Colorado. 2155 pp.

Behnke, R.J. 1992. Native trout of western North America. American Fisheries Society, Bethesda, Maryland. 275 p.

Beier, P. and J.E. Drennan. 1997. Forest structure and prey abundance in foraging areas of northern goshawks. Ecological Applications 7:564-571.

Bell, R.R. and J.B. Kimsey. 1955. Some considerations of the chemical treatment of the Monticello Reservoir basin, Napa County. Calif. Dept. of Fish and Game, Inland Fish. Admin. Rep. No. 55. 7pp.

Bennett, L.A. and F.B. Samson. 1984. Marten ecology and habitat management in the central Rocky Mountains: problem analysis. USDA Forest Service and Colorado Cooperative Wildlife Research Unit, Colorado State University. Fort Collins, CO. 60 pp.

Bergstrom, J.C., H.K. Cordell, G.A. Ashley, and A.E. Watson. 1990. Economic Impacts of Recreational Spending on Rural Areas: A Case Study. *Economic Development Quarterly* 4(1): 29-39.

Bias, M.A. 1989. Habitat use by California spotted owls in the central Sierra Nevada. Humboldt State University, Arcata. Master's thesis. 55pp.

Biotic Invasions: Causes, Epidermiology, Global Consequences and Control. IN: Issues in Ecology #5, Ecological Society of America. Pps. 1-20.

Bissonette, J.A., D.J. Harrison, C.D. Hargis, T.G. Chapin. 1997. The influence of spatial scale and scale-sensitive properties on habitat selection by American marten. Pages 368-385 in J.A. Bissonette, editor. Wildlife and landscape ecology: effects of pattern and scale. Springer-Verlag, New York, N.Y.

Bissonette, J.A., R.J. Fredrickson, and B.J. Tucker. 1988. The effects of forest harvesting on marten and small mammals in western Newfoundland. Final Report, for the Newfoundland and Labrador Wildlife Division and Corner Brook Pulp and Paper, Ltd. (Kruger). Logan, UT: Utah Cooperative Fish and Wildlife Research Unit, Department of Fisheries and Wildlife, College of Natural Resources, Utah State University. 109pp.

Blakesley, J.A. and B.R. Noon. 1999. Demographic parameters of the California spotted owl on the Lassen National Forest; preliminary results (1990-1998). Summary Report, February 1999. USDA Forest Service, Pacific Southwest Research Station, Arcata, CA. 44pp.

Blakesley, J.A., 2003. Ecology of the California spotted owl: breeding dispersal and associations with forest stand characteristics in northeastern California. Ph.D. dissertation, Colorado State University, Ft. Collins, p. 60.

Bleich, Vernon C., John G. Kie, Eric R. Loft, Thomas R. Stephenson, Michael W. Oehler, Sr., and Alvin L. Medina. 2005. Managing Rangelands for Wildlife. In: Clait E. Braun, Editor. 2005. Techniques for Wildlife Investigations and Management. The Wildlife Society, Bethesda, Maryland, USA, pages 873

Bloom, P.H., G.R. Stewart and B.J. Walton. 1986. The status of northern goshawk in California, 1981-1983. Adm. Rept. 85-1. State of California, Department of Fish and Game, Sacramento, CA.

Bolster, B.C. 1998. Calif. Dept. of Fish and Game, Presentation to the Western Bat Working Group Workshop. Feb. 9-13, 1998. Reno, Nevada.

Bombay, H.L. 1999. Scale perspectives in habitat selection and reproductive success for willow flycatchers (*Empidonax traillii*) in the central Sierra Nevada, California. Masters thesis, California State University, Sacramento. 223 pp.

Bombay, H.L. 2003. Annual report and preliminary demographic analysis for willow flycatcher monitoring in the Central Sierra Nevada in partial fulfillment of contract 53-91S8-01-NRM09 between Dr. Michael L. Morrison under subcontract to Tetra Tech FW, Inc. and USDA Forest Service, Pacific Southwest Region, Vallejo, CA. 50 pp.

Bombay, H.L., M.L. Morrison, and L.S. Hall. 2003. Scale perspectives in habitat selection and animal performance for willow flycatchers (*Empidonax traillii*) in the central Sierra Nevada, CA. Studies in Avian biology No. 26:60-72, 2003.

Bombay, H.L., M.L. Morrison, D.E. Taylor, and J. W. Cain. 2001. Annual report and preliminary demographic analysis for willow flycatcher monitoring in the Central Sierra Nevada in partial fulfillment of contract RFQ-IBET-17-01-053 between University of California, San Diego - White Mountain Research Station and USDA Forest Service, Tahoe National Forest. 46 pp.

Borisenko, A. N., and M. P. Hayes. 1999. Status of the foothill yellow-legged frog (*Rana boylii*) in Oregon. Final Report under contract ORFO080197-1 to the The Nature Conservancy under contract 1448-13420-7-M262 to the US Fish and Wildlife Service. 39 pp.

Bossard, Carla C., John M. Randall, and Marc C. Hoshovsky. 2000. Invasive Plants of California's Wildlands. University of California Press. 360 pages.

Boyce, D.A. and C.M. White. 1979. A peregrine falcon nesting habitat survey in the Mendocino National Forest - 1979, Wilderness Research Institute.

Bradford, D.F. 1991. Mass mortality and extinction in a high elevation population of *Rana muscosa*. Journal of Herpetology 25(2):174-177.

Bradford, D.F., F. Tabatabai, and D.M. Graber. 1993. Isolation of remaining populations of the native frog, *Rana muscosa*, by introduced fishes in Sequoia and Kings Canyon National Parks, California. Conservation Biology 7: 882-888.

Bradford, D.F., F. Tabatabai, and D.M. Graber. 1993. Isolation of remaining populations of the native frog, *Rana muscosa*, by introduced fishes in Sequoia and Kings Canyon National Parks, California. Conservation Biology 7: 882-888.

Breeding Bird Survey. Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 - 2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, MD

Brocke, R.H., J.P. O'Pezio, and K.A. Gustafson. 1988. A forest management scheme mitigating impact of road networks on sensitive wildlife species.

Brody, A.J. and M.R. Pelton. 1989. Effects of roads on Black Bear movements in western North Carolina. Wild. Soc. Bull. 17, 5-10.

Brooks, R. R. 1987. Serpentine and its vegetation - A multidisciplinary approach. Ecology, Phytogeography and Physiology series volume 1. Dioscorides Press, Portland, Oregon. 454 pages.

Brown, L.R. and P.B. Moyle. 1987. Survey of fishes of mid-elevation streams of the San Joaquin Valley. Unpubl. Rep. Calif. Dept. of Fish and Game. 220pp.

Brown, P. 1996. Presentation at the Natural History and Management of Bats in California and Nevada Conference. The Wildlife Society Western Section, Nov. 13-15, 1996. Sacramento, CA.

Brunton, D.F. 1971. Observations of the great gray owl on winter range. Can. Field Nat. 86: 315-322.

Buck, S., C. Mullis and A. Mossman. 1983. Final report: Coral Bottom - Hayfork Bally fisher study. USDA Forest Service. Unpublished report. 133 pp.

Buehler, D.A., T.J. Mersmann, J.D. Fraser, J.K.D. Seegar. 1991. Effects of human activity on bald eagle distribution on the northern Chesapeake Bay. J. of Wildl. Manage. 55:282-290.

Bull, E.L. and M.G. Henjum. 1990. Ecology of the great gray owl. General Technical Report PNW-GTR 265. Pacific Northwest Research Station, USDA Forest Service, Portland OR. 39pp.

Bull, E.L., R.S. Holthausen, D.B. Marx. 1990. How to determine snag density. Western Journal of Applied Forestry 5:56-58.

Bull, Evelyn L.; Parks, Catherine G.; Torgersen, Torolf R. 1997. Trees and logs important to wildlife in the interior Columbia River basin. Gen. Tech. Rep. PNW-GTR-391. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Burkett, E.E. and J.C. Lewis. 1992. The spread of the red fox. Outdoor Calif. 53(2):1-4.

Bury, R.B. 1980. Conservation of the amphibians of the United States: review. U.S.A. Dept. of the Interior, Fish and Wildlife Service. Resource publication 134, Washington, D. C., 34 pp.

Buskirk, S.W. 1994. Introduction to the genus *Martes*. Pages 1-10 In S.W. Buskirk, A.S. Harestad, M.G. Raphael, and R.A. Powell, editors. Martens, sables and fishers: biology and conservation. Cornell University Press, Ithaca, New York. 484 pp.

Buskirk, S.W. and L.F. Ruggiero. 1994. American marten. Pages 7-37 in L.F. Ruggiero, K.B. Aubry, S.W. Buskirk, L.J. Lyon, and W.J. Zielinski, eds. The scientific basis for conserving forest carnivores: American marten, fisher, lynx, and wolverine in the western United States. U. S. Forest Service Gen. Tech. Rep. RM-254.

Buskirk, S.W. and R.A. Powell. 1994. Habitat ecology of fishers and American martens. Pages 283-296 in Buskirk, S.W., A.S. Harestad, M.G. Raphael, and R.A. Powell eds. Martens, sables, and fishers: biology and conservation. Cornell University Press, Ithaca, N.Y.

Buskirk, S.W.; Zielinski, W.J. 2003. Small and mid-sized carnivores. In: Zabel, C.J.; Anthony, R.G., editors. Mammalian community dynamics: Management and conservation in the coniferous forests of western North America. Cambridge, UK: Cambridge University Press; 207-249.

Busnel, R. G. and J. L. Fletcher (eds.). 1978. Effects of noise on wildlife. New York: Academic Press.

Butts, T.W. 1992. Wolverine (*Gulo gulo*) biology and management: A literature review and annotated bibliography. Unpublished paper for the U.S. Forest Service. Northern Region.

Bytherowicz, A., and M.E. Fenn. 1996. Nitrogen Deposition in Calif. Forests: A Review. *Environmental Pollution* 92(2). Published by Elsevier Science Ltd.

Bytherowicz, A., J. Carroll, M. Fenn, P. Miller, R. Musselman, and B. Takemoto. 1998. *Distribution and Transport of Air Pollutants to Vulnerable Calif. Ecosystems.* USDA Forest Service, Pacific Southwest Region. Riverside CA. 92507.

Cahill, T., R. Eldred, and P. Feeney. 1986. *Particulate Monitoring and Data Analysis for the National Park Service 1982-1985*. Univ. Calif., Davis. 95616

Cahill, T.A., J.J. Carroll, D. Campbell and T.E. Gill. 1996. Air Quality. Pages 1227-1260 In *Sierra Nevada Ecosystem Project: Final Report to Congress, Assessments and scientific basis for management options*. Vol. II, Ch. 48. Univ. Calif. Centers for Water and Wildland Resources, Davis, CA 95616-8750.

Caicco Steven L. 1998. Current status, structure, and plant species composition of the riparian vegetation of the Truckee River, California and Nevada. Madrono, volume 45, number 1, 17 pages.

Cain III, J.W., M.L. Morrison, and H.L. Bombay. 2003. Predator activity and nest success of willow flycatchers and yellow warblers. Journal of Wildlife Management 67(3):600-610.

Cain, J. W. 2001. Nest success of yellow warblers (*Dendroica petechia*) and willow flycatchers (*Empidonax traillii*) in relation to predator activity in montane meadows of the central Sierra Nevada, California. Thesis, California State University, Sacramento, California, USA. In: Predator Activity and Nest Success of Willow Flycatchers and Yellow Warblers, James W. Cain III, Michael L. Morrison and Helen L. Bombay, The Journal of Wildlife Management, Vol. 67, No. 3 (Jul., 2003), pp. 600-610.

Calef, G.W. 1973. Natural mortality of tadpoles in a population of *Rana aurora*. Ecology 54: 741-758.

Calhoun, A.J. 1942. The biology of the black-spotted trout (*Salmo clarki henshawi*) (Gill and Jordan) in two Sierra Nevada lakes. Ph.D. dissertation. Stanford University, Palo Alto, California. 218 pp.

California Academy of Sciences. 1992. Copy of locality records from the data base of California Academy of Sciences.

California Air Resources Board. 1998. A program update for off-road motorcycles and ATVs. Accessed 9/18/2007. Available on-line: http://www.arb.ca.gov/msprog/offroad/mcfactst.htm.

California Air Resources Board. 1998. *Particle Pollution: Charting a Course for Clean Air.* Calif. Environmental Protection Agency.

California Department of Fish and Game. 1994. Five-year status review: greater sandhill crane (*Grus canadensis tabida*). Reported to: California Fish and Game Commission. 12 pp.

California Environmental Protection Agency News Release. 1997. ARB Approves Emission Limits for Off-Road Vehicles. Accessed 9/18/2007. Available on line: http://www.arb.ca.gov/newsrel/nr012194.htm

California Interagency Noxious and Invasive Plant Committee. 2007. Noxious Times - 2007 California Noxious weed ratings list. Volume 8, No. 4, pages 8 and 9.

California Native Plant Society. 2001. Inventory of rare and endangered plants of California (6th edition). Rare plant scientific advisory committee, David P. Tibor, convening editor. CNPS, Sacramento, CA 388 pages.

California Native Plant Society. 2006. Inventory of rare and endangered plants (online edition, v7-06a). California Native Plant Society. Sacramento, CA. Accessed routinely. Available online at: http://www.cnps.org/inventory.

California State Parks. 2003, December. California Outdoor Recreation Plan 2002. Sacramento, CA. 78 pages.

California State Parks. 2005, May. Park and Recreation Trends in California. Sacramento, CA. 23 pages.

Call, D.R. 1990. Home range and habitat use by California spotted owls in the central Sierra Nevada. Unpublished Thesis. Humboldt State University, Arcata CA. 83 pp.

Campbell, L.A. 2004. Distribution and habitat association of mammalian carnivores in the central and southern Sierra Nevada [PhD dissertation]. Davis (CA): University of California, Davis. 167 p.

Carr, L.W., Fahrig, L. 2001. Effect of road traffic on two amphibian species of different vagility. Conservation Biology 15(4), 1071–1078.

Carroll, C., W.J. Zielinski, and R.F. Noss. 1999. Using presence-absence data to build and test spatial habitat models for the fisher in the Klamath Region, U.S.A. Conservation Biology 6:1344-1359.

CDFG (California Department of Fish and Game). 1990. 1989 annual report on the status of California's state listed threatened and endangered plants and animals. California Department of Fish and Game, Sacramento.

CDFG (California Department of Fish and Game). 1994. Five-year status review: greater sandhill crane (*Grus canadensis tabida*). Reported to: California Fish and Game Commission. 12 pp.

CDFG (California Department of Fish and Game). 1998. An Assessment of Mule and Black-tailed Deer Habitats and Populations in California. Report to the Fish and Game Commission. February 1998. 57pp.

CDFG (California Department of Fish and Game). 1988 Revised 2005, 2006. A Guide to the California Wildlife Habitat Relationships System (CWHR). Edited by Kenneth E. Mayer and William F. Laudenslayer, Jr. State of California, Resources Agency, Department of Fish and Game Sacramento, CA. 166 pp.

CDFG (California Department of Fish and Game). 1996. Managing non-native species in California: the red fox. California Department of Fish and Game, Sacramento, California

CDFG (California Department of Fish and Game). 2003. Deer Hunting Draft Environmental Document, February 3, 2003. State of California, The Resources Agency, Department of Fish and Game. 269pp + appendices

CDFG (California Department of Fish and Game). 2004. Final Environmental Document regarding the hunting of doves, band-tailed pigeons, common snipe, and American crows. State of California, The Resources Agency. Sacramento, CA. 146 pp.

CDFG (California Department of Fish and Game). 2004. Final Environmental Document: Bear Hunting. California Department of Fish and Game, Sacramento, California.

CDFG (California Department of Fish and Game). 2004. Special animals. California Department of Fish and Game, Sacramento, California.

CDFG (California Department of Fish and Game). 2008. Special animals. California Department of Fish and Game, Sacramento, California.

Cech, J.J., S.J. Mitchell, D.T. Castleberry, and M. McEnroe. 1990. Distribution of California stream fishes: influence of environmental temperature and hypoxia. Env. Biol. Fish. 29:95-105.

Chandler, Sheri K., James D. Fraser, David A. Buehler, Janis K. D. Seegar. 1995. Perch Trees and Shoreline Development as Predictors of Bald Eagle Distribution on Chesapeake Bay. Journal of Wildlife Management, Vol. 59, No. 2, pp. 325-332.

Chapel, M., A. Carlson, D. Craig, T. Flaherty, C. Marshall, M. Reynolds, D. Pratt, L. Pyshora, S. Tanguay and W. Thompson. 1992. Recommendations for managing late-seral-stage forest and riparian habitats on the Tahoe National Forest. Located at: USDA Forest Service, Tahoe National Forest, Nevada City, CA. 31pp.

Chapin, T.G., D.J. Harrison, D.M. Phillips. 1997. Seasonal habitat selection by marten in an untrapped forest preserve. J. Wildl. Manage. 61:707-717.

Chapin, T.G., D.J. Harrison. 1998. Conservation Biology 12:1327-1338.

Chatfield, Andrea H. 2005. Habitat Selection by a California Spotted Owl Population: A Landscape Scale Analysis Using Resource Selection Functions. A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science – University of Minnesota, St. Paul Minnesota. Unpublished.

Chen, T.H., J.A.Gross, W.H. Karasov. 2006. Sublethal effects of lead on northern leopard frog (Rana pipiens) tadpoles. Environ Toxicol Chem 25(5):1383-9.

Chin, A., D.M. Rohrer, D.A. Marion, and J.A. Clingenpeel. 2004. Effects of all-terrain vehicles on stream dynamics. Pgs. 292-296 In: Guldin, James M., tech. comp. 2004. Ouachita and Ozark Mountains symposium: ecosystem management research. Gen. Tech. Rep. SRS–74. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 321 p.

Claar, J. J.; Anderson, N.; Boyd, D. [et al]. 1999. Carnivores. In: Joslin, G.;Youmans, H., cords. Effects of recreation on Rocky Mountain wildlife: a review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society. 307pp.

Clark, W.R. and E.K. Fritzell. 1992. A review of population dynamics of furbearers. *In:* Wildlife 2001: populations. D.R. McCullough and R.H. Barrett, eds. Elsevier Applied Science, London. 1163 pp.

Clevenger, A.P. 1994. Habitat characteristics of Eurasian pine Martens, *Martes martes*, in an insular Mediterranean environment. Ecography 17:257-263.

Clinton, B.D. and J.M. Vose. 2003. Differences in surface water quality draining four road surface types in the southern Appalachians, S. J. Appl. Forestry 27(2), pp. 100–106.

Coffin, P.D. 1981. Distribution and life history of the Lahontan/Humboldt cutthroat trout, Humboldt River drainage basin. Nevada Department of Wildlife, Reno, Nevada. 69 pp.

Coffin, P.D. 1983. Lahontan cutthroat trout fishery management plan for the Humboldt River Basin. Federal Aid to Fish Restoration Project Report F-20-17, Study 1X, Job No. 1-P-1. Nevada Department of Wildlife, Reno, Nevada. 33 pp.

Coffin, P.D. 1988. Nevada's native salmonid program status, distribution and management. Nevada Department of Wildlife, Reno, Nevada. 400 pp.

Coleman, M.E., and V.K. Johnson. 1988. Summary of trout management at Pyramid Lake, Nevada, with emphasis on Lahontan cutthroat trout, 1954-1987. American Fisheries Society Symposium 4:107-115.

Cooper, D. J. and Evan C Wolf. 2004. Fens of the Sierra Nevada, California. Department of Forest, Rangeland and watershed Stewardship, Colorado State University, Fort Collins, CO. An unpublished progress report of work in classifying Sierra Nevada Fens sent to Anne Bradley, R-5 botanist.

Cooper, J.J. 1983. Distributional ecology of native and introduced fishes in the Pit River system, northeastern California, with note on the Modoc sucker. Calif. Fish and Game 69:39-53.

Copeland J. P., Peek J. M., Groves C. R., Melquist W. E., McKelvey K. S., McDaniel G. W., Long C. D., Harris C. E. 2007. Seasonal habitat associations of the wolverine in central Idaho. Journal of Wildlife Management. 71: 2201–2212.

Cordell, H.K. 1999. *Outdoor Recreation in American Life: A National Assessment of Demand and Supply Trends.* USDA Forest Service, Southern Research Station. Athens, Georgia. 449 pages.

Corn, P.S., and L.J. Livo. 1989. Leopard frog and wood frog reproduction in Colorado and Wyoming. The Northwestern Naturalist 70(1):1-9.

Costanza, R., and H.E. Daly. 1992. Natural capitol and sustainable development. *Conservation Biology* 6(1):37-46.

Cowan, W. 1983. Annual fisheries management report FY-83' Summit Lake Indian Reservation, Humboldt Country, Nevada. Unpublished report. Summit Lake Paiute Tribe, Winnemucca, Nevada. 37 pp.

Craig, D. 1991. A habitat management program for the bald eagle on the Tahoe National Forest - draft; unpublished report. Available at the Tahoe National Forest Supervisor's Office, 631 Coyote Street, Nevada City, CA. 10p.

D'Antonio, Carla M., Eric L. Berlow, and Karen L. Haubensak. 2004. Invasive Exotic Plant Species in Sierra Nevada Ecosystems. USDA Forest Service General Technical Report PSW-GTR-193.pages 175-183.

Daehler, Curtis C. 2003. Performance comparisons of co-occurring native and alien invasive plants: Implications for conservation and restoration. Annual Review of Ecology, Evolution, and Systematics. Available online at: http://ecolsys.annualreviews.org

Damiani, C., D.C. Lee, S.L. Jacobson. 2007. Effects of noise disturbance on northern spotted owl reproductive success. Unpublished report. USDA Forest Service. Pacific Southwest Research Station, Redwood Sciences Laboratory, Arcata, CA.

Dark, S.J. 1997. A landscape-scale analysis of mammalian carnivore distribution and habitat use by fisher. M.S. Thesis, Humboldt State Univ. 67 pp

Davidson, C. 1994. Westward Frog. Multimedia Tour of Calif. (images, sounds, and species notes). http://ice.ucdavis.edu/Toads/oldpage/wwfrog.html

Davis: University of California, Centers for Water and Wildland Resources. 1996. Sierra Nevada Ecosystem Project, Final Report to Congress.

Daw, S. K., and S. DeStefano. 2001. Forest structure of Northern Goshawk nest stands and post-fledging areas. Journal of Wildlife Management 65:59–65.

de Vos, A. 1951. Recent findings in fisher and marten ecology and management. Transactions North American Wildl. Conf. 16:498-505.

Dean Runyan Associates. 1994. "Campers in Calif. - Travel Patterns and Economic Impacts." Portland, OR. July 1994. 31 pages.

Dean Runyan Associates. 1996. "Calif. Travel Impacts by County, 1991-1994." Portland, OR. March 1996. 105 pages.

Dean Runyan Associates. 1999. "Calif. Travel Impacts by County, 1992-1997." Portland, OR. February 1999. 104 pages.

Delaney, D.K., T.G. Grubb, P. Beier, L.L. Pater, and M.H. Reiser. 1999. Effects of helicopter noise on Mexican spotted owls. Journal of Wildlife Management 63:60-76.

Delaney, David K. and Teryl G. Grubb. 2001. Effects of Off-Highway Vehicle Noise on Northern Spotted Owls: Sound Data Results. A report to the Mendocino National Forest. Contract Number 43-91Z9-0055.

Delaney, David K. and Teryl G. Grubb. 2003. Effects of Off-Highway Vehicle Noise on Northern Spotted Owls: 2002 Results. A Report to the State of California Department of Parks and Recreation, Off-Highway Motor Vehicle Recreation Division Contract Number 4391Z9-0-0055.

Delaney, David K., Teryl G. Grubb, Paul Beier, Larry L. Pater, and M. Hildegard Reiser. 1999. Effects of Helicopter Noise on Mexican Spotted Owls. Journal of Wildlife Management Vol. 63 (1), Pages 60-76.

Detrich, P. 1982. Results of California winter bald eagle survey--1982. U. S. Dept. Int. Fish Wildl. Serv., Sacramento, CA. 16 pp.

Detrich, P. 1990. The California bald eagle management plan - draft; unpublished report. Available at the Tahoe National Forest Supervisor's Office, 631 Coyote Street, Nevada City, CA. 71p.

deVos, J.C., M.R. Conover, and N.E. Headrick. 2003. Mule deer conservation: Issues and management strategies. Jack H. Berryman Institute Press. Logan, UT.

Dietrich, P.J. 1981. Historic range of breeding bald eagles in California. Unpublished manuscript. Redding, CA. 17 pp.

Dillingham, C. P. 2005. Conservation Assessment for *Meesia triquetra* (three-ranked hump-moss) and *Meesia uliginosa* (broad-nerved hump-moss) in California with a focus on the Sierra Nevada Bioregion. Unpublished report prepared for R5 Forest Service, Vallejo, California. 28 pages.

Dole, J.W. 1998. Professor at California State University, Northridge. Personal communication

Dougherty, C.K., G.R. Smith. 2006. Acute effects of road de-icers on the tadpoles of three anurans. Applied Herpetology, Vol. 3(2), pp. 87-93.

Douglass, Kriss S, John Hamann, and Gayle Joslin. 1999. Vegetation, Soils and Water. Pages 9.1-9.11 *In* G. Joslin and H. Youmans, coordinators. Effects of recreation on Rocky Mountain wildlife: A review for Montana. Committee on effects of recreation on wildlife, Montana Chapter of the Wildlife Society. 307 pages.

Dovers, S.R., T.W. Norton, and J.W. Handmer. 1996. Uncertainty, ecology, sustainability, and policy. *Biodiversity and Conservation* 5:1143-1167.

Drost, C.A., and G.M. Fellers. 1996. Collapse of a regional frog fauna in the Yosemite area of the Calif. Sierra Nevada, USA. *Conservation Biology* 10:414-425.

Duane, Timothy. 1999. Shaping the Sierra: Nature, Culture, and Conflict in the Changing West. University of California Press. Berkeley and Los Angeles, CA. Lewis, Henry. 1973. Patterns of Indian Burning in California: Ecology and Ethnohistory. Pp. 55-116 *In: Before the Wilderness: Environmental Management by Native Californians*. Edited by T. C. Blackburn and K. Anderson. Ballena Press. Menlo Park, CA.

Duellman, W.E. and L. Trueb. 1986. Biology of the amphibians. McGraw-Hill Publishing Company. New York, NY. 670 pp.

Duncan Furbearer Interagency Workgroup. 1989. Workgroup assembled to review the proposed Duncan Timber Sale, Tahoe National Forest and formulate proposed Management Guidelines. Members present: Slader Buck, Reginald Barrett, Terri Simon-Jackson, Gordon Gould, Ron Schlorff, Jeff Finn, Joelle Buffa, Maeton Freel, Jeff Mattison, Mike Chapel, Mariana Armijo, Julie Lydick and Phil Turner.

Duron, Wendy. 1990. Survey of historic locations of *Ivesia webberi* on the Plumas and Tahoe National Forests. A cost-share effort between the Nature Conservancy, the Tahoe National Forest and the Plumas National Forest - unpublished report.

Ecology. 1-17. University of Oregon, Eugene Oregon.

Elmore, Wayne and Robert L. Beschta. 1987. Riparian areas: Perceptions in Management. Rangelands 9 (6), pages 260-265.

Endangered Species Act. 1973 as amended. 50 CFR Chapter IV part 402. 12pp.

Erman, N. A. 2002. Lessons from a long-term study of springs and spring invertebrates (Sierra Nevada, California, U.S.A.) and implications for conservation and management. Conference Proceedings, Spring-fed Wetlands: Important Scientific and Cultural Resources of the Intermountain Region, 2002. Available online at: http://www.wetlands.dri.edu. 13 pages.

Evermann, B.W. 1905. The golden trout of the southern High Sierras. Bull. U.S. Bur. Fish. 25:1-51.

Fahrig, L., J.H. Pedlar, S.E. Pope, P.D. Taylor, and J.F. Wegner. 1995. Effect of road traffic on amphibian density. Biological Conservation 73:177-182.

Fahrig, Lenore, John H. Pedlar, Shealagh E. Pope, Philip D. Taylor and John F. Wegner. 1995. Effect of Road Traffic on Amphibian Density. Biological Conservation. Vol. 73. Pages 177-182.

Federal Register 1970. Volume 35, page 13520. Listing of Lahontan Cutthroat Trout as endangered species.

Federal Register 1975. Volume 40, page 29864. Listing of Lahontan Cutthroat Trout as threatened species.

Federal Register 2001. Volume 66 (49): 14626-14758. Final determinations of critical habitat for the California Red-legged Frog; Final Rule.

Ferguson, Leslie; Celestine Lacey Duncan, and Kathleen Snodgrass. 2003. Backcountry road maintenance and weed management. Tech. Rep. 0371-2811-MTDC. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. 22 pages.

Fitch, H.S. 1938. *Rana boylii* in Oregon. Copeia, Vol 1938(3):pg. 148.

Flowers, Seville. 1973. Mosses: Utah and the west. Brigham Young University Press. 567 pages.

Foltz, Randy B. and Dexter L. Meadows. 2007. Impacts of ATV traffic on undesignated trails. Streams systems technology center. 3 pages.

Forman, R.T.T. and L.E. Alexander. 1998. Roads and their major ecological effects. Annual Review of Ecology and Systematics 29:207-31.

Formon, Richard T. and Lauren E. Alexander. 1998. Roads and Their Major Ecological Effects. Annual Review Ecology. Vol. 29, Pages 207-231.

Fowler, C., B. Valentine, S. Sanders and M. Stafford. 1991. Habitat Suitability Index Model: willow flycatcher (*Empidonax traillii*). Unpublished document, USDA Forest Service, Tahoe National Forest. 15 pp.

Fowler, Catherine. 1988. Habitat capability model for the northern goshawk. USFS, Tahoe National Forest, Nevada City, CA. 21 pp.

Franklin, Jerry F. 2003. Challenges to temperate forest stewardship – focusing on the future. CSIRO Publishing. 10 pages.

Fraser, J.D. 1985. The impact of human activities on bald eagle populations - a review. Pages 68-84 in J.M. Gerrard and T.M. Ingram, eds. The bald eagle in Canada. Headingley, Manitoba: White Horse Plains Pub.

Fraser, J.D. 1985. The impact of human activities on bald eagle populations - a review. Pages 68-84 in J.M. Gerrard and T.M. Ingram, eds. The bald eagle in Canada. Headingley, Manitoba: White Horse Plains Pub.

Fraser, J.D., L.D. Frenzel, J.E. Mathisen. 1985. The impact of human activities on breeding bald eagles in north-central Minnesota. J. Wildl. Manage. 59:585-592.

Freddy, D. J., W. M. Bronaugh, and M. C. Fowler. 1986. Responses of mule deer to disturbance by persons afoot and snowmobiles. Wildl. Soc. Bull. 14:63-68.

Freel, M. 1991. A literature review for management of fisher and marten in California. Unpubl. Document, USDA Forest Service, Pacific Southwest Region.

Freel. K. 1997. Herpetologist with USGS, Point Reyes, CA [personal communication with Tahoe National Forest Fisheries Biologist].

French, J., and J. Curran. 1991. DRAFT Lahontan cutthroat trout fishery management plan for the Quinn River drainage basin. Nevada Department of Wildlife, Reno, Nevada. 46 pp.

Frest, T.J. and E.J. Johannes. 1993. Mollusk Species of Special Concern within the Range of the Northern Spotted Owl. Final Report to the Forest Ecosystem Management Working Group, USDA, Forest Service. Deixis Consultants, Seattle WA. 98 pages.

Frest, T.J. and E.J. Johannes. 1993. Mollusk Species of Special Concern within the Range of the Northern Spotted Owl. Final Report to the Forest Ecosystem Management Working Group, USDA, Forest Service. Deixis Consultants, Seattle WA. 98 pages.

Frest, T.J.; Johannes, E.J. 1995. Interior Columbia basin mollusk species of special concern. Seattle,WA: Deixis Consultants; Final report to the Interior Columbia Basin Ecosystem Management Project, a contract report prepared for the U.S. Department of Agriculture, Forest Service; U.S. Department of the Interior, Bureau of Land Management, Upper Columbia River Basin Ecosystem Management Project. Walla Walla, WA.Contract #43-0E00-4-9112. 274 p. (plus appendices).

Frest, T.J.; Johannes, E.J. 1998 (1995). Freshwater mollusks of the Upper Klamath Drainage, Oregon. Seattle, WA: Deixis Consultants; 1998 yearly report to Oregon National Heritage Program and Klamath Project, U.S. Department of the Interior, Bureau of Reclamation. Contract #ORFO 092094, 200 p. (plus appendices).

Froehlich, H.A. 1979. Soil compaction from logging equipment: effects on growth of young ponderosa pine. *J. Soil and Water Conservation* 34:276-278.

Froehlich, H.A. and D.H. McNabb. 1984. Minimizing soil compaction in Pacific Northwest forests. Pages 159-192 In *Forest soils and treatment impacts: Proceedings of the 6th North American Forest Soils Conference, June 1983* edited by E.L. Stone. Knoxville, TN. Department of Forestry, Wildlife and Fisheries, Univ. Tennessee, Knoxville, TN 37920.

Furniss, M.J., T.D. Roelofs and C.S. Yee. 1991. Road construction and maintenance. In *Influences of forest and rangeland management on salmonid fishes and their habitats* edited by W.R. Meehan. Pages 297-323. Special Publication No. 19. American Fisheries Society, Bethesda, MD.

Gaines, William L.; Singleton, Peter H.; Ross, Roger C. 2003. Assessing the Cumulative Effects of Linear Recreation Routes on Wildlife Habitats on the Okanogan and Wenatchee National Forests. Gen. Tech. Rep. PNW-GTR-586. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 79 pages.

Garber, S.D. and J. Burger. 1995. A 20 year study documenting the relationship between turtle decline and human recreation. *Ecological Applications* 5:1151-1162.

Gerstung, E.R. 1986. Fishery management plan for Lahontan cutthroat trout (*Salmo clarki henshawi*) in California and western Nevada water. Inland Fisheries Administrative Report No. 86-, Federal Aid Project F33-R-11, The Resources Agency, California Department of Fish and Game. 54 pp.

Gerstung, E.R. 1986. Fishery management plant for Lahontan cutthroat trout (*Salmo clarki henshawi*) in California and western Nevada water. Inland Fisheries Administrative Report No. 86-, Federal Aid Project F33-R-11, The Resources Agency, California Department of Fish and Game. 54 pp.

Gerstung, E.R. 1988. Status, life history, and management of the Lahontan cutthroat trout. American Fisheries Society Symposium 4:93-106.

Gibson, David J., Eric D. Adams, Joseph S. Ely, Danny J. Gustafson, Douglas McEwen, and Tracy R. Evans. 2000. Eighteen years of herbaceous layer recovery of a recreation area in amesic forest. Journal of the Torrey Botanical Society, 127 (3), pages 230-239.

Gillespie, G. R. 2002. Impacts of sediment loads, tadpole density, and food type on the growth and development of tadpoles of the spotted tree frog *Litoria spenceri*: an in-stream experiment. Biological Conservation, 106:141-150.

Girard, C. 1854. Description of *Sebastues ruber, Sebastes ruber* var. *parvu, Sebastes variabilis*, and *Centrarchus maculosus*. The Pacific 3: 165-209.

Godish, T. 1991. *Air Quality*. Lewish Publishers, Inc.

Goebel, P. Charles, Brian J. Palik, and Kurt S. Pregitzer. 2003. Plant diversity contributions of riparian areas in watersheds of the northern lake states, USA. Ecological Applications, volume 13, number 6, pages 1595-1609.

Golightly, R.T, T.F. Penland, W.J. Zielinski, and J.M. Higley. 2006. Fisher diet in the Klamath/North Coast Bioregion. Unpublished report, Department of Wildlife, Humboldt State University, Arcata, California.

Golightly, R.T. and W.J. Zielinski. 1997. Food habits of fisher in northwestern California. (In prep.)

Graber, D.M. 1996. Status of terrestrial vertebrates. Pgs 709-726 in Vol. II Assessments and Scientific Basis for Management Options. Sierra Nevada Ecosystem Project, Final Report to Congress. Centers for Water and Wildland Resources, University of California, Davis CA.

Graumlich, L.J. 1993. A 1000 year record of temperature and precipitation in the Sierra Nevada. *Quaternary Research* 39:249-255.

Gray, E.M. 1995. DNA fingerprinting reveals a lack of genetic variation in northern populations of the western pond turtle (*Clemmys marmota*). Conservation Biology 5:1244-1255.

Green, G. A., H. L. Bombay, M. L. Morrison. 2003. Conservation assessment of the willow flycatcher in the Sierra Nevada. Unpublished document. USDA Forest Service, Pacific Southwest Region, CA. 62 pp.

Green, G.A., H.L. Bombay, M.L. Morrison. 2003. Conservation Assessment of the willow flycatcher in the Sierra Nevada. USDA Forest Service, Pacific Southwest Region, Vallejo, CA. 62 pp.

Green, G.A., L.A. Campbell, and D.C. Macfarlane. Submitted. A conservation assessment for fishers (*Martes pennanti*) in the Sierra Nevada of California. USDA Forest Service, Pacific Southwest Region, Vallejo, California. 72 p.

Greene, C. 1995. Habitat requirements of great gray owls in the central Sierra Nevada. M.S. Thesis. University of Michigan. 94pp.

Grinnell, J. and A.H. Miller. 1994. The distribution of the birds of California. Pacific Coast Avifauna, No. 27. 608 pp.

Grinnell, J., and T.I. Storer. 1924. Animal life in the Yosemite; an account of the mammals, birds, reptiles, and amphibians in a cross-section of the Sierra Nevada. Univ. California Press, Berkeley.

Grinnell, J., J.S. Dixon, and J.M. Linsdale. 1937. Fur-bearing mammals of California. Univ. of California Press, Berkeley. Vols. 1 and 2. 777p

Grubb, T.G. 1976. A survey and analysis of bald eagle nesting in Western Washington. M.S. Thesis, Univ. Washington, Seattle. 87 pp.

Grubb, T.G. 1995. Food habits of bald eagles breeding in the Arizona desert. Wilson Bulletin 107(2), pp. 258-274.

Grubb, T.G. 1995a. Constructing bald eagle nests with natural materials. USDA Forest Service research note RM-RN-535, 8p. Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

Grubb, T.G. 1995b. Food habits of bald eagles breeding in the Arizona Desert. Wilson Bulletin 107:258-274.

Grubb, T.G. and C.E. Kennedy. 1982. Bald eagle winter habitat on southwestern National Forests. USDA Forest Service Research paper RM-237, 13p. Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.

Grubb, T.G. and R.M. King. 1991. Assessing human disturbance of breeding bald eagles with classification tree models. J. Wildl. Manage. 55:500-511.

Grubb, T.G., L.L. Pater and K. K. Delaney. 1998. Logging truck noise near nesting northern goshawk. USDA Forest Research Note RMRS-RN-3.

Grubb, T.G., W.W. Bowerman, J.P. Giesy and G.A. Dawson. 1992. Responses of breeding bald eagles, *Haliaeetus leucocephalus*, to human activities in north central Michigan. Canadian Field-Naturalist 106(4):443-453.

Grubb, T.G., W.W. Bowerman, J.P. Giesy and G.A. Dawson. 1992. Responses of breeding bald eagles, *Haliaeetus leucocephalus*, to human activities in north central Michigan. Canadian Field-Naturalist 106(4):443-453.

Gucinski, Hermann; Furniss, Michael J.; Ziemer, Robert R.; Brookes, Martha H. 2001. Forest roads: a synthesis of scientific information. Gen. Tech. Rep. PNW-GTR-509. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 103 p.

Guldin, James M., tech. comp. 2004. Ouachita and Ozark Mountains symposium: ecosystem management research. Gen. Tech. Rep. SRS–74. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 321 p.

Gutiérrez, R. J., and S. Harrison. 1996. Applying metapopulation theory to Spotted Owl management: a history and critique. Pages 167–185 in D. R. McCullough, editor. Metapopulations and wildlife conservation. Island Press, Washington, D.C.

Gutierrez, R.J., M.E. Seamans and M.Z. Peery. 1999. Population ecology of the California spotted owl in the central Sierra Nevada: annual results 1998. Annual progress Report March 1999. Region 5, USDA Forest Service. 20pp.

Gutzwiller, K.J. and W.C. Barrow. 2003. Influences of roads and development on bird communities in protected Chihuanhuan desert landscapes. Biological Conservation 1113:225-237.

Hagans, D. K., W. E. Weaver, and M. A. Madej. 1986. Long-term on-site and off-site effects of logging and erosion in the Redwood Creek Basin, northern California. Pages 38–65 In: Papers presented at the American Geophysical Union meeting on cumulative effects. National Council for Air and Stream Improvement, New York, Technical Bulletin 490.

Halford, Anne. 1992. Interim management guide for *Lewisia longipetala* – a cost-share agreement between the California Native Plant Society and the Tahoe, Eldorado and Lake Tahoe Basin Management Unit – an administrative report - Unpublished USDA PSW region, 34 pages.

Hamann, B., H. Johnston, P. McClelland, S. Johnson, L. Kelly and J. Gobielle. 1999. Birds. Pages 3.1-3.34. In: G. Joslin and H. Youmans, cords. Effects of recreation on Rocky Mountain wildlife: a review for Montana. Committee on the effects of Recreation on Wildlife, Montana Chapter of the Wildlife Society.

Hargis C.D., J.A. Bissonette, and D.L. Turner. 1999. The influence of forest fragmentation and landscape pattern on American martens. J. of Appl. Ecol. 36:157-172.

Hargis, C.D. and D.R. McCullough. 1984. Winter diet and habitat selection of marten in Yosemite National Park. Journal of Wildlife Management 48:140-146.

Hargis, C.D. and J.A. Bissonette. 1995. The effect of forest fragmentation on American marten populations and prey availability. Final report for the Utah Division of Wildlife Resources, Wasatch-Cache National Forest, Ashley National Forest, Utah Wilderness Association (Contract No. 91-9166). December 31, 1995. 96pp.

Hargis, C.D. and J.A. Bissonette. 1997. The influence of forest fragmentation and prey availability on American marten populations: a landscape level analysis. Pages 437-451 in Proulx, Gilbert, H.N. Bryant and P.M. Woodard, eds. *Martes*: taxonomy, ecology, techniques, and management. Proceedings of the Second International Martes symposium. The Provincial Museum of Alberta. Edmonton, Alberta, Canada. 474 p.

Hargis, C.D., J.A. Bissonette and D.L Turner. 1999. The influence of forest fragmentation and landscape pattern on American martens. Journal of Applied Ecology 36:157-172.

Hargis, C.D., Perloff, R.D. and C. McCarthy. 1991. Home ranges and habitats of northern goshawks in eastern California. Draft Rep. C.D. Hargis, Dept. Fish and Wildl., Utah State Univ. Logan, UT. 17 pp.

Harmata, A.R. and Oakleaf, B. 1992. Bald eagles in the greater Yellowstone ecosystem: an ecological study with emphasis on the Snake River, Wyoming. Cheyenne, WY: Wyoming Game and Fish Department. [Pages unknown] In: Gaines, William L.; Singleton, Peter H.; Ross, Roger C. 2003. Assessing the Cumulative Effects of Linear Recreation Routes on Wildlife Habitats on the Okanogan and Wenatchee National Forests. Gen. Tech. Rep. PNW-GTR-586. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Harr, R.D. and R.A. Nichols. 1993. Stabilizing forest roads to help restore fish habitats: a northwest Washington example. *Fisheries* 18(4):18-22.

Harris, J.H., S.D. Sanders, and M. A. Flett. 1987. Willow flycatcher surveys in the Sierra Nevada. Western Birds 18:27-36.

Harris, J.H., S.D. Sanders, and M.A. Flett. 1988. The status and distribution of the willow flycatcher in the Sierra Nevada: results of the 1986 Survey. California Department of Fish and Game. Wildlife Management Division Administrative Report. 88-1. 32 pp.

Harrison, C. 1978. A field guide to the nests, eggs and nestlings of North American birds. W. Collins Sons and Co., Cleveland OH. 416 pp.

Harrison, S., Hugh Safford, James B. Grace, Joshua H. Viers, Kendi F. Davies. 2006. Regional and local species richness in an insular environment: Serpentine plants in California. Ecological Monographs 76 (1), pages 41-56.

Havlick, David G. 2002. No Place Distance: Roads and Motorized Recreation on America's Public Lands. Island Press. Washington D.C. 297 pp.

Hayes, M. P. and M. R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylii*): implications for management. Proceedings of the Symposium on Management of Amphibians, Reptiles and Small Mammals in North America. Gen. Tech. Rpt. RM-166, Rocky Mountain Research Station, USDA Forest Service. Fort Collins, CO. pp 144-158.

Hayes, M.P. and M.R. Jennings. 1986. Decline of ranid frog species in western North America: are bullfrogs (*Rana catesbeiana*) responsible? Journal of Herpetology 20(4):490-509.

Hayes, M.P. and M.R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylii*): implications for management. Proceedings of the Symposium on Management of Amphibians, Reptiles and Small Mammals in North America. Gen. Tech. Rpt. RM-166, Rocky Mountain Research Station, USDA Forest Service. Fort Collins, CO. pp 144-158.

Heinemeyer, K.S. 1993. Temporal dynamics in the movements, habitat use, activity, and spacing of reintroduced fishers in Northwestern Montana. [M.S.]. Missoula: University of Montana. 158 p.

Hejl, Sallie J. 1997. A landscape perspective on the effects of clearcutting on birds in cedar/hemlock forests. Intermountain Journal of Science 3(4): 149.

Hickman, J.C. 1993. *The Jepson Manual - Higher Plants of Calif.* Berkeley and Los Angeles: Univ. Calif. Press.

Hickman, T., and R.F. Raleigh. 1982. Habitat suitability index models: cutthroat trout. Report number USFWS/OBS-82/10.5. USDI, Fish and Wildlife Service, Western Energy and Land Use Team, Office of Biological Services, Washington, D.C.

Hilborn, R. 1987. Living with uncertainty in resource management. *North American J. of Fisheries Mgt* 7:1-5.

Hill, M. 1975. Geology of the Sierra Nevada. Univ. Calif. Press, Berkeley, CA.

Hine, R.L., B.L. Les, and B. F. Hellmich. 1981. Leopard frog populations and mortality in Wisconsin, 1974-76. Wis. Dep. Natur. Resour. Tech Bull. 122. 39pp.

Holland, D.C. 1991. A synopsis of the ecology and status of the western pond turtle (*Clemmys marmorata*) in 1991. Report to USFWS National Ecology Research Center, San Simeon Field

Holland, D.C. 1994. The Western Pond Turtle: Habitat and History. Final Report, U.S. Department of Energy, Bonneville Power Administration, Division of Fish and Wildlife, Wildlife diversity Program, Oregon Department of Fish and Wildlife. August.

Holling, C.S. 1978. *Adaptive environmental assessment and management.* John Wiley and Sons. New York, NY.

Hornocker, M.G. and H.S. Hash. 1981. Ecology of the wolverine in northwestern Montana. Can. J. Zool. 59:1286-1301.

Howard, J. K. & K. M. Cuffey, 2003. Freshwater mussels in a California North Coast Range river: occurrence, distribution, and controls. Journal of the North American Benthological Society 22: 63–77.

Huggett, R. J. 1993. *Modeling the human impact on nature: systems analysis of environmental problems.* Oxford Univ. Press, New York.

Hupf, T. H. 1977. Natural histories of two species of leopard frogs, *Rana blairi* and *Rana pipiens*, in a zone of sympatry in northeastern Nebraska. MS Thesis, University of Nebraska, Lincoln, Lincoln, Nebraska.

Hynes, H.B.N. 1970. *The Ecology of Running Waters*. Liverpool Univ. Press, Liverpool, England. 555 pages.

Ikeda, D. H. and J. A. Witzman. 1989. Ecological survey and status report for *Astragalus webberi* on the Plumas National Forest. A cost-share agreement between the Nature Conservancy and the Plumas National Forest – an administrative report - Unpublished, USDA, PSW region.

Irwin, J.T., J.P. Costanzo and R.E. Lee. 1999. Terrestrial overwintering in the northern cricket frog, *Acris crepitans*. Canadian Journal of Zoology 77:1240–1246

Ivey, G. 1995. Draft paper given at the Sandhill Crane Workshop, August 8-9, 1995. Preliminary unpublished data. Alturas, CA.

Jalkotzy, M. G., P. I. Ross, and M. D. Nasserden. 1997. The Effects of Linear Developments on Wildlife: A Review of Selected Scientific Literature. Prepared for Canadian Association of Petroleum Producers. Arc Wildlife Services Ltd., Calgary. 115pp.

James, A.H. 1997. Sandhill cranes breeding in Sierra Valley, Ca. West Birds 8:159-160.

Jassby, A.D., J.E. Reuter, R.P. Axler, C.R. Goldman, and T.J. Hackley. 1994. Atmospheric deposition of nitrogen and phosphorous in the annual nutrient load of Lake Tahoe (Calif. Nevada). *Water Resources Research*, 30:2207-2216.

Jennings, M. 1993. Current Status of 25 species of California Herps. Presented at the 1993 Wildlife Society Western Section Meeting.

Jennings, M. R. 1996. Volume II. Chapter 31. Status of amphibians. Pp 921-944 in Sierra Nevada Ecosystem Project: Final report to Congress. Centers for Water and Wildland Resources, University of California, Davis.

Jennings, M. R. 1997. Research Associate with California Academy of Sciences, San Francisco, CA [personal communication with Tahoe National Forest Biologist].

Jennings, M. R. 1998. USGS Herpetologist, Davis, CA. Personal communication.

Jennings, M. R., and M. P. Hayes. 1985. Pre-1900 overharvest of California red-legged frogs (*Rana aurora draytonii*): The inducement for bullfrog (*Rana catesbeiana*) introduction. Herpetologica, 41:94-103.

Jennings, M. R., and M. P. Hayes. 1994. Amphibian and reptile species of special concern in California. A Report to the California CDFG, Rancho Cordova, California. 255 pp.

Jennings, M.K. 1988. Natural history and decline of native ranids in California. Proceedings of the Conference on California Herpetology. Southwestern Herpetologists Society. p. 61-72.

Jennings, M.R. 1988. Natural history and decline of native ranids in California. Pgs. 61-72 in Proceedings of the Conference on California Herptology. Eds. H.P. DeLisle, P. R. Brown, B. Kaufman and B. M. McGurty.

Jennings, M.R. and M.P. Hayes. 1985. Pre-1900 over harvest of California red-legged frogs (*Rana aurora draytonii*) : the inducement for bullfrog (*Rana catesbeiana*) introduction. Herpetologica 41 (1): 94-103.

Jennings, M.R. and M.P. Hayes. 1992. Copy of locality records from the data base of Mark R. Jennings and Marc P. Hayes for use in support of the petition to list *Rana aurora draytonii* under the endangered Species Act. 30pp.

Jennings, M.R. and M.P. Hayes. 1994. Amphibian and reptile species of special concern in California. California Department of Fish and Game, Final Report. 255 pp.

Jennings, M.R. and M.P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California, California Department of Fish and Game, pgs. 80-83.

Jennings, Mark R., and Michael M. Fuller. 2004. Origin and distribution of leopard frogs, *Rana pipiens* complex, in California. California Fish and Game 90(3):119-139.

Johnsgard, P.A. 1975. North American game birds of upland and shoreline. Univ. Nebraska Press, Lincoln. 183 pp.

Johnson, G., D. Bennett, and T. Bjornn. 1983. Juvenile emigration of Lahontan cutthroat trout in the Truckee River/Pyramid Lake system. Pages 90-175. In: Restoration of a Reproductive Population of Lahontan Cutthroat Trout (*Salmo clarki henshawi*) to the Truckee River/Pyramid Lake System. Special Report U.S. Department of the Interior, Fish and Wildlife Service, Great Basin Complex Office, Reno, Nevada.

Jones & Stokes Associates, Inc. 1987. Survey of habitat and populations of the Valley elderberry longhorn beetle along the Sacramento River. Final report prepared for U. S. Department of Interior, Fish and Wildlife Service, Region 1. Sacramento, California.

Jones and Stokes. 1997. Eldorado National Forest survey.

Jones, J. A., F. A. Swanson, B. C. Wemple, and K. U. Snyder. 2000. Effects of roads on hydrology, geomorphology, and disturbance patches in stream networks. Conservation Biology, 14:76-85.

Jordan, D.S. and B.W. Evermann. 1896. Fishes of North and Middle America. Bull. U.S. Nat. Mus. 47:1-3705.

Joslin, G., and H. Youmans, coordinators. 1999. Effects of recreation on Rocky Mountain wildlife: a review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society. 307pp.

Joslin, G., and H. Youmans, Coordinators. 1999. Effect of Recreation on Rocky Mountain Wildlife: A Review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society. 307 pages.

Jurek, R.M. 1988. Five-year status report - bald eagle. State of California, The Resources Agency, Department of Fish and Game; unpublished report. 15p.

Kamler JF, Ballard WB. 2002. A review of native and nonnative red foxes in North America. Wildl Soc Bull 30:370–379

Kan, T., 1993. Interim Management Guide for *Eriogonum umbellatum* var. *torreyanum*. A cost-share agreement between the Nature Conservancy and the Tahoe National Forest – an administrative report - Unpublished, USDA, PSW region.

Kassar, Chris. 2005. Motorized Recreation at a Crossroads: Lessons from the Past Converge with Management Practices of the Future – Off-Road Vehicle Use on Public Lands. A report completed for the Friends of the Inyo. 66 pages.

Kasworm, W .F. and T.L. Manley. 1990. Road and Trail Influences on Grizzly Bears and Black Bears in Northwest Montana from Bears: Their Biology and Management, Vol. 8, A Selection of Papers from the Eighth International Conference on Bear Research and Management, Victoria, British Columbia, Canada, February 1989, (1990), pp. 79-84

Kattelmann, R. and M. Embury. 1996. Riparian areas and wetlands. Pages 201-273 In *Sierra Nevada Ecosystem Project: Final Report to Congress, Assessments, Commissioned Reports and Background Information*, Vol III Ch. 5. Univ. Calif. Centers for Water and Wildland Resources, Davis, CA 95616-8750.

Kaye, Thomas N. and Jennie R. Cramer. 2005. Conservation assessment for *Cypripedium fasciculatum* and *Cypripedium montanum*. Developed by the Institute for Applied Ecology for the R-5 USDA Forest Service, unpublished. 50 pages.

Keane, John. 1995. Unpublished report. Draft report to the California Tahoe Conservancy RE: Northern Goshawks final report.

Keister, G.P. and R.G. Anthony. 1983. Characteristics of bald eagle communal roosts in the Klamath Basin, Oregon and California. J. Wildl. Manage. 47:1072-1079.

Keller, E.A. and F.J. Swanson. 1979. Effects of large organic material on channel form and fluvial processes. *Earth Surface Processes* 4:361-80.

Knapp, R. 1994. Wilderness Record. Volume 19, Number 2. Davis, California.

Knapp, R. A., and K. Matthews. 2000. Non-native fish introductions and the decline of the mountain yellow-legged frog (*Rana muscosa*) from within protected areas. Conservation Biology, 14:428-438.

Knapp, R.A. 1993. Non-native trout in natural lakes of the Sierra Nevada: An analysis of their distribution and impacts on native aquatic biota. Sierra Nevada Ecosystem Project: Final Report to Congress, Volume III, Chapter 8, pp 363-407. Davis: University of California, Centers for Water and Wildland Resources.

Knapp, R.A. 1996. Non-native trout in natural lakes of the Sierra Nevada: An analysis of their distribution and impacts on native aquatic biota. Sierra Nevada Ecosystem Project: Final Report to Congress, Volume III, Chapter 8, pp 363-407. Davis: University of California, Centers for Water and Wildland Resources.

Knight, N.J. 1985. Microhabitats and temperature requirements of hardhead (*Mylopharadon conocephalus*) and Sacramento squawfish (*Ptychocheilus grandis*), with notes for some other native California stream fishes. Unpubl. Ph.D Dissertation., University of California, Davis. 161pp.

Knight, R.L. and K. J. Gutzwiller. 1995. Wildlife and recreationists: Coexistence through management and research. 372pp. Island Press: Washington, D.C.

Knight, R.L. and S. K. Skagen. 1987. Effects of recreational disturbance on birds of prey: a review. Southwest Raptor Management Symposium and Workshop.

Knight, R.L.; Cole, D.N. 1991. Effects of recreational activity on wildlife in wildlands. Transactions of the North American Wildlife and Natural Resources Conference. 56: 239-247.

Koch, D.L., and J.J. Cooper, E.L. Lider, R.L. Jacobson and R.J. Spencer. 1979. Investigations of Walker Lake, Nevada: Dynamic ecological relationships. Desert Research Center, University of Nevada, Reno. 191 pp.

Koehler, G.M., W.R. Moore and A.R. Taylor. 1975. Preserving the pine marten: management guidelines for western forests. Western Wildlands 2:31-36.

Koide, Roger T. and Harold A. Mooney. 1987. Revegetation of serpentine substrates: Response to Phosphate Application. Environmental Management volume 11, number 4, pages 563-567.

Kondolf, G.M., R. Kattelmann, M. Embury, and D.C. Erman. 1996. Status of riparian habitat. Pages 1009-1030 In *Sierra Nevada Ecosystem Project: Final Report to Congress, Assessments and scientific basis for management options*, Vol II Ch. 30. Univ. Calif. Centers for Water and Wildland Resources. Davis, CA 95616-8750.

Krohn, W.B., Arthur, S.M., Paragi, T.F. 1994. Mortality and vulnerability of a heavily trapped fisher population. In: Buskirk, S.W., Harestad, A.S., Raphael, M.G., comps., eds. Martens, sables and fishers: biology and conservation. Ithaca, NY: Cornell University Press: 137-148.

Kruckeberg, Arthur R. 1984. California serpentines: flora, vegetation, geology, soils and management problems. University of California Press, Berkeley. 180 pages.

Kucera, T.E. (1995) Recent photograph of a Sierra Nevada red fox. California Fish and Game, 81, 43–44.

Kucera, T.E., W.J. Zielinski, and R.H. Barrett. 1995. Current distribution of the American marten, *Martes americana*, in California. Calif. Fish and Game 81:96-103

Kunz, T.H. and R.A. Martin. 1990. *Plecotus townsendii*. Mammalian Species. The American Society of Mammalogists. No. 175:1-6.

Kupferberg, S. J. 1996a. Hydrologic and geomorphic factors affecting conservation of a river-breeding frog (Rana boylii). Ecological Applications, 6:1332-1344.

Laeger, Eve. 2002. *Botrychium* surveys in California-2002. Prepared for the Sierra Nevada Framework. Unpublished.

Lamberson, R.H., R.L. Truex, W.J. Zielinski, D.C. Macfarlane. 2000. Preliminary analysis of fisher population viability in the southern Sierra Nevada. Unpublished document, February 15. Available at USDA Forest Service, Tahoe National Forest Supervisor's Office, Nevada City, CA. 20pp.

Langley, P. 1996. Quality Assessment of Late Seral Old-Growth Forest Mapping. Pages 663-670 In *Sierra Nevada Ecosystem Project: Final Report to Congress, Assessments and scientific basis for management options*, Vol. II Ch. 30. Univ. Calif. Centers for Water and Wildland Resources. Davis, CA 95616-8750.

Lannoo, M. editor. 2005. Amphibian declines: The conservation status of the United States species. University of California Press. 1094 pgs.

Larson, D.J. 1996. Historic water-use priorities and public policies. Pages 163-180 In *Sierra Nevada Ecosystem Project: Final Report to Congress, Assessments and scientific management options.* Vol II Ch. 8. Univ. Calif. Centers for Wildland Resources. Davis, CA 95616-8750.

Laymon, S.A. 1988. The ecology of the spotted owl in the central Sierra Nevada, California. University of California, Berkeley. PhD Dissertation. 285pp.

Lea, T.N. 1968. Ecology of the Lahontan cutthroat trout, *Salmo clarki henshawi*, in Independence Lake, California. Master's thesis. University of California, Berkeley. 95 pp.

Lefcort, H. 1996. Adaptive, chemically mediated fright response in tadpoles of the southern leopard frog, *Rana utricularia*. Copeia 1996:455–459

Lefcort, H. 1998. Chemically mediated fright response in southern toad (*Bufo terrestris*) tadpoles. Copeia 1998:445–450.

Lefcort, H., K.A. Hancock, K.M. Maur and D.C. Rostal. 1997. The effects of used motor oil, silt, and the water mold *Saprolegnia parasitica* on the growth and survival of mole salamanders (genus *Ambystoma*). Archives of Environmental Contamination and Toxicology 32:383–388

Lehman, R.N. 1979. A survey of selected habitat features of 95 bald eagle nest in California. Calif. Dept. Fish and Game. Wildl. Manage. Branch Admin. Rep. 79-1, Sacramento. 23 pp.

Lehman, R.N., D.E. Craigie, P.L. Colins and R.S. Griffen. 1980. An analysis of habitat requirements and site selection criteria for nesting bald eagle in California. Report by Wilderness Research Institute, Arcata, CA. for U.S. Forest Service. Region 5, San Francisco, CA. 106 pp.

Leiberg, J.B. 1902. *Forest conditions in the northern Sierra Nevada, Calif.* Professional Paper No. 8, Series H, Forestry 5. USDI Geological Survey Washington, D.C.

Leung, Yu-Fai and Jeffrey L. Marion. 1996. Trail degradation as influenced by environmental factors: a state-of-the-knowledge review. Journal of Soil and Water Conservation, 51 (2), 9 pages.

Lewis J.C., Sallee K.L., Golightly R.T. 1999. Introduction and range expansion of nonnative red foxes (*Vulpes vulpes*) in California. Am Midl Nat 142:372–381

Lewis, J.C., K.L. Sallee, and R.T. Golightly Jr. 1993. Introduced red fox in California. Calif. Dep. of Fish and Game, Nongame Bird and Mammal Sec. Rep. 93-10. 56pp. + appends.

Licht, L.E. 1971. Breeding habits and embryonic thermal requirements of the frog, *Rana aurora aurora* and *Rana pretiosa pretiosa*, in the Pacific Northwest. Ecology 52(1):116-124.

Lidberg, J. personal communication. 2006. California and Nevada Interstate Mule Deer Population Numbers. CA Dept. of Fish and Game.

Liddle, M. 1997. Recreation ecology: the ecological impact of outdoor recreation and ecotourism. New York: Chapman and Hall. 639 pgs.

Lind, A. 1996. Research Herpetologist, Pacific Southwest Region, USDA Forest Service, Arcata, CA, personal observation.

Lind, A.J. 2005. Reintroduction of a declining amphibian: determining an ecologically feasible approach for the foothill yellow-legged frog (*Rana boylii*) through analysis of decline factors, genetic structure, and habitat associations. Ph.D. Dissertation, University of California, Davis. (March) 169 pp.

Lindh, Brianna C. and Patricia S. Muir. 2004. Understory vegetation in young Douglas-fir forests: does thinning help restore old-growth composition? Forest Ecology and Management 192, pages 285-296.

Littlefield, C.D. 1982. The status and distribution of greater sandhill cranes in California, 1981. The California Resources Agency, Department of Fish and Game.

Littlefield, C.D. 1989. Status of greater sandhill crane breeding populations in California, 1988. State of Calif. the Resources Agency, Dept. of Fish and Game, Wildlife Management Division, Nongame Bird and Mammal Section. 40 pp.

Litton, R. Burton Jr. 1984. Visual Vulnerability of the Landscape: Control of Visual Quality. USDA Forest Service Research Paper WO

Lloyd, Alan C. and Thomas A. Cackette. 2001. Diesel Engines: Environmental Impact and Control. Journal of the Air and Waste Management Association, Vol. 51. Pages 809-847.

Longhurst, W.M., A.S. Leopold, and R.F. Dasmann. 1952. A survey of Calif. deer herds: their ranges and management problems. *Calif. Department of Fish and Game Bulletin* No. 6.

Loomis, John B. and Robert Richardson. 2000. Economic values of protecting roadless areas in the United States. An analysis prepared for the Wilderness Society and Heritage Forests Campaign.

Loos G., and P. Kerlinger. 1993. Road mortality of saw-whet and screech-owls on the Cape May peninsula. J. Raptor Res. 27:210–213

MacDonald, L., A. Smart, and R. Wissmar. 1991. "Monitoring Guidelines to Evaluate Effects of Forestry Activities on Streams in the Pacific Northwest and Alaska." US Environmental Protection Agency, Region 10, NPS Section, WD-139, 1200 Sixth Avenue, Seattle WA 98101.

Mace, R.D. and J.S. Waller, 1996 Grizzly Bear Distribution and Human Conflicts in Jewel Basin Hiking Area, Swan Mountains, Montana Wildlife Society Bulletin, Vol. 24, No. 3, Predators, (Autumn, 1996), pp. 461-467

Mack, R. Daniel Simberloff, W. M. Lonsdale, Harry Evans, M. Clout, and E. Bazzaz. 2000.

Magill, Arthur. 1990. Assessing Public Concern for Landscape Quality: A Potential Model to Identify Visual Thresholds. USDA Forest Service Pacific Southwest Research Station Research Paper PSW

Maharaj, V. and J. Carpenter. 1999. *The Economic Impacts of Fishing, Hunting and Wildlife Viewing on National Forest Lands.* American Sportfishing Association. April 1999. 41 pages.

Manci, K.M. D.N. Gladwin, R. Villella, and M. G. Cavendish. 1988. Effects of aircraft noise and sonic booms on domestic animals and wildlife: a literature synthesis. U.S. Fish and Wildlife Service, National Ecology Research Center, Fort Collins, CO. 88p.

Marra P.P. and R.L. Holberton. 1998. Corticosterone levels as indicators of habitat quality: effects of habitat segregation in a migratory bird during the non-breeding season. Oecologia 116, pp. 284–292.

Marrin, D.L., and Erman, D.C. 1982. Evidence against Competition between Trout and Nongame Fishes in Stampede Reservoir, California. North American Journal of Fisheries Management: Vol. 2, No. 3 pp. 262–269

Martin, D.L. 1992. Sierra Nevada Anuran Guide. Canorus Ltd. Ecological Research Team. Canorus Ltd. Press. San Jose. 28 pp.

Martin, D.L. 1992. Sierra Nevada Anuran Guide. Canorus, Ltd. Ecological Research Team. San Jose, CA.

Martin, D.L. 1994. Personal communication regarding mountain yellow-legged frog habitat needs.

Martin, S.K. 1987. The ecology of the pine marten (*Martes americana*) at Sagehen Creek, California. PhD Dissertation, University of California, Berkeley. 223pp

Maser, C., J.M. Trappe and D.C. Ure. 1978. Implications of small mammal mycophagy to the management of western coniferous forests. Trans. North Am. Wildl. and Nat. Resour. Conf. 43:78-88.

Mathisen, John E. 1968. Effects of Human Disturbance on Nesting of Bald Eagles. Journal of Wildlife Management, Vol. 32(1), pp. 1-6.

Matthews, K. 1999. Personal communication regarding movement of mountain yellow-legged frogs in the Sierra Nevada.

Maxell, B. A., and D. G. Hokit. 1999. Amphibians and reptiles. Pp. 2.1-2.30 In: J. Joslin and H. Youmans, committee chairs. Effects of recreation on Rocky Mountain wildlife: a compendium of the current state of understanding in Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of the Wildlife Society.

Mayer, K.E. and W.F. Laudenslayer, Jr., eds. 1988. "A Guide to the Wildlife Habitats of Calif." Calif. Dept of Forestry and Fire Protection. Sacramento, CA. 166 pages.

Mazerolle M. J. 2003. Night driving surveys as an amphibian monitoring technique in Kouchibouguac National Park, 1995–2002. Parks Canada - Ecosystem Monitoring and Data Reports 9, Parks Canada, Halifax, Nova Scotia, Canada.

Mazerolle M. J. 2004. Amphibian road mortality in response to nightly variations in traffic intensity. Herpetologica. 60:45–53.

McAfee, W.R. 1966. Lahontan cutthroat trout. Pages 225-231 in A. Calhoun, editor. Inland Fisheries management. California Department of Fish and Game, Sacramento, California.

McCammon B., J. Rector and K. Gebhardt. 1998. *A Framework for Analyzing the Hydrologic Condition of Watersheds*. USDA Forest Service and USDI Bureau of Land Management, BLM Technical Note 405. 48 pages

McCashion, J.D. and R. M. Rice. 1983. Erosion on logging roads in northwestern California: How much is avoidable? Journal of Forestry 81 (1): 23-26.

McCune, B. and L. Geiser. 1997. Macrolichens of the Pacific Northwest. Oregon State University and USDA Forest Service, Corvallis, OR, USA, 386 pages.

McCune, B., Jill Grenon, and Erin Martin. 2006. Lichens in relation to management issues in Sierra Nevada National Parks. Unpublished report developed cooperatively between Oregon State University and the National Park system. 45 pages.

McDonald, D.W. 1983. The ecology of carnivore social behavior. Nature 301:279-384.

McGarigal, K. 1988. Human-eagle interactions on the Lower Columbia River. M.S. Thesis, Oregon State Univ., Corvallis. 115pp.

McLellan, B.W. and D.M. Shackleton. 1988. Grizzly bears and resource extraction industries: effects of roads on behavior, habitat use, and demography. Journal of Applied Ecology. 25:451-460.

Megahan, W.F. and W.J. Kidd. 1972. Effects of logging and logging roads on erosion and sediment deposition from steep terrain. *J. Forestry.* 7:136-141.

Menke, J., C. Davis, P Beesley. 1996. Rangeland Assessment. Pp. 901-972 In: Sierra Nevada Ecosystem Project, Final Report to Congress, Vol. III, Assessments, commissioned reports and background information. Centers for Water and Wildland Resources, University of California, Davis CA

Merriam, Kyle E., Jon E. Keeley, and Jan L. Beyers. 2006. Ecological Applications 16(2), pages 515-527.

Meyer, Judy L., Louis A. Kaplin, Denis Newbold, David L. Strayer, Christopher J. Woltemade, Joy B. Zedler, Richard Beilfuss, Quentin Carpenter, Ray Semlitsch, Mary C. Watzin and Paul H. Zedler. 2003. Where Rivers are born: The Scientific Imperative for Defending Small Streams and Wetlands. American Rivers and Sierra Club, pps. 24.

Michael, D. N. 1995. Barriers and bridges to learning in a turbulent human ecology. Pages 461-485 In *Barriers and bridges to the renewal of ecosystems and institutions* edited by L.H. Gunderson, C.S. Holling, and S.S. Light. Columbia Univ. Press, New York, NY.

Migratory Bird Treaty Act of 1918. P.L. 65-186, Ch. 128, 40 Stat. 755; 16 U.S.C. 703-712. July 3.

Miller, R.G. 1951. The natural history of Lake Tahoe fishes. Unpubl. Ph.D. Dissertation. Stanford University. 160 pp.

Miller, R.S., G.S. Hochbaum and D.B. Botkin. 1972. A simulation model for the management of sandhill cranes. Yale University School of Forestry and Environmental Studies Bulletin 80.

Moll, J.E. 1998. Environmentally Sensitive Roads. Road Technology Series, San Dimas Technology and Development Center. San Dimas, CA.

Monk, J., B.J. Walton, R. Olendorff and D. Carrier. 1988. California peregrine falcon implementation plan. Santa Cruz Predatory Bird Research Group. 44 pp.

Montopoli, G.J. and D.A. Anderson. 1991. A logistic model for the cumulative effects of human intervention on bald eagle habitat. J. Wildl. Manage. 55:290-293.

Moore, R.L. and A.R Graefe, R.J. Gitelson, and E. Porter. 1992. *The Impacts of Rail-Trails - A Study of Users and Nearby Property Owners from Three Trails.* USDI National Park Service. Rivers and Trails Conservation Program. February, 1992. 34 pages.

Moore, R.L. and K. Barthlow. 1998. *The Economic Impacts and Uses of Long-Distance Trails - A Case Study of the Overmountain Victory National Historic Trail.* Department of Parks, Recreation and Tourism Management, North Carolina State Univ. Raleigh, NC. March 1998. 63 pages.

Morey, S. 1988. Northern Leopard Frog (*Rana pipiens*). Pages 90-91 in Zeiner, D.C., W. F. Laudenslayer, Jr. and K. E. Mayer (eds). California's Wildlife, Volume 1: Amphibians and Reptiles. California Department of Fish and Game, Sacramento, CA. 272 pp.

Morey, S. 1988. Northern Leopard Frog (*Rana pipiens*). Pages 90-91 in Zeiner, D.C., W. F. Laudenslayer, Jr. and K. E. Mayer (eds). California's Wildlife, Volume 1: Amphibians and Reptiles. California Department of Fish and Game, Sacramento, CA. 272 pp.

Morgan, M., and M. Henrion. 1990. *Uncertainty: A guide to dealing with uncertainty in quantitative risk and policy analysis.* Cambridge Univ. Press, New York. 332 pages.

Morrison, M.L., H.L. Bombay, J.W. Cain, and D.E. Taylor. 2000. Annual Report and Preliminary Demographic analysis for Willow Flycatcher monitoring in the Central Sierra Nevada. Unpublished document, USDA Forest Service, Tahoe National Forest. 34 pp.

Moyle, P. B. 1973. Effects of introduced bullfrogs, *Rana catesbeiana*, on the native frogs of the San Joaquin Valley, California. Copeia 18-22.

Moyle, P.B. 1976. Inland fishes of California. University of California Press, Berkeley, California. 405 pages.

Moyle, P.B. and D.M. Baltz. 1985. Microhabitat use by an assemblage of California stream fishes: developing criteria for instream flow recommendations. Trans. Amer. Fish. Soc. 114:695-704.

Moyle, P.B. and M. Gard. 1993. South Yuba River fisheries survey and habitat assessment. Report to the California State Department of Parks and Recreation. 66pp.

Moyle, P.B. and R.A. Daniels. 1982. Fishes of the Pit River system, and Surprise Valley region. University of Calif. Publ. Zool. 115:1-82.

Moyle, P.B. and R.D. Nichols. 1973. Ecology of some native and introduced fishes of the Sierra Nevada foothills, central California. Copeia. 1973: 478-490.

Moyle, P.B., B. Vondracek and G. D. Grossman. 1983 Response of fish populations in the North Fork of the Feather River, California to treatment with fish toxicants. N. Amer. J. Fish. Mgmt. 3:48-60.

Moyle, P.B., R.M. Yoshiyama, J. E. Williams, and E.D. Wikramanyake. 1995. Fish species of special concern in California. Dept. Fish and Game, Inland Fisheries Division. Rancho Cordova, CA Final Report for contract No. 2128IF. 272 pp.

Mullin, Barbara, Lars Anderson, Joseph DiTomomaso, Robert Eplee, Kurt Getsinger. 2000. Council for Agricultural Science and Technology (CAST) Issue Paper #13.

Munger, James C., Bruce R. Barnett, Stephen J. Novak, and Aaron A. Ames. 2003. Impacts of Off-highway motorized vehicles trails on the reptiles and vegetation of the Owyhee Front. USDI, Idaho Bureau of Land Management, Technical Bulletin number 03-3. Available online at: www.id.blm.gov. 23 pages.

Murphy, Dennis D., Erica Fleishman, and Peter A. Stine. 2004. Biodiversity in the Sierra Nevada. A paper presented at the Sierra Nevada Science Symposium in October of 2202. USDA FS GTR PSW-GTR-193 pages 167-174

Murphy, G.I. 1947. Notes on hardhead control in the East Fork of the Russian River, Mendocino County, California. Calif. Dept. Fish and Game. 34:101-110.

National Environmental Policy Act. 1986. 40 CFR Parts 1500-1508. 45pp.

National Resources Defense Council. http://www.nrdc.org/land/forests/roads/chap6.asp. Accessed 3/27/2007. End of the Road – The Adverse Ecological Impacts of Roads and Logging: A Compilation of Independently Reviewed Research.

NatureServe. 2006. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.7. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer.

Neal, D.L., J. Verner, G.N. Steger and G. Eberlein. 1989. A study of spotted owl home-range and composition in the Sierra National Forest. 1988 Progress Report. Pacific Southwest Forest and Range Experiment Station. Fresno, California.

Newbold, J.D.,Erman, D.C., Roby, K. B. 1980. Effects of logging on macroinvertebrates in streams with and without buffer strips. Can. J. Fish. Aquat. Sci. 37: 1046-1085. In: Gucinski, Hermann; Furniss, Michael J.; Ziemer, Robert R.; Brookes, Martha H. 2001. Forest roads: a synthesis of scientific information. Gen. Tech. Rep. PNW-GTR-509. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 103 p.

Newcombe, C. P., and D. D. MacDonald. 1991. Effects of suspended sediments on aquatic ecosystems. North American Journal of Fisheries Management, 11:72-84.

Newcombe, C. P., and J. O. T. Jensen. 1996. Channel suspended sediment and fisheries: a synthesis for quantitative assessment of risk and impact. North American Journal of Fisheries Management, 16:693-727.

Noon, B.R. and K.S. McKelvey. 1996. Management of the spotted owl: A case history in conservation biology. Annu. Rev. Ecol. Syst. 27:135-162.

Nussbaum, R. A., E. D. Brodie, Jr., and R.M. (or R.C) Storm. 1983. Amphibians and Reptiles of the Pacific Northwest. University of Idaho. 332 pp.

O'Connell, M. J. 2003. Detecting, measuring and reversing changes to wetlands. Wetlands Ecology and management, volume 11, pages 397-401.

Pacific Flyway Council. 1997. Pacific Flyway management plan for the Central Valley population of greater sandhill cranes. Pacific Flyway Study Comm. [c/o Pacific Flyway Representative USFWS], Portland, OR 97232-4181. Unpubl. Rept. 44pp. and appendices.

Pacific Gas and Electric (PG&E). 1985. Bald Eagle and Fish Study. Pit 3, 4 and 5 Project. Biosystems Analysis, Inc. and University of California, Davis.

Panik, H. R., and S. Barrett. 1994. Distribution of amphibians and reptiles along the Truckee River System. Northwest Science 68: 197–204.

Panik, H.R. 1995. An ecological survey of the mountain yellow-legged frog (*Rana muscosa*) in Nevada. (Unpub. Report) Nevada Division of Wildlife.

Pankik, R. 1998. Science teacher at Western Nevada Community College, Carson City, NV. Personal communication with George Elliott, Forest Service fisheries biologist, Eldorado NF.

Pan-Pacific Entomologist. Scientific Note: New Distribution Records for the Elderberry Longhorn Beetle *Desmocerus californicus* Horn (*Coleoptera: Cerambycidae*). 76(1): 74-76.

Parendes, Laurie A, and Julia A. Jones. 2000. Role of light availability and dispersal in exotic plant invasion along roads and streams in the H. J. Andrews Experimental Forest, Oregon. Conservation Biology, Vol. 14, No. 1, pages 64-75.

Pauchard, Anibal and Paul B. Alaback. 2005. Edge type defines alien plant species invasions along *Pinus contorta* burned, highway and clearcut forest edges. Forest Ecology and Management 223 (2006) pages 327-335.

Pennsylvania Department of Conservation and Natural Resources. Fragmentation – Impact of Roads. Accessed 1/11/2007. Available online at: http://www.dcnr.state.pa.us/wlhabitat/forest/forest_fragment.htm.

Penrod, K., R. Hunter, and M. Merrifield. 2001. Missing linkage: Restoring connectivity in the California Landscape. Conference Proceedings co-sponsored by the California Wilderness Coalition, The Nature Conservancy, U.S. Geological Survey, Center for Reproduction of Endangered Species, and California State Parks.

Perrine, J.D. 2005. Ecology of red fox (*Vulpes vulpes*) in the Lassen Peak region of California, USA. PhD dissertation. University of California, Berkeley

Perrine, J.D., J.P. Pollinger, B.N. Sacks, R.H. Barrett, R.K. Wayne. 2007. Genetic evidence for the persistence of the critically endangered Sierra Nevada red fox in California. Conservation Genetics; 8:1083-1095.

Perrine, J.D., L.C. Campbell, and G.A. Green. 2006. Conservation Assessment for the Sierra Nevada red fox (*Vulpes vulpes necator*), USDA Forest Service.

Perry, C. and R. Overly. 1976. Impact of roads on big game distribution in portions of the Blue Mountains of Washington. Pages 62-68 in: Hieb, S.R., Ed. Proceedings of the Elk-Logging-Roads Symposium. December 16-17, 1976, Moscow, Idaho. Forest, Wildlife and Range Experiment Station, University of Idaho, Moscow, ID.

Perry, C., and R. Overly. 1977. Impact of roads on big game distribution in portions of the Blue Mountains of Washington, 1972-1973. Applied Research Bulletin No. 11. Washington Game Department, Olympia, WA 38 pp.

Phelps, K. 1996. Species account for *Cypripedium fasciculatum*. USDA FS White River NF, Dillion Ranger District. Unpublished.

Philpott, W. 1997. Summaries of the life histories of California bat species. USDA Forest Service, Sierra National Forest, Pine Ridge Ranger Station. 30pp. Unpublished Document.

Pierson, E.D. 1996. Pierson and Rainey Consultants, Berkeley CA. Presentation at the North California Mine Assessment for Bats Seminar. Shasta College, Redding CA. June 4-6, 1996.

Pierson, E.D. 1996. Presentation to the Western Section of the Wildlife Society, Natural History and Management of Bats in California and Nevada Workshop. Nov. 13-15. Sacramento, CA.

Pierson, E.D., W.E. Rainey and D.M. Koontz. 1991. Experimental mitigation for Townsend's big-eared bat at the McLaughlin Mine in California. From Proceedings V: Issues and technology in the management of impacted wildlife, April 8-10, 1991. Snowmass, Co., Thorne Ecological Institute, Boulder, CO.

Pollet I., L.I. Bendell-Young. 2000. Amphibians as indicators of wetland quality in wetlands formed from oil sands effluent. Environmental Toxicology and Chemistry: Vol. 19, No. 10 pp. 2589–2597

Pollution Locator: Smog and Particulates: County Reports. Accessed 9/17/2007. http://www.scorecard.org/env-releases/cap/county.tcl?fips_county_code=06061; and http://www.scorecard.org/env-releases/cap/county.tcl?fips_county_code=06057

Potvin, F., L. Belanger and K. Lowell. 2000. Marten habitat selection in a clearcut boreal landscape. Conservation Biology 14:844-857.

Powell, R.A. 1979. Mustelid spacing patterns: variations on a theme by Mustela Zhurnal Tierpsychologie. 50:153-165.

Power, M. E. 1990. Resource Enhancement by Indirect Effects of Grazers: Armored Catfish, Algae, and Sediment. Ecology, Vol. 71, No. 3, pp. 897-904 Published by: Ecological Society of America.

Powers, Lori. 1993. Summary of monitoring efforts for a population of willow flycatchers in Perazzo Meadows 1992 and 1993. 4pp.

Pringle, C. M., R. J. Naiman, G. Bretschko, J. R. Karr, M. W. Oswood, J. R. Webster, R. L. Welcomme, and M. J. Winterbourn. 1988. Patch dynamics in lotic systems: the stream as a mosaic. Journal of the North American Benthological Society, 7:502-524.

Radle, A. L. 1999. The Effect of Noise on Wildlife. World Forum For Acoustic

Rankel, G.L. 1976. Fishery management program, Summit Lake Indian Reservation, Humboldt County, Nevada. Special Report of the U.S. Fish and Wildlife Service, Division of Fishery Services, Reno, Nevada. 35 pp.

Raphael, M.G. and M. White. 1984. Use of snags by cavity-nesting birds in the Sierra Nevada. Wildlife Society Monograph No. 86. 66pp.

Raphael, Martin G., and Marshall White. 1984. Use of snags by cavity-nesting birds in the Sierra Nevada. Wildlife Monographs 86: 1-66.

Rathbun, G.B., M.R. Jennings, T. G. Murphey and N. R. Siepel. 1993. Status and ecology of sensitive aquatic vertebrates in lower San Simeon and Pico Creeks, San Luis Obispo Co., Calif. USFWS National Ecology Research Center., San Simeon, CA. Prepared for California Department of Parks and Recreation. 103 pp.

Records of Decision for the Eight Eastside Rivers and 22 Westside Rivers Wild and Scenic River Study Reports, 1999

Reeves, J.G. 1964. Age and growth of the hardhead minnow *Mylopharodon conocephalus* in the American River basin of California, with notes on its ecology. M.S. Thesis. University of California, Berkeley. 90 pp.

Reid, L. M., and T. Dunne. 1984. Sediment production from forest road surfaces. Water Resources Research, 20:1753–1761.

Reid, M. 1989. The predator-prey relationships of the Great Gray Owl in Yosemite National Park. National Park Service, Western Region, Tech. Rep. NPS/WRUC/NRTR-89/32. Univ. California, Davis, CAU.S.A.

Reid, M. E. 1989. The predator-prey relationships of the Great Gray Owl in Yosemite National Park. Tech. Rep. 35. CA: Coop. National Park, Resources Studies Unit, University of California.

Reid, M.E. 1989. The predator-prey relationships of the great gray owl in Yosemite National Park. Cooperative National Park Research Studies Unit Technical Report No. 35. 86pp.

RHJV (RIPARIAN HABITAT JOINT VENTURE). 2004. Version 2.0. The riparian bird conservation plan: a strategy for reversing the decline of riparian associated birds in California. California Partners in Flight. http://www.prbo.org/calpif/pdfs/riparian.v-2.pdf.

Richards, R.C., C.R. Goldman, T.C. Frantz, and R. Wickwire. 1975. Where have all the Daphnia gone? The decline of a major cladoceran in Lake Tahoe, California-Nevada. Verh. Internat. Verein. Limnol. 19:835-842.

Richardson, E. V., B. Simons, S. Karaki, M. Mahmood, and M. A. Stevens. 1975. Highways in the river environment: hydraulic and environmental design considerations training and design manual. U.S. Department of Transportation, Federal Highway Administration, Washington, D.C.

Roberts, B.C., and R.G. White. 1992. Effects of angler wading on survival of trout eggs and pre-emergent fry. North American Journal of Fisheries Management 12:450-459.

Robitaille, J.F., K. Aubry . 2000. Occurrence and activity of American martens, *Martes americana*, in relation to roads and other routes Acta Theriologica 45 (1): p 137.

Romin, L.A., and J.A. Bissonette. 1996. Deer-vehicle collisions: status of state monitoring activities and mitigation efforts. Wildlife Society Bulletin 24(2):276-283.

Rooney, Thomas P. 2003. Off-road vehicles as dispersal agents for invasive plant species in a forested landscape. Unpublished, 25 pages.

Roovers, Pieter, Beatrijs Bossuyt, Hubert Gulinck and Martin Hermy. 2004. Vegetation recovery on closed paths in temperate deciduous forests. Journal of Environmental Management, 74, pages 273-281.

Rost, G.R. and J.A. Bailey. 1979. Distribution of mule deer and elk in relation to roads. Journal of Wildlife Management. 43(3):634-641.

Rowley, W. 1955. 1954 creel census, North Fork, Feather River. Calif. Dept. Fish and Game, Inland Fish. Admin. Rep. 55 17pp.

Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, L.J. Lyon and W.J. Zielinski, tech. eds. 1994. The Scientific Basis for Conserving Forest Carnivores: American Marten, Fisher, Lynx, and Wolverine in the United States. Gen. Tech. Rep. RM-254. Ft. Collins, CO: U. S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 184 pp.

Rutter, C. 1908. The fishes of the Sacramento-San Joaquin basin, with a study of their distribution and variation. U.S. Bur. Fish. Bull. 27:143-48.

Sada, Donald W., Jack E. Williams, Anne Halford, Jim Ramakka, Jill C. Silvey, Paul Summers, Lyle Lewis. 2001. Riparian Management – A guide to managing, restoring, and conserving springs in the western United States. USDI, BLM, technical reference BLM/ST/ST-01/001+1737-17, Denver, Colorado. 70 pages.

Safford, H. D. and Susan Harrison. 2005. The effects of fire on serpentine vegetation and implications for management. USDA Forest Service General Technical Report, PSW-GTR-189.

Safford, H. D., J. H. Viers, S. P. Harrison. 2005. Serpentine endemism in the California flora: A database of serpentine affinity. Madrono, Vol. 52, number 4, pages 222-257.

Saiki, M.K. 1984. Environmental conditions and fish faunas in low elevation rivers and the irrigated San Joaquin Valley floor, California. Calif. Fish and Game 70:145-157

Sanders, S.D., and M.A. Flett. 1989. Ecology of a Sierra Nevada population of willow flycatchers (*Empidonax traillii*), 1986-1987. Wildlife Management Division Administrative Report 88-3. 34pp.

Schempf, P.F. and M. White. 1977. Status of six furbearer populations in the mountains of northern California. USDA Forest Service. 51 pp.

Schlorff, Ron. 1998. Wildlife Biologist, Sensitive Species Branch, California Dept. of Fish and Game, Sacramento, CA. pers. comm.

Schueck, Linda S., John M. Marzluff, and Karen Steenhof. 2001. Influence of Military Activities on Raptor Abundance and Behavior. The Condor, Vol. 103, Issue 3. Pages 606-615.

Schwartz, M. and Pilgrim. March 30, 2008. Personal communication. Wolverine population DNA.

Scott, Virgil E., and John L. Oldemeyer. 1983. Cavity-nesting bird requirements and response to snag cutting in ponderosa pine. pp. 19-23 in Snag habitat management: proceedings of the symposium, Jerry W. Davis, Gregory A. Goodwin, and Richard A. Ockenfels [technical coordinators], U. S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, General Technical Report, RM-99.

Seamans, M.E. 2005. Population Biology of the California Spotted Owl in the Central Sierra Nevada. Ph.D. Dissertation. University of Minnesota. St. Paul, Minnesota.

Serena, M. 1982. The status and distribution of the willow flycatcher (*Empidonax traillii*) in selected portions of the Sierra Nevada, 1982. Calif. Dept. of Fish and Game, Wildlife Management Division Administrative Report No. 82-5. 28 pp.

Shefferson, Richard P., Michael Wei, Tiiu Kull, and D. Lee Taylor. 2005. High specificity generally characterizes mycorrhizal association in rare lady's slipper orchids, genus *Cypripedium*. Molecular Ecology 14, pages 613-626.

Sheley, R. L. and Janet K. Petroff. 1999. Biology and Management of Noxious Rangeland Weeds. Oregon State University Press, Corvallis. 438 pages.

Sherburne, S.S. and J.A. Bissonette. 1994. Marten subnivean access point use: response to subnivean prey levels. J. Wildl. manage. 58:400-405.

Sherwin, R. 1998. Presentation to the Western Bat Working Group Workshop. February 9-13. Reno, Nev., Pers. Comm.

Sidle, R.C., A.J. Pearce, and C.L. O'Loughlin. 1985. Hillslope stability and land use. Water resource Monographs. Series II, Washington, DC: American Geophysical Union.

Siegel, R. B. and D. DeSante. 1999. Version 1.0. The draft avian conservation plan for the Sierra Nevada Bioregion: conservation priorities and strategies for safeguarding Sierra bird populations. Institute for Bird Populations report to California Partners in Flight.

Sierra Business Council. 1999. Sierra Nevada Wealth Index, Understanding and Tracking our Region's Wealth, 1999

Sierra Nevada Ecosystem Project, Final Report to Congress. 1996. Volumes 1-111 and addendum.

Sigler, W.F., and J.W. Sigler. 1987. Fishes of the Great Basin: A Natural History. University of Nevada Press, Reno, Nevada. 425 pp.

Sigler, W.F., W.T. Helm, P. A. Kucera, S. Vigg, and G. W. Workman. 1983. Life history of the Lahontan cutthroat trout, *Salmo clarki henshawi*, in Pyramid Lake, Nevada. Great Basin Naturalist 43:1-29.

Simon, T.L. 1980. An ecological study of the marten in the Tahoe National Forest, California. M.S. Thesis, California State University, Sacramento. 140pp.

Simon, T.L. 1980. An ecological study of the marten in the Tahoe National Forest, California. M.S. Thesis. California State University, Sacramento. 140 pp.

Skagen, Susan K., Richard L. Knight, Gordon H. Orians. Human Disturbance of an Avian Scavenging Guild Source: Ecological Applications, Vol. 1, No. 2, (May, 1991), pp. 215-225

Slevin, J.R. 1928. The amphibians of western North America; an account of the species known to inhabit California, Alaska, British Columbia, Washington, Oregon, Idaho, Utah, Nevada, Arizona, Sonora, and Lower California. Occasional Papers of the California Academy of Sciences (16):1-152.

Snyder, J.O. 1917. The fishes of the Lahontan system of Nevada and northeastern California. Bull. U.S. Bur. Fish. 35:33-86.

Soil Science Society of America (SSSA). 1987. *Glossary of soil science terms.* SSSA, Madison, WI 53711.

Somer, W. 1998. Lahontan Cutthroat Trout, A Threatened Resource. Department of Fish and Game Wild Trout Project winter 1998. Vol. 3, No. 2.

Soule, M. 1951. Power development of the Kings River drainage, Fresno County, California. Rep. No 3., Junction development of the Kings River and its Middle and South Forks. Calif. Dept. Fish and Game, Inland Fish. Admin. Rep. 51. 17pp.

Spellerberg, Ian. F. 1998. Ecological Effects of Roads and Traffic: A Literature Review. Global Ecology and Biogeography Letter. 7. Pages 317-333.

Spencer, W. D. 1981. Pine marten habitat preferences at Sagehen Creek, California. UnpubL MLS. thesis, Univ. California, Berkeley, 121 pp.

Spencer, W.D. and W. J. Zielinski. 1983. Predatory behavior of pine martens. Journal of Mammalogy 64:715-717.

Spencer, W.D. and W.J. Zielinski. 1983. Predatory Behavior of Pine Martens. Journal of Mammalogy. 64(4) pp. 715-717.

Spencer, W.D., R.H. Barrett, and W.J. Zielinski. 1983. Marten habitat preferences in the northern Sierra Nevada. Journal of Wildlife Management 47:1181-1186.

Stalmaster, M. V. 1987. The bald eagle. Universe Books, New York, N. Y. 227pp., In: Joslin, G., and H. Youmans, coordinators. 1999. Effects of recreation on Rocky Mountain wildlife: a review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society. 307pp.

Stalmaster, M.V. 1976. Winter ecology and effects of human activity on bald eagles in the Nooksack River Valley, Washington. M.S. Thesis. West. Washington State Coll. Bellingham, WA. 100 pp.

Stalmaster, M.V. and J.R. Newman. 1978. Behavioral responses of bald eagles to human activity. Journal of Wildlife Management. 42 (or 52):506-513.

Stebbins, R. C. 1985. A Field Guide to Western Reptiles and Amphibians. Second edition, revised. Houghton Mifflin Company, Boston, Mass. USA.

Stebbins, R.C. 1972. California amphibians and reptiles. Univ. Calif. Press, Berkeley. 152 pp.

Steele, Jim. 1993. Preliminary report of neotropical migratory bird monitoring at San Francisco State University's Sierra Nevada Field Campus for the Summers of 1992 and 1993. 8 pp.

Steger, G.N., T.E. Munton, G.P. Eberlein and K.D. Johnson. 1998. A study of spotted owl demographics in the Sierra National Forest and Sequoia and Kings Canyon National Parks. USDA Forest Service, Pacific Southwest Research Station, Fresno, CA. Annual Progress Report, November 1998. 5pp.

Steger, G.N., T.E. Munton, G.P. Eberlein and K.D. Johnson. 1999. A study of spotted owl demographics in the Sierra National Forest and Sequoia and Kings Canyon National Parks. USDA Forest Service, Pacific Southwest Research Station, Fresno, CA. Annual Progress Report, December 1999. 16pp.

Steidl, Robert J. and Brian F. Powell. 2006. Assessing the Effects of Human Activities on Wildlife. Visitor Impact Monitoring. Vol. 23, number 2. Pages 50-58

Steinhart, P. 1990. California's Wild Heritage: Threatened and Endangered Animals in the Golden State. Calif. Dept. of Fish and Game. 108 pp.

Stewart, W.C. 1996. Economic Assessment of the Ecosystem. Pages 973-1063. In *Sierra Nevada Ecosystem Project: Final Report to Congress, Assessments, Commissioned Reports and Background Information,* Vol. III Ch. 23. Univ. Calif. Centers for Water and Wildland Resources, Davis, CA 95616.

Stewart, W.C., 1997. *Bioregional demographic trends and implications for biodiversity*. Report to the California Biodiversity Council.

Storer, T. I. 1925. A synopsis of the Amphibia of California. Univ. Calif. Publ. Zool. 27: 1-342.

Storer, T.I. 1930. Notes on the range and life-history of the Pacific fresh-water turtle, *Clemmys marmorata*. Univ. Calif. Publ. Zool. 32:429-441.

Sumner, F.H. 1940. The decline of the Pyramid Lake fishery. Transactions of the American Fisheries Society 69:216-224.

Sumner, L. and J.S. Dixon. 1953. Birds and mammals of the Sierra Nevada. University of California Press, Berkeley, CA. 484pp.

Swarthout, E.C.H. and Steidl, R.J., 2001. Flush responses of Mexican spotted owls to recreationists. Journal of Wildlife Management 65, pp. 312–317.

Swarthout, Elliot C. H. and Robert J. Steidl. 2003. Experimental Effects of Hiking on Breeding Mexican Spotted Owls. Conservation Biology. Vol. 17 (1), 12 pages.

Switalski, Adam T. Date Unknown. How Many is Too Many: A Review of Road Density for Wildlife. Accessed 1/12/2007. Available online at: http://www.wildlandscpr.org/databases/biblionotes/biblio11.4.html.

Szewczak, Joseph M. 2002. White Mountain Research Station, Bishop, CA. Personal communication and information provided on website (http://www.wmrs.edu/joe/CarmanBats/CarmanBats.html)

Szewczak, Joseph M.; S.M. Szewczak, M.L. Morrison and L.S. Hall. 1998. Bats of the White and Inyo Mountains of California-Nevada. Great Basin Naturalist 58:66-75.

Tahoe National Forest Land and Resources Management Plan. 1990.

Tahoe National Forest maps for Endangered, Threatened and Sensitive species sightings and their habitats.

Tatum L. 1998. Wildlife Biologist. USFS, Mendocino National Forest, Supervisor's Office.

Taylor, D.W. 1981. Freshwater Mollusks of California: A Distributional Checklist. California Department of Fish and Game 67(3):140-163.

Taylor, Richard B. Unknown date. The Effects of Off-Road Vehicles on Ecosystems. An unpublished report, Texas Parks and Wildlife, P.O. Box 5207, Uvalde, Texas. 12 pages.

Thomas, J. W., H. Black, Jr., R. J. Scherzinger, and R. J. Pedersen. 1979. Deer and elk. In Wildlife habitats in managed forests: the Blue Mountains of Oregon and Washington, ed. J. W. Thomas, 104-127. U.S. Department of Agriculture, Forest Service, Agricultural Handbook No. 553. Portland, Oregon.

Thompson, W. H., Robert C. Ehrhart, Paul L. Hansen, Thomas G. Parker, and William C. Haglan. 1998. Assessing Health of a riparian site. *In:* Proceedings - Specialty Conference on Rangeland Management and Water Resources, 10 pages.

Tierney, M. 1997. Tahoe National Forest, Downieville District Wildlife Biologist, Camptonville, CA, personal observation.

Travel Industry Association of America. 1997. "Profile of Travelers Who Participate in Historical and Cultural Activities." Washington, D.C. 43+ pages.

Trombulak S. C. and C.A. Frissell. 2000. Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities. Conservation Biology, 14:18-30.

Trombulak, S. C. and Christopher A. Frissell. 2000. Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities. Conservation Biology, Volume 14, No. 1, pages 18-30.

Truex, Richard L.; Zielinski, William J.; Golightly, Richard T.; Barrett, Reginald H.; Wisely, Samantha M. 1998. A meta-analysis of regional variation in fisher morphology, demography, and habitat ecology in California Draft report submitted to: California Department of Fish and Game, Wildlife Management Division, Nongame Bird and Mammal Section. 118 p.

Tsukamoto, George. 2001. Impact of Roads on Elk and Other Wildlife. Washington Department of Fish and Wildlife Game Trails. Accessed 1/11/2007. Available online at http://wdfw.wa.gov/wlm/game/hunter/gametrails/2001/impact_roads.htm

Tuan, Yi-Fu. 1974. Topophilia: A Study of Environmental Perception, Attitudes, and Values. New York: Columbia University Press.

Turkiewicz, K. 1998. "PM $_{2.5}$ Monitoring Network Design. Air Report." Calif. Air Resources Board. Sacramento, CA 95814.

Twitty, V.C., D. Grant and O. Anderson. 1967. Amphibian orientation: An unexpected observation. Science 155(3760):352-353.

U.S. Department of Transportation Federal Highway Administration. 2004. Synthesis of Noise Effects on Wildlife Populations. Publication Number FHWA-HEP-06-016

U.S. Environmental Protection Agency. 2003. Reducing Air Pollution from Nonroad Engines. Office of Transportation and Air Quality. EPA420-F-03-011.12 pages.

United States Congress. 2007.Congressional Budget Office. The Budget and Economic Outlook: Fiscal Years 2008-2017. Available online at: http://www.cbo.gov/

USDA Departmental Regulation 5600-2, Environmental Justice, December 15, 1997.

USDA Forest Service - Handbook 7709.56. 1987. Road Preconstruction Handbook. Available online at: http://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsh?7709.56.

USDA Forest Service Engineering Manual 7700-30 Mixed Use Guidebook. 2005. Guidelines for Engineering Analysis of Motorized Mixed Use on National Forest System Roads. Government Printing Office.

USDA Forest Service Pacific Southwest Region. 2001a. Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement. Sacramento, CA.

USDA Forest Service Pacific Southwest Region. 2001b. Sierra Nevada Forest Plan Amendment Record of Decision. January 12, 2001. Volumes 1-6 and Appendices.

USDA Forest Service Pacific Southwest Region. 2004a. Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement. Vallejo, CA. Volumes 1-2.

USDA Forest Service Pacific Southwest Region. 2004b. Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement Record of Decision. Region 5, Vallejo, CA.

USDA Forest Service, Forest Service, Pacific Northwest Region. 2001. Forest Roads: A Synthesis of Scientific Information. Gen. Tech. Report PNW-GTR-509. 103 pages.

USDA Forest Service, Tahoe National Forest, Land and Resource Management Plan (LRMP), 1990

USDA Forest Service. 1974, April. Agriculture Handbook Number 462. National Forest Landscape Management Volume 2. Chapter 1 – The visual management system. 47 pages.

USDA Forest Service. 1977. Bald eagle habitat management guidelines, unpublished report, U. S. Forest Service, California Region. 60p.

USDA Forest Service. 1984. Land Management Planning Direction. Pacific Southwest Region. San Francisco.

USDA Forest Service. 1985. National Forest Landscape Management, Volume 2, Chapter 6: Fire. USDA Forest Service Agricultural Handbook No. 608.

USDA Forest Service. 1990. Tahoe National Forest Land and Resources Management Plan.

USDA Forest Service. 1991. Management recommendations for the northern goshawk in the southwestern United States. Northern Goshawk Scientific Committee. Southwestern Region. 184 pp.

USDA Forest Service. 1991. Protocol for surveying for spotted owls in proposed management activity areas and habitat conservation areas. 19 pp.

USDA Forest Service. 1992. "Investigating Water Quality in the Pacific Southwest Region: Best Management Practices Evaluation Program." Forest Service. Pacific Southwest Region.

USDA Forest Service. 1992. Biological Evaluation for Drought-Related Timber Salvage on National Forests of the Sierra Nevada Province, Pacific Southwest Region (R5). 94pp.

USDA Forest Service. 1993. California Spotted Owl Sierran Province Interim Guidelines Environmental Assessment. 87pp.

USDA Forest Service. 1993. Ecological Guide to Mixed Conifer Plant Associations. 71 pp.

USDA Forest Service. 1993b. *Principal Laws Relating to Forest Service Activities.* US Government Printing Office, Superintendent of Documents, Mail Stop: SSOP, Washington, D.C. 20402-9328. (ISBN 0-16-041927-1). 1184 pages.

USDA Forest Service. 1994. Biological Evaluation for Managing willow flycatcher (*Empidonax traillii*) Habitat on Plumas National Forest Range Allotments. DRAFT. 26 pp.

USDA Forest Service. 1994. Guide to Forested Communities of the Upper Montane in the Central and Southern Sierra Nevada. 164 pp.

USDA Forest Service. 1994. Management guidelines for the greater sandhill crane on National Forest Systems Lands in California. Pacific Southwest Region, San Francisco, Ca. 40 pp.

USDA Forest Service. 1994. The scientific basis for conserving forest carnivores. American marten, fisher, lynx and wolverine in the western United States. General Technical Report RM-254. 184pgs.

USDA Forest Service. 1995. Landscape Aesthetics: A Handbook for Scenery Management. USDA Forest Service Agriculture Handbook Number 701.

USDA Forest Service. 1995a. Revised Forest Service Manual for Noxious Weed Management. Forest Service Manual 2080, WO Amendment No 2000-95-5. USDA Forest Service. Washington, D.C. 20090-6090. 10 pages

USDA Forest Service. 1997. *Ecological subregions of Calif.: Section and subsection descriptions* compiled by S.R. Miles and C.B. Goudy. Publication R5-EM-TP-005. USDA Forest Service Pacific Southwest Region, San Francisco, CA 94111 (http://www.fs.fed.us/r5/projects/ecoregions/).

USDA Forest Service. 1998. Region 5 letter, July 31. Use of information in the Sierra Nevada Science Review in planning and decision making.

USDA Forest Service. 1998. Sensitive Species List 1998. Pacific Southwest Region. San Francisco.

USDA Forest Service. 1998. Sierra Nevada Science Review-report of the Science Review Team charged to synthesize new information of range wide urgency to the national forests of the Sierra Nevada. Pacific Southwest Research Station. July 25, 1998. 115pp.

USDA Forest Service. 1998. *Stemming the Invasive Tide: Forest Service Strategy for Noxious and Nonnative Plant Management.* USDA Forest Service. Washington, D.C. 20090-6090. 29 pages

USDA Forest Service. 1999. New information and management considerations for the northern goshawk (*Accipter gentilis*). Tahoe National Forest, Nevada City, CA. 16 pp.

USDA Forest Service. 2000. A Willow Flycatcher Survey Protocol for California. 48 pp.

USDA Forest Service. 2000. Forest Service Roadless Area Conservation Final Environmental Impact Statement Biological Evaluation for Threatened, Endangered and Proposed Species and Sensitive Species. Written by Seona Brown and Ron Archuleta and signed on 11/13/2000. Unpublished. 90 pages.

USDA Forest Service. 2000. Pacific Southwest Region. Non-point source pollution on national forests is managed through the Regional Water Quality Management Plan.

USDA Forest Service. 2000. Survey Protocol for the Great Gray Owl in the Sierra Nevada of California. 32pp.

USDA Forest Service. 2000. Survey Protocol for the Northern Goshawk in the Pacific Southwest Region.

USDA Forest Service. 2000. Washington Office letter, March 13. Direction on Forest Service timber sale environmental analysis requirements.

USDA Forest Service. 2001. Pacific Southwest Region. Sierra Nevada Forest Plan Amendment, Final Environmental Impact Statement. Vallejo, CA.

USDA Forest Service. 2002. Pacific Southwest Region. National Visitor Use Monitoring Results for Tahoe National Forest. 24 pages.

USDA Forest Service. 2004. Pacific Southwest Region. Sierra Nevada Forest Plan Amendment, Final Supplemental Environmental Impact Statement. Vallejo, CA.

USDA Forest Service. 2004. Pacific Southwest Region. Sierra Nevada Forest Plan Amendment, Final Supplemental Environmental Impact Statement. Vallejo, CA.

USDA Forest Service. 2004. Tahoe National Forest. Roads and Travel Analysis Project.

USDA Forest Service. 2005. Guidelines for Road Maintenance Levels. Available online at: http://www.fs.fed.us/eng/php/library_card.php?p_num=0577%201205P.

USDA Forest Service. 2005. Policy for Section 106 of the NHPA Compliance in Travel Management: Designated Routes for Motor Vehicle Use. On file, USDA Forest Service Pacific Southwest Region, Vallejo.

USDA Forest Service. 2006. Programmatic Agreement among the U.S.D.A. Forest Service, Pacific Southwest Region, U.S.D.A. Forest Service, Intermountain Region's Humboldt-Toiyabe National Forest, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act for Designating Motor Vehicle Routes and Managing Motorized Recreation on the National Forests in California. On file, USDA Forest Service, Pacific Southwest Region, Vallejo.

USDA Forest Service. 2006. *RS-FMP focus.* 48 pages.

USDA Forest Service. 2006. Tahoe National Forest Management Indicator Species report.

USDA Forest Service. 2007. Pacific Southwest Region. Business Plan for the Tahoe National Forest – A Window of Opportunity. R5-MB-131. 48 pages.

USDA Forest Service. 2008. Sierra Nevada Forests Bioregional Management Indicator Species (MIS) Report: Life history and analysis of Management Indicator Species of the 10 Sierra Nevada National Forests: Eldorado, Inyo, Lassen, Modoc, Plumas, Sequoia, Sierra, Stanislaus, and Tahoe National Forests and the Lake Tahoe Basin Management Unit. Pacific Southwest Region, Vallejo, CA. January 2008. 128pp

USDA Forest Service. Photo Series for Quantifying Natural Forest Residues: Southern Cascades, Northern Sierra Nevada. 1981. 145 pp.

USDA Forest Service. Tahoe National Forest. Maps for Endangered, Threatened and Sensitive species sightings and their habitats.

USDA Forest Service. Tahoe National Forest. Occurrence records for sensitive and watchlist plants.

USDA, USEPA, Tennessee Valley Authority, FEMA, USDC, NOAA, USDD, USDHUD, USDI. 1998. Stream Corridor Restoration: Principles, Processes, and Practices. Final manuscript - unpublished.

USDI Fish and Wildlife Service 2000. Endangered and Threatened Wildlife and Plants: 90-day Finding on a Petition to List Mountain Yellow-legged Frog as Endangered. Federal Register 65 (198): 60603-60605.

USDI Fish and Wildlife Service. 1982. Pacific coast American peregrine falcon recovery plan. 87pp.

USDI Fish and Wildlife Service. 1986. Pacific Bald Eagle Recovery Plan. U. S. Fish and Wildlife Service, Portland, Oregon. 160 pp.

USDI Fish and Wildlife Service. 1986. Recovery plan for the Pacific bald eagle. Portland, Oregon. 163 pages.

USDI Fish and Wildlife Service. 1995. Recovery plan for the Lahontan cutthroat trout. Portland, Oregon. 108 pp.

USDI Fish and Wildlife Service. 1996, June 24. The California red-legged frog, *Rana aurora draytonii*, was listed as federally threatened.

USDI Fish and Wildlife Service. 1996. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Red-Legged Frog. Federal Register 61 (101): 25813-25833.

USDI Fish and Wildlife Service. 1999. Endangered and Threatened Wildlife and Plants; final rule to remove the American peregrine falcon from the federal list of endangered and threatened wildlife, and to remove the similarity of appearance provision for free-flying peregrines in the conterminous United States; final rule. August 25. Federal Register 64 (164): 46542-46558.

USDI Fish and Wildlife Service. 2000. Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the California Red-Legged Frog (*Rana aurora draytonii*). Federal Register 65 (176): 54892-54932.Vindum, J. 1994. Research Associate with California Academy of Sciences, San Francisco, CA [personal communication with Tahoe National Forest District Biologist].

USDI Fish and Wildlife Service. 2000. Endangered and Threatened Wildlife and Plants: 90-day finding on a Petition to List the California Spotted owl as Threatened or Endangered. Federal Register 65 (198): 60605-60607.

USDI Fish and Wildlife Service. 2001. (Letter from Wayne S. White to Bradley Powell and Jack Blackwell, January 11; Biological Opinion on Formal Endangered Species Consultation and Conference on the Biological Assessment for the Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement.) Copy located at: Tahoe National Forest, Supervisor's Office, Nevada City, CA.

USDI Fish and Wildlife Service. 2002, September 12. *California Red-legged Frog Recovery Plan* was released (Federal Register, Vol. 67, No. 177, pgs. 57830-57831).

USDI Fish and Wildlife Service. 2002. Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*). U. S. Fish and Wildlife Service, Portland, OR. 173 pp.

USDI Fish and Wildlife Service. 2003. Endangered and Threatened Wildlife and Plants; 12-Month Finding for a Petition to List the Sierra Nevada Distinct Population Segment of the Mountain Yellow-legged Frog (*Rana muscosa*). Federal Register 68 (11): 2283-2303.

USDI Fish and Wildlife Service, 2004, April 8. 50 CFR Part 17 Endangered and Threatened Wildlife and Plants; 12-month Finding for a Petition To List the West Coast Distinct Population Segment of the Fisher (*Martes pennanti*); Proposed Rule

USDI Fish and Wildlife Service. 2004. Federal Register / Vol. 69, No. 86 / Tuesday, May 4, 2004 Endangered and Threatened Wildlife and Plants; Review of Species That Are Candidates or proposed for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions; Notice of Review; Proposed Rule / Summary of petitioned candidates. Mountain yellow-legged frog Pg. 24889

USDI Fish and Wildlife Service. 2006. Service finds that most owl populations are stable or increasing in the Sierra Nevada. Press release. May 23.

USDI Fish and Wildlife Service. 2006. Protection of Bald Eagles; Definition. 50 CFR Part 22. RIN 1018-AT94. Federal Register, Vol. 71, Number 32.

USDI Fish and Wildlife Service. 2007. Final rule: bald eagle delisting in the lower 48 states. Federal Register. Vol. 72, No. 130, July 9, 2007, pgs. 37346-37372.

USDI Fish and Wildlife Service. Letter to Tahoe National Forest with species list. Available at: Tahoe National Forest Supervisor's Office, Nevada City, CA.

Verner, J. 1999. Review of "A Preliminary Report on the Status of the California Spotted Owl in the Sierra Nevada." Unpublished report. USDA Forest Service, Pacific Southwest Research Station, Fresno, CA. July 7, 1999. 9p.

Verner, J. and A.S. Boss, technical coordinators. 1980. California wildlife and their habitats: Western Sierra Nevada. USDA Forest Service, PSW-37., Berkeley, CA. 439 pp.

Verner, J., K.S. McKelvey, B.R. Noon, R.J. Gutierrez, G.I. Gould, Jr. and T.W. Beck, Technical Coordinators. 1992. The California spotted owl: a technical assessment of its current status. Gen. Tech. Rep. PSW-GTR-133. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 285pp.

Verner, J., K.S. McKelvey, B.R. Noon, R.J. Gutierrez, G.I. Gould, Jr. and T.W. Beck, Technical Coordinators. 1992. The California spotted owl: a technical assessment of its current status. Gen. Tech. Rep. PSW-GTR-133. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 285pp.

von Der Lippe, Moritz and Ingo Kowarik. 2007. Long-distance dispersal of plants by vehicles as a driver of plant invasions. Conservation Biology, Volume 21, number 4, pages 986-996.

Vos, C.C. and J.P. Chardon. 1998. Effects of habitat fragmentation and road density on the distribution pattern of the moor frog, *Rana arvalis*. Journal of Applied Ecology 35(1): 44-56.

Vredenburg, V.T. 2004. Proc Natl Acad Sci USA 101:7646–7650.

Vredenburg, V.T., R. Bingham, R. Knapp, J. A. T. Morgan, C. Moritz, and D. Wake. 2007. Concordant molecular and phenotypic data delineate new taxonomy and conservation priorities for the endangered mountain yellow-legged frog. Journal of Zoology 271:361-374.

Wales, J.H. 1946. The hardhead problem in the Sacramento River above Shasta Lake, California. Calif. Dept. Fish and Game, Inland fish. Admin. Rep. 46. 4pp.

Wang, J.C.S. 1986. Fishes of the Sacramento-San Joaquin estuary and adjacent waters, California: A guide to the early life histories. Interagency Ecological Study Program for the Sacramento - San Joaquin Estuary, Tech. Rep. 9.

Washington Department of Transportation. Noise Impact Assessment. Available online at: http://www.wsdot.wa.gov/TA/Operations/Environmental/Noisechapter011906.pdf.

Wasser, Samuel K., Kenneth Bevis, Gina King, and Eric Hanson. 1997. Noninvasive Physiological Measures of Disturbance in the Northern Spotted Owl. Conservation Biology, Vol. 11, Number 4. Pages 1019-1022.

Wasser, Samuel K., Kenneth Bevis, Gina King, and Eric Hanson. 1997. Noninvasive Physiological Measures of Disturbance in the Northern Spotted Owl. Conservation Biology, Vol. 11, Number 4. Pages 1019-1022.

Waters, T. F. 1995. Sediment in streams: sources, biological effects and control. American Fisheries Society, Bethesda, Maryland, Monograph 7.

Watson, J.W., M.G. Garrett, and R.G. Anthony. 1991. Foraging ecology of bald eagles in the Columbia River estuary. J. Wildl. Manage. 55:492-499.

Watson, Mark L. - compiler. 2005. Habitat Fragmentation and the Effects of Roads on Wildlife and Habitats. Background and literature review, Conservation Services Division of the New Mexico Department of Game and Fish. 18 pages.

Welsh, H. H., Jr., and L. M. Ollivier. 1998. Stream amphibians as indicators of ecosystem stress: a case study from California's redwoods. Ecological Applications, 8:1118-1132.

White, C.M. 1974. Hunting range of a breeding peregrine falcon on the Sagavanirktok River. Unpublished report. Brigham Young Univ., Provo, UT and Dept. of Interior, U.S. Fish and Wildlife Service, Anchorage, AK.

White, M. and R.H. Barrett. 1979. A review of the wolverine in California with recommendations for management. Unpublished paper. Prepared for the USDA Forest Service, Region 5. By the Dept. of Forestry and Resource Management. College of Natural Resources. University of Calif. Berkley. 71 pp.

Whitson, Tom; Larry Burrill, Steven Dewey, David Cudney, B. E. Nelson, Richard Lee, and Robert Parker. 1996. Weeds of the West. The Western Society of Weed Science. 630 pages.

Wilderness Society. 2006. Addressing the Ecological Effects of Off-Road Vehicles (ORVs). Science and Policy Brief, August 2006, No. 3.

Wildlands CPR. How Many is Too Many: A Review of Road Density Thresholds for Wildlife. Accessed 8/13/2007. Available online at: http://www.wildlandscpr.org/node/124/print.

Wildlands CPR. The Impact of Roads on Aquatic Benthic Macroinvertebrates and Using Bioassessments as Indicators of Stream Health. Accessed 8/13/2007. Available online at: http://www.wildlandscpr.org/node/127/print

Wilson, B. L., Valerie D. Hipkins, Edna Rey-Vizgirdas, and Thomas N. Kaye. 2004. Variation in *Lewisia kelloggii* (Portulacaceae) with description of a new species endemic to Idaho. Unpublished paper – USDA 13 pages.

Wilson, J. 1981. Some aspects of the ecology of the great gray owl in the Central Sierra Nevada. USDA Forest Service. 30pp.

Wilson, J. 1985. Great gray owl survey, 1984. California Department of Fish and Game. Project W-65-R-2. Progress Report.

Winter, J. 1981. Some aspects of the ecology of the great gray owl in the Central Sierra Nevada. USDA, Forest Service. Stanislaus National Forest Contract # 43-2276. Final report. Sonora, CA. 30pp.

Winter, J. 1982. Further investigations on the ecology of the great gray owl in the central Sierra Nevada. Final Report to the Forest Service under contract #43-2348. Stanislaus National Forest, Sonora CA. 35pp.

Winter, J. 1982a. Further investigations on the ecology of the Great Gray Owl in the central Sierra Nevada. U.S. For. Serv., Stanislaus Natl. For. Final Rep., Contract 43-2348.

Winter, J. 1982b. Great Gray Owl habitat survey, Stanislaus National Forest. U.S. For. Serv., Stanislaus Natl. For. Final Rep., Contract 53-2-37.

Winter, J. 1984. Great Gray Owl survey, 1984. State of California, Dept. of Fish and Game. Project W-65-R-2, Job 11-3. Progress Report (January 1985).

Winter, J. 1986. Status, distribution and ecology of the great gray owl (*Strix nebulosa*) in California. San Francisco, CA: San Francisco State University. 121pp. M.S. thesis.

Wisdom, M. J., H. K. Preisler, N. J. Cimon, B. K. Johnson. 2004. Effects of Off-Road Recreation on Mule Deer and Elk. Transactions of the North American Wildlife and Natural Resources Conference 69: in press.

Wisdom, Michael J., Norman J. Cimon, Bruce K. Johnson, Edward O. Garton and Jack Ward Thomas. Unknown date. Spatial Partitioning by Mule Deer and Elk in Relation to Traffic. In: Transactions of the 69th North American Wildlife and Natural Resources Conference. Pages 509-530.

Wisdom, Michael J., Richard S. Holthausen, Barbara C. Wales, Christina D. Hargis, Victoria A. Saab, Danny C. Lee, Wendel J. Hann, Terrell D. Rich, Mary M. Rowland, Wally J. Murphy, and Michelle R. Eames. 2000. Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-scale Trends and Management Implications. Volume 1 – Overview. Gen. Tech. Rep. PNW-GTR-485. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 3 vol. (Quigley, Thomas M., tech. ed.; Interior Columbia Basin Ecosystem Management Project: Scientific Assessment).

Witmer, G.W., and D.S. DeCalesta. 1985. Effect of forest roads on habitat use by Roosevelt elk. Northwest Science 59:122-125.

Wright, G. A., and D. W. Speake. 1975. Compatibility of the eastern wild turkey with recreational activities at Land Between the Lakes, Kentucky. Pages 578-584 in Proceedings of the Annual conference of the Southeastern Association of Fish and Wildlife Agencies.

Wright, G.A. 1975. A study of the compatibility of the eastern wild turkey with recreational activities at Land Between the Lakes, Kentucky. M.S. Dissertation, Auburn University, Auburn, Alabama.

Yarmaloy, C.M. Bayer, and V. Geist. 1988. Behavior responses and reproduction of mule deer, *Odocoileus hemionus*, does following experimental harassment with an all-terrain vehicle. Canadian Field Naturalist 102:425-429.

York E. 1996. Fisher population dynamics in north-central Massachusetts [MSc thesis]. Amherst (MA): Univ. Massachusetts. 122 p

Yorks, T. P., N. E. West, R. J. Mueller, and S. D. Warren. 1997. Toleration of traffic by vegetation: life form conclusions and summary extracts from a compressive database. Environmental Management 21(1), pages 121-131.

Young, D. D., and J. J. Beecham. 1986. Black bear habitat use at Priest Lake, Idaho. Int. Conf. Bear Res. And Manage. 6:7-80

Youngblood, Quentin. 1998. District Biologist, Tahoe National Forest. personal communication.

Youngblood, Quentin. 1998. Sierraville Ranger District Biologist. Personal communication regarding sandhill cranes breeding in Carmen Valley, Tahoe National Forest.

Zeedyk, William D. 1996. Managing roads for wet meadow ecosystem recovery. US Department of Transportation, Federal Highway Administration, Federal Lands Highway Programs, Washington DC, FHWA-FLP-96-016, 80 pages.

Zeiner, D.C., W.F. Laudenslayer, Jr. and K.E. Mayer. 1988. California's wildlife. Volume 1. Amphibians and Reptiles. California Statewide Wildlife Habitat Relationships System, California Department of Fish and Game, Sacramento, California.

Zeiner, D.C., W.F. Laudenslayer, Jr., K. E. Mayer, and M. White. 1988. California's Wildlife. Volume I. Amphibians and Reptiles. California Statewide Wildlife Habitat Relationships System. Department of Fish and Game, The Resources Agency, Sacramento, CA. 272 pages.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer and M. White, (Eds.). 1990. California wildlife: Volume II: Birds. State of California, The Resources Agency, Dept. of Fish and Game, Sacramento, CA pp. 184-185.

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer and M. White. 1990. California Wildlife: Volume III: Mammals. California Dept. of Fish and Game, Sacramento CA. 407 pp.

Zielinski, W.J. 1981. Food habits, activity patterns and ectoparasites of the pine marten at Sagehen Creek, California. Unpublished thesis. Univ. of California, Berkeley. 121 pp.

Zielinski, W.J., F.V. Schlexer, R.L. Truex and L.A. Campbell. 1999. A preliminary assessment of live-trapping as a technique to estimate the proportion of reproductive female fishers. USDA Forest Service, Pacific Southwest Research Station, Arcata CA. 18 pp.

Zielinski, W.J., K.M. Slauson, C.R. Carroll, C.J. Kent, and D.G. Kudrna. 2001. Status of American martens in coastal forests of the Pacific states. Journal of Mammalogy 82, 478-490.

Zielinski, W.J., R.L. Truex, F.V. Schlexer, L.A. Campbell, and C. Carroll. 2005. Historical and contemporary distributions of carnivores in forests of the Sierra Nevada, California, USA. Journal of Biogeography 32:1385-1407.

Zielinski, W.J., T.E. Kucera, and R.H. Barrett. 1995. Current distribution of fishers, *Martes pennanti*, in California. California Fish and Game 81, 104-112.

Zielinski, W.J., W.D. Spencer and R.H. Barrett. 1983. Relationship between food habits and activity patterns of pine martens. J. Mammalogy 64:387-396.

Zielinski, William J., Keith M. Slauson, and Ann E. Bowles. 2007. The Effect of Off-Highway Vehicle Use on the American Marten in California, USA. U.S. Dept. of Agric., Forest Service, Pacific Southwest Region, and California Department of Parks and Recreation, Off-Highway Vehicle Recreation Division. 28 pp.

Zielinski, William J., Keith M. Slauson, and Ann E. Bowles. 2007. The Effect of Off-Highway Vehicle Use on the American Marten in California, USA. U.S. Dept. of Agric., Forest Service, Pacific Southwest Region, and California Department of Parks and Recreation, Off-Highway Vehicle Recreation Division. 28 pp.

Zweifel, R. G. 1955. Ecology, distribution, and systematics of frogs of the Rana boylei group. University of California Publications in Zoology, 54, 207-292.

Appendix I: Acronyms & Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ACS	Aquatic Conservation Strategy
AD	Anno Domini (Latin- in the year of the Lord)
ADA	Americans With Disabilities Act
ADA	Aquatic Diversity Area
ALT	Alternative
AML	Abandoned Mine Land
AML	Arc Macro Language (GIS term)
AMP	Allotment Management Plan
AMS	Aquatic Management Strategy
ANC	Acid Neutralizing Capacity
APCD	Air Pollution Control District
AQMD	Air Quality Management District
AQRV	Air Quality Related Value
ATV	All Terrain Vehicle
AUM	Animal Unit Month
BACM	Best Available Control Measure
BAER	Burned Area Emergency Rehabilitation
BC	Before Christ
BD	Brush Disposal
BHCO	Brown-headed cowbird
BLM	Bureau of Land Management
BMP	Best Management Practice
BMPEP	Best Management Practices Evaluation Program
BOE	California State Board of Equalization
BVFSYU	Big Valley Sustained Yield Unit
CADMP	California Acid Deposition Monitoring Program
CAR	Critical Aquatic Refuge
CARB	California Air Quality Board
CDF	California Department of Forestry and Fire Protection
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CIBA	California Indian Basketweavers Association
CIPC	California Invasive Plant Council

CNPS	California Native Plant Society
CO	Carbon monoxide
CRLF	California Red-Legged Frog
CRMP	Coordinated Resource Management Plan
CS	Conservation Strategy for Mountain Yellow-Legged Frog
CTL	Cut to Length
CURES	Coalition United for Recreation in the Eastern Sierra
CWAP	Clean Water Action Plan
CWE	Cumulative Watershed Effect
CWHR	California Wildlife Habitat Relationship
CWMA	Cooperative Weed Management Area
DAU	Deer Assessment Unit
DBH	Diameter Breast Height
DEIS	Draft Environmental Impact Statement
DEM	Digital Elevation Model
DFC	Desired Future Condition
DFPZ	Defensible Fuel Profile Zone
DTM	Digital Terrain Model
DWR	Department of Water Resources
ECM	Ectomycorrhizal
EHR	Erosion Hazard Rating
EIS	Environmental Impact Statement
EM	Forest Service Engineering Manual
EMAP	Environmental Monitoring and Assessment Program
EMDS	Ecosystem Management Decision Support
EO	Executive Order
EP	Eastside Pine
EPA	Environmental Protection Agency
EPC	Ecosystem Process Conceptual
ERA	Equivalent Roaded Area
ESA	Ecologically Significant Area
ESA	Endangered Species Act
EW	Emphasis Watershed
F	Fahrenheit
FA	Foraging Area
FDR	Forest Development Road
FEMAT	Forest Ecosystem Management Assessment Team
FERC	Federal Energy Regulatory Commission
FIA	Forest Inventory and Analysis
FICMNEW	Federal Interagency Committee for the Management of Noxious and Exotic Weeds

FLAG	Federal Land Managements' Air Quality Related Values Work Group
FLAM MAP	Flammability Map
FNWA	Federal Noxious Weed Act
FO	Forest Order
FOFEM	First Order Fire Effects Model
FOM	Fine organic matter
4WD, 4X4	Four Wheel Drive
FR	Federal Regulations
FS	Forest Service
FSH	Forest Service Handbook
FSM	Forest Service Manual
FVS	Forest Vegetation Simulation
FY	Fiscal Year
FYLF	Foothill Yellow-Legged Frog
GIS	Geographic Information System
GP	Georgia Pacific
GPRA	Government Performance and Results Act
HFQLG	Herger-Feinstein Quincy Library Group
HSA	Hydrologic Sub-area (CalWater Level 4, 100,000 – 500,000 acres)
HUC	Hydrologic Unit Code
IASC	Interagency Air and Smoke Council
IBA	Important Bird Area
IBI	Index of Biotic Integrity
IC	Ion Chromatography
ID	Interdisciplinary
IDT	Interdisciplinary Team
IMPROVE	Interagency Monitoring of Protected Visual Environmental
INFRA	A Forest Service database that houses information on all Forest Service improvements and facilities
IPM	Integrated Pest Management
KMDA	Known Mineral Deposit Area
KV	Knutson-Vandenberg
LAC	Limit of Acceptable Change
LEP	Limited English proficiency
LF	Leopard Frog
LIPM	Laser Integrating Plate Method
LNF	Lassen National Forest
LOP	Limited Operating Period
LRMP	Land and Resource Management Plan.
LSOG	Late Successional/Old Growth

LTBMU	Lake Tahoe Basin Management Unit
LWA	Landscape-Watershed Analysis
LWM	Large Woody Material
MA	Management Area
MBF	Thousands of Board Feet
MC	Mixed Conifer
MEA	Management Emphasis Area
MILS	Mineral Industry Location System
MIS	Management Indicator Species
ML	Road Maintenance Level 1-5
MMBF	Millions of Board Feet
MOU	Memorandum (or Memo) of Understanding
MU	Modern Urban
MYLF	Mountain Yellow-Legged Frog
NAAQS	National Ambient Air Quality Standards
NADP	National Atmospheric Deposition Program
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NF	National Forest
NFMA	National Forest Management Act
NFS	National Forest System
NFSPUFF	A Dispersion Model for Smoke Management in Complex Terrain
NIFC	National Interagency Fire Coordination Center
NO_2	Nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NO_2	Nitrogen Oxides
NPS	National Park System
NRHP	National Register of Historic Places
NRV	Natural Range of Variability
NSRE	National Survey on Recreation and the Environment
NVUM	National Visitor Use Monitoring
OGC	Office of General Counsel
OHV	Off Highway Vehicle
OMB	Office of Management and Budget
ORV	Off Road Vehicle
OSHA	Occupational Safety and Health Administration
OSV	Over Snow Vehicle
PAC	Protected Activity Center
PAOT	Persons-at-One-Time

PCT	Pacific Crest Trail
PFA	Post-Fledging Area
PFC	Proper Functioning Condition
PFIRS	Prescribed Fire Incident Reporting System
PIT	Passport in Time
PIXE	Proton Induced X-ray Emission
PM_{10}, $PM_{2.5}$	Particulates ranging from 10 to 2.5 microns in size
PNC	Potential Natural Community
PNF	Plumas National Forest
PSD	Prevention of Significant Deterioration Program
PSW	Pacific Southwest Forest and Range Experiment Station
QLG	Quincy Library Group
R	Rural
R5	Region 5: Pacific Southwest Region
RA	Riparian Area
RACM	Reasonably Available Control Measure
RARE	Roadless area review and evaluation
RARE II	Second Roadless Area Review and Evaluation (1979)
RCA	Riparian Conservation Area
RCO	Riparian Conservation Objective
RD	Ranger District
RDEIS	Revised Draft Environmental Impact Statement
RHCA	Riparian Habitat Conservation Areas
RIM	Recreation Information Management
RMO	Riparian Management Objectives
RN	Roaded Natural
RNA	Research Natural Area
ROD	Record of Decision
ROG	Reactive Organic Gases
ROS	Recreation Opportunity Spectrum
ROW	Right-of-way
RSL	Remote Sensing Lab
RVD	Recreation Visitor Day
S&G	Standard and Guideline
SAFE	Simulation and Analysis of Fire Effects on Forests
SHPO	State Historical Preservation Officer
SIA	Special Interest Area
SIO	Scenic Integrity Objectives
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring Network

SMARA	Surface Mining and Reclamation Act
SMP	Smoke Management Program
SMS	Scenery Management System
SNEP	Sierra Nevada Ecosystem Project
SNFP	Sierra Nevada Framework Project
SNFPA	Sierra Nevada Forest Plan Amendment
SNRF	Sierra Nevada Red Fox
SO_2	Sulfur dioxide
SO_2	Sulfur Oxides
SPAM	Sierra Provinces Assessment and Monitoring
SPI	Sierra Pacific Industries
SPLAT	Strategically placed area treatments
SQ	Square
SQS	Soil Quality Standards
SSFCA	Southern Sierra Fisher Conservation Area
TAMM	Timber Assessment Market Model
TCP	Traditional Cultural Property
TEP	Threatened, Endangered and Proposed
TEPS	Threatened, Endangered, Proposed, and Sensitive
TES	Threatened, Endangered and Sensitive Species
TIA	Travel Industry Association of America
TMDL	Total Maximum Daily Load
TNF	Tahoe National Forest
TOC	Threshold of Concern
TOG	Total organic gases
TOR	Thermal Optical Reflectance
TPZ	Timber Production Zone
TRP	Tribal Relations Programs
TRPA	Tahoe Regional Planning Agency
TV	Truth Value
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOC	Volatile Organic Compound
VQO	Visual Quality Objectives
WA	Watershed Analysis
WCA	Watershed Condition Assessment
WFNH	Willow Flycatcher Nesting Habitat

WFSA	Wildland Fire Situation Analysis
WIFL	Willow Flycatcher
WMO	Watershed Management Objectives
YRRD	Yuba River Ranger District
YT	Yosemite Toad

Appendix J: Biological Evaluation for Sensitive Plants and Fungi

Prepared by: /s/ Kathy Van Zuuk Date: August 26, 2008

Journey Level Ecologist/Botanist/
Noxious Weed Coordinator

Executive Summary

The Environmental Impact Statement (EIS) for this project analyzed 7 alternatives. The preferred alternative (Alternative 6) proposes to: prohibit cross country travel on about 804,400 acres and prohibit use on 1,400 miles of motorized trails un-authorized for motorized use; designate about 70 miles of motorized trails; impose wet weather seasonal closures on all native surface trails; and change about 276 miles of existing National Forest Transportation System (NFTS) roads from "open to highway legal vehicles only" to "open to all vehicles." Botanical surveys are complete for about 62 miles of proposed motorized trails – over 845 acres. The remaining miles will be surveyed in the upcoming field season. For motorized trails that have not been surveyed presence of sensitive species is assumed. Consultation with the United States Fish and Wildlife Service (USFWS) is not required per the Programmatic Agreement between the USFWS and Region 5 of the Forest Service.

The following information provides a summary of the effects to sensitive species from implementation of Alternative 6. Alternative 6 has potential habitat for all of the sensitive species on the Tahoe National Forest (TNF) sensitive list.

Sensitive Species Name	Effects Determination from Implementation of Alternative 6
Arabis rigidissima* var. *demota	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Astragalus webberi	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Botrychium ascendens	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Botrychium crenulatum	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Botrychium lunaria	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Botrychium minganense	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Botrychium montanum	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Bruchia bolanderi	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Calochortus clavatus* var. *avius	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Clarkia biloba* ssp. *Brandegeae	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.

Sensitive Species Name	Effects Determination from Implementation of Alternative 6
Cudonia monticola	May affect individuals and/or its habitat.
Cypripedium fasciculatum	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Cypripedium montanum	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Dendrocollybia racemosa	May affect individuals and/or its habitat.
Epilobium howellii	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Erigeron miser	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Eriogonum umbellatum* var. *torreyanum	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Fissidens aphelotaxifolius	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Fritillaria eastwoodiae	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Helodium blandowii	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Hydrothyria venosa	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Ivesia aperta* var. *aperta	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Ivesia aperta* var. *canina	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Ivesia sericoleuca	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Ivesia webberi	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Lewisia cantelovii	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Lewisia kelloggii* ssp. *hutchisonii* and ssp. *kelloggii	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Lewisia longipetala	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Lewisia serrata	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Lupinus dalesiae	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Meesia triquetra	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Meesia uliginosa	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Mielichhoferia elongata	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing.
Monardella follettii	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.

Sensitive Species Name	Effects Determination from Implementation of Alternative 6
Penstemon personatus	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Phacelia stebbinsii	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Phaeocollybia olivacea	May affect individuals and/or its habitat.
Pyrrocoma lucida	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.
Tauschia howellii	May affect individuals and/or its habitat but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the TNF.

Introduction

The purpose of this biological evaluation is to analyze the potential effects of the Tahoe National Forest (TNF) Motorized Travel Management DEIS on threatened, endangered, proposed and sensitive (TEPS) species of plants and fungi and their habitats. The species list includes the United States Department of Agriculture (USDA) Forest Service (FS) Region 5 Forester's Sensitive Species List (July 2006). This biological evaluation was prepared in accordance with FS Manual (FSM) direction 2672.42 and meets legal requirements set forth under Section 7 of the Endangered Species Act (ESA) of 1973, as amended, and implementing regulations [19 U.S.C. 1536 (c), 50 CFR 402.12 (f) and 402.14 (c)].

Potential habitat for TEPS species was identified within the project area using aerial photos, vegetation, soil, and elevation maps. Descriptions of the procedure used to conduct the potential habitat search are located at the Supervisors Office in the *Tahoe National Forest Sensitive Plant Program Standards and Guidelines* (Van Zuuk 2003 with ongoing updates). Table J-1 lists all the Forest Service sensitive species known or suspected to occur on the TNF. Table J-1 provides a general description of their habitat and the USFWS listing status and California Native Plant Society (CNPS) status for each species. The status rating is provided to give the reader an indication of the rarity of the species within its known range of occurrence.

Consultation to Date

The United States Fish and Wildlife Service (USFWS) is contacted every 90 days to obtain a current list of threatened, endangered, proposed, and candidate species that may be present on the TNF. The most recent list is available for review at the Supervisors Office (SO). One USFWS Candidate species, *Ivesia webberi*, has potential habitat on the TNF. However, no federally listed plant species occurs on the TNF. Consultation with the United States Fish and Wildlife Service (USFWS) is not required for this project.

Current Management Direction

Current management direction for threatened, endangered, proposed, and sensitive plant and fungi species on the TNF can be found in the following documents, filed at the SO Office:

- Forest Service Manual and Handbooks (FSM/H 2670)
- National Forest Management Act (NFMA)

- Endangered Species Act (ESA)
- National Environmental Policy Act (NEPA)
- Tahoe National Forest Land and Resource Management Plan (LRMP) as amended by the Sierra Nevada Forest Plan Amendment (SNFPA 2001), Final Supplemental Environmental Impact Statement (January 2004). The standards and guidelines in the January 2004 SNFPA Record of Decision (ROD) are incorporated by reference.
- Species-specific recovery plans which establish population goals for recovery of those species
- Species management plans
- Species management guides or conservation strategies
- Regional Forester policy and management direction

General Forest Service direction for sensitive plants/fungi species is summarized below:

1. Assist States in achieving their goals for conservation of endemic species.
2. As part of the NEPA process, review programs and activities, through a biological evaluation, to determine their potential effect on sensitive species.
3. Avoid or minimize impacts to species whose viability has been identified as a concern.
4. If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole.
5. Establish management objectives in cooperation with the States when a project on National Forest System (NFS) lands may have a significant effect on sensitive species population numbers or distribution. Establish objectives for Federal Candidate species, in cooperation with the USFWS and the States.
6. Conduct field surveys for TEPS plant species early enough in project planning process that the project can be designed to conserve or enhance TEPS plants and their habitat (SNFPA ROD page 66, S&G #125).
7. Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining fen ecosystems and plant species that depend on these ecosystems (SNFPA ROD page 65, S&G #118).

Table J-1. Tahoe National Forest sensitive plants and fungi

Species	Status (USFWS)	Status (CNPS*)	General Habitat Grouping
Arabis rigidissima* var. *demota	None	1B	High elevation openings and rocky areas at elevations of 7,500-8,500 feet
Astragalus webberi	None	1B	Forest edges and openings at 2,700-4,000 feet in full to partial sun
Botrychium ascendens	None	2	Riparian plant communities at 4,000 feet
Botrychium crenulatum	None	2	Riparian plant communities at 4,000 feet
Botrychium lunaria	None	2	Riparian plant communities at 4,000 feet
Botrychium minganense	None	2	Riparian plant communities at 4,000 feet
Botrychium montanum	None	2	Riparian plant communities at 4,000 feet
Bruchia bolanderi	None	2	Riparian habitats at 4,000-9,500 feet
Calochortus clavatus* var. *avius	None	1B	Forest edges and openings at 3,000-5,800 feet (ARRD)
Clarkia biloba* ssp. *Brandegeae	None	1B	Forest edges and openings at 3,000 feet and below
Cudonia monticola	None	None	Older forest -mixed conifer-no elevation restrictions
Cypripedium fasciculatum	None	4	Older forest at 500-7,200 feet, mixed conifer
Cypripedium montanum	None	4	Older forest at 600-7,500 feet, mixed conifer
Dendrocollybia racemosa	None	None	Older forest–mixed conifer-no elevation restrictions
Epilobium howellii	None	1B	Riparian between 6,000-9,000 feet
Erigeron miser	None	1B	High elevation openings and rocky areas at 6,000 feet and above in granite clefts
Eriogonum umbellatum* var. *torreyanum	None	1B	High elevation openings and rocky areas between 6,000-8,000 feet
Fissidens aphelotaxifolius	None	None	Riparian at 6,300 feet and below, along streams near small waterfalls and in wet crevices of cliffs
Fritillaria eastwoodiae	None	3	Forest edges and openings between 00-5,000 feet in full to partial sun
Helodium blandowii	None	2	Riparian at 6,500 feet and above in wet areas
Hydrothyria venosa	None	None	Aquatic at elevations between 1,150 to 7,000 feet
Ivesia aperta* var. *aperta ***Ivesia aperta* var. *canina*** ***Ivesia sericoleuca*** ***Ivesia webberi***	None None None Candidate	1B 1B 1B 1B	Riparian at elevations between 4,500-7,500 feet in eastside meadows and seasonal drainages
Lewisia cantelovii	None	1B	Riparian at elevations between 1,000-4,500 feet, on cliffs/outcrops within the Yuba River drainages
Lewisia kelloggii* ssp. *hutchisonii	None	3	Forest edges and openings at elevations between 5,200-7,000 feet
Lewisia kelloggii* ssp. *kelloggii	None	None	Forest edges and openings at elevations between 5,400-9,000 feet
Lewisia longipetala	None	1B	High elevation openings and rocky areas at elevations between 8,300-9,500 feet in damp gravel
Lewisia serrata	None	1B	Riparian at elevations between 3,000-5,000 feet, on cliffs/outcrops within American River drainages
Lupinus dalesiae	None	1B	Forest edges and openings between 3,000-8,000 feet (YRRD)

Species	Status (USFWS)	Status (CNPS*)	General Habitat Grouping
Meesia triquetra	None	2	Riparian with no elevation restrictions, primarily fens
Meesia uliginosa	None	2	Riparian with no elevation restrictions, primarily fens
Mielichhoferia elongata	None	2	Copper and heavy metal at elevations between 1,500-3,600 feet
Monardella follettii	None	1B	Serpentine at elevations between 2,000-6,500 feet
Penstemon personatus	None	1B	Forested edges and openings at elevations between 4,500-6,500 feet, in partial sun
Phacelia stebbinsii	None	1B	Forested edges and openings at elevations between 3,000-6,000 feet, westside
Phaeocollybia olivacea	None	None	Older forest with no known elevation restriction, mixed conifer
Pyrrocoma lucida	None	1B	Riparian at elevations below 6,000 feet in eastside meadows/alkali flats
Tauschia howellii	None	1B	High elevation openings and rocky areas at elevations between 5,500-8,500 feet

*California Native Plant Society (CNPS) from http:///www.cnps.org/inventory

Description of the Alternatives

Seven alternatives are analyzed in detail. Refer to Chapter 2 of the DEIS for a complete description of the alternatives. Chapter 2 of the DEIS is included in this report by reference.

Existing Environment (plant communities and habitats)

The existing or current condition of sensitive plant and fungus populations reflects all of the past human actions on TNF system lands and past and current climatic conditions. We do not have a complete baseline of historic conditions for these species but the TNF area has a rich botanical history as noted in historic accounts such as those listed in Leiberg (1902) and True (2003). Some of the past human actions on the forest continue to impact sensitive species/are persistent. Without baseline data, it is difficult to quantify how past human actions have altered the rare plants and their habitats. Without annual plant monitoring data, it is difficult to quantify the effects of various actions on rare plants and their habitats. However, field observations of specific sites (by the author) such as the *Clarkia biloba* ssp. *Brandegeae* site along Mosquito Ridge Road and the *Cypripedium fasciculatum* site near Rock Creek shows that sensitive species are being killed and/or injured. In some cases, aggressive non-native plants (weeds) are competing with the sensitive species for soil and water. The significance of effects varies by species, within species, and between sites.

This section of the biological evaluation presents what is known about the plant communities that support sensitive species, what is known about each sensitive species, and what is known about how motorized vehicle use on the forest impacts plant communities and sensitive species (native vegetation).

Summary of the existing condition of NFTS motorized roads and trails and motorized trails un-authorized for motorized use: The existing condition of NFTS motorized roads and trails and motorized

trails un-authorized for motorized use varies. There are many different reasons for this variation in existing condition. How the motorized trail was developed and where the motorized trail was developed are two of the main reasons for variation in existing condition.

How motorized trails are developed: The condition of some of the NFTS motorized roads and trails and the motorized trails un-authorized for motorized use varies due to the way they were developed. Some of the NFTS motorized roads and trails and the motorized trails un-authorized for motorized use were developed (pioneered) by users seeking access to a destination – creating a motorized trail without engineering input. All native surface motorized trails have the potential to erode. Soil and water surveys show that most trail systems have the potential for some sort of soil erosion or watershed impacts. (Refer to section 3.02 (Soil and Watershed) of the DEIS for more information.) Those motorized trails that were developed without engineering input frequently do not have the erosion control structures such as rolling dips that would help to control/mitigate soil erosion. Examples of motorized trails pioneered without engineering input include the YRN-M1, YRN-M2, YRN-007, YRN-4, YRN-M3a, and YRN-M3b that were developed by miners. Some of the motorized trails un-authorized for motorized use were designed and developed by the TNF and were constructed to minimize tread loss and sustain long term use. For example, Maintenance Level (ML) 1 roads that are currently being considered as motorized trails include SV-005, TKN-001, YRS-SF6, YRS-B12, and YRN-509. In general, motorized trails un-authorized for motorized use (that are not ML 1 roads) lack the drainage, grade and gradient features that would sustain long term use at least along some portion of the trail. Therefore, the mitigations described in Appendix A (Road Cards) of the DEIS were developed to improve the conditions of motorized trails un-authorized for motorized use. According to water and soil surveys, about one half of the inventoried motorized trails had erosion identified as an issue somewhere along the trail; about 10 percent had wetland issues; about 20 percent were incised up to at least 6 inches; and about 67 percent did not have any perennial water crossings. When motorized trails erode they have the potential to impact sensitive species.

Where motorized trails are developed: Some NFTS motorized roads and trails and some motorized trails un-authorized for motorized use were developed in areas that impact sensitive species. Examples of NFTS motorized trails that are known to impact sensitive species are displayed in Table J-2. Surveys of motorized trails proposed for addition to the NFTS show that some motorized trails un-authorized for motorized use are also negatively impacting sensitive plants. For example, individual plants in an occurrence of *Ivesia sericoleuca* have been killed and injured by development and use of the motorized trail un-authorized for motorized use labeled TKN-M2.

Motorized trails un-authorized for motorized use have been proposed for addition to the NFTS on all districts within a variety of habitats. All proposed motorized trails currently exist as a footprint visible on the ground, i.e. new construction is not proposed. However, some of the proposed motorized trails are currently revegetating. Some have been on-the-ground for over 50 years. For example, an old mining trail that has become a motorcycle trail. Some were more recently created by motorized vehicle users who flagged in areas and removed vegetation to make the motorized trail. Some are drivable by passenger vehicles, and some can only be used by specialized 4-wheel drive vehicles and/or motorcycles.

Sensitive plants and plant communities known to be impacted by motorized vehicle use: As mentioned above, Table J-2 displays the sensitive species on the TNF that are known to be impacted by

motorized vehicle use on NFTS motorized trails. The listing in Table J-2 is not comprehensive since surveys of all of the NFTS motorized trails have not been done. NFTS motorized trails are not analyzed in this evaluation other than how they contribute to cumulative impacts to sensitive species. Surveys of the proposed motorized trails will be completed in the field season of FY 2008. To date, about 62 miles of proposed motorized trails have received rare plant and weed surveys. Therefore, this analysis focuses on impacts to known sensitive species occurrences in areas that have been surveyed and to potential habitats in areas where the surveys are not complete.

There are no threatened, endangered, or proposed (TEP) plants known to occur on TNF system lands and impacts to TEP species are not expected. One USFWS Candidate plant species has potential habitat on TNF system lands. However, TEP plant surveys are done when sensitive species surveys are done.

Direct impacts to sensitive plants and fungi can occur from use of the NFTS motorized trails, use of motorized trails un-authorized for motorized use, and from cross country use. It is believed that most users stay on motorized trails. However, even a single motorized vehicle pass can kill and/or injure sensitive species. In general, the significance of the impacts is dependent on the location of the road/trail/area in relation to the sensitive species occurrence, the amount of motorized vehicle use at the site of the occurrence, the season in which the use occurs, and the condition of the occurrence being impacted (species/community trend). In general terms, when sensitive species are located immediately adjacent or within a road/trail/area, it is at increased risk of adverse impacts. Known direct and indirect impacts are summarized below:

- Direct impacts from injury or being killed when plants are run over
- Indirect impacts from increased risk of weed introduction and spread
- Indirect impacts from changed hydrology – generally from below ground water interception by the road/trail/area and/or wheel tracks, interception of overland flow by the road/trail/area or wheel tracks, and/or channeling of water on the road/trail/area or wheel tracks - dumping water and sediment into the adjacent plant community, and undercutting roots
- Indirect impacts from increased erosion from wind, and the channeling of water carrying sediment when ground cover is reduced/eliminated
- Indirect impacts from increased risk to pollinators (reduction in number of pollinators) when vegetation is reduced/eliminated and/or the pollinator is killed
- Indirect impacts from soil compaction that reduces seed germination and seedling survival, and soil infiltration of water
- Indirect impacts from loss of vegetative cover of associated plant species that may benefit or negatively impact the species by the creation of bare soil and/or contribution to the impacts listed above
- Indirect impacts from possible loss of genetic variability due to habitat fragmentation
- Cumulative impacts to habitats – cumulative impacts are possible because many of the sensitive species are habitat specific and at least some of those habitats are fragile and do not recover readily from disturbance.

As mentioned previously, botanical surveys of about 62 miles of proposed motorized trails (about 845 acres) are complete. Table J-3 provides a list of the motorized trails proposed for addition to the NFTS that have been surveyed.

Table J-2. Sensitive plant species known to be impacted by existing motorized vehicle use on motorized trails

Quadrangle	Road or Trail	Impact/Comment
Antelope SE	Antelope Valley	*Ivesia aperta* var. *aperta* is along the State/County/non-forest road.
Blue Canyon SE	0019-024	The NFS road and user-created trail go through a wetland.
Boca NW	Stampede Dam Road	The State/County/non-forest road is adjacent to occurrences of *Ivesia sericoleuca* in sections 4 and 16.
Boca NW	270-8	The NFS road is adjacent to an occurrence of *Ivesia sericoleuca* in section 16.
Calpine SE	71	NFS road goes through an occurrence of *Ivesia sericoleuca* in section 17.
Calpine SE	Highway 89	State Highway 89 goes through occurrences of *Pyrrocoma lucida* in section 29.
Camptonville	Highway 49	*Clarkia biloba* ssp. *Brandegeae* is adjacent to Highway 49.
Cisco Grove NW	12E45 – Pierce wetland area	Un-authorized and authorized motorized trails go through occurrences of the sensitive plant *Phacelia stebbinsii*.
Clio SE	0009-015	The motorized trail (county road) goes through an occurrence of the sensitive plant – *Epilobium howellii.*
Dog Valley SW	Babbitt Road	The NFS road is adjacent to an *Ivesia sericoleuca* occurrence.
Dog Valley SW	270-8	The NFS and unclassified roads go through *Ivesia sericoleuca* occurrences in sections 15 and 16.
Downieville SW	0302-015	The motorized trail goes through an occurrence of the sensitive plant - *Lewisia kelloggii* ssp. *hutchisonii.*
Downieville SW	Unauthorized - off 10E17	The un-authorized motorized trail is adjacent to an occurrence of the sensitive plant - *Lewisia kelloggii* ssp. *hutchisonii.*
Gold Valley	NFTS motorized trail	The NFTS motorized trail goes through an occurrence of the sensitive plant – *Lewisia kelloggii* ssp. *hutchisonii*.
Goodyear's NE	0035-016	NFS road goes through an occurrence of the sensitive plant *Lupinus dalesiae*.
Goodyear's NE	0035-017	NFS road goes through an occurrence of the sensitive plant *Lupinus dalesiae*.
Graniteville	Spur to the 50-4	*Cypripedium fasciculatum* is at the end of the NFS road - a spur off the 50-4 road.
Hobart Mills SE	Off the 886	*Ivesia sericoleuca* is adjacent to the NFS road.
Hobart Mills SE	889-6	*Ivesia sericoleuca* is adjacent to the NFS road.
Hobart Mills SE	Unauthorized off the 89-32	The road goes through *Ivesia sericoleuca* occurrences in section 23 and 30 – Prosser Reservoir area. *Ivesia sericoleuca* is located on or adjacent to TKN-J14.
Hobart Mills SE	890-4 road	*Ivesia sericoleuca* is adjacent to the NFS motorized trail.
Hobart Mills NW	860-20	The NFS road goes through an occurrence of *Ivesia sericoleuca.*
Hobart Mills NE	886-18 spur	The NFS road goes through an occurrence of *Ivesia sericoleuca* in section 35.
Hobart Mills NE	889-1	The NFS road goes through an occurrence of *Ivesia sericoleuca*.
La Porte	25-28	*Cypripedium fasciculatum* is growing on the road cutbank.
Loyalton SW	Antelope Valley	*Ivesia aperta* var. *aperta* is along the State/County/non-forest road.

Quadrangle	Road or Trail	Impact/Comment
Loyalton SW	Unclassified	*Ivesia aperta* var. *aperta* is along the road.
Michigan Bluff	Mosquito Ridge	*Clarkia biloba* ssp. *Brandegeae* is adjacent to the road.
Mount Fillmore	25-29	*Lewisia kelloggii* var. *hutchisonii* is growing in and adjacent to the road and within road dispersed camping spurs.
Norden SW	Unauthorized	*Eriogonum umbellatum* var. *torreyanum* is near the un-authorized road in section 36.
North Bloomfield NE	729-2	*Fritillaria eastwoodiae* is along the NFS road
North Bloomfield NE	0729-003-02	NFS road goes through an occurrence of the sensitive plant *Fritillaria eastwoodiae*.
North Bloomfield NE	0020-003-05-0	NFS road goes through an occurrence of the sensitive plant *Fritillaria eastwoodiae*
North Bloomfield NE	00020-003	NFS road goes through an occurrence of the sensitive plant *Cypripedium fasciculatum*
North Bloomfield NE	0020-003-04-01	NFS road and authorized motorized trail go through an occurrence of the sensitive plant *Fritillaria eastwoodiae*.
North Bloomfield NE	0020-003	NFS road and authorized motorized trail go through an occurrence of the sensitive plant *Fritillaria eastwoodiae*.
North Bloomfield SE	0020-001 Rock Creek	NFS road goes through an occurrence of the sensitive plant *Cypripedium fasciculatum*.
North Bloomfield NE	Rock Creek	*Cypripedium fasciculatum* is adjacent to the road.
Sattley	12-3	*Epilobium howellii* is adjacent to the road.
Truckee NE	686A-10	The State/County/non-forest road and an un-authorized road go through an occurrence of *Ivesia sericoleuca* in section 11.
Washington NE	0637-004	The county road goes through an occurrence of the sensitive plant *Clarkia biloba* ssp. *Brandegeae*.

There are 40 species of plant and fungi identified as sensitive that have potential to or are known to occur on TNF lands. None of the TNF sensitive plants or fungi is dependent on motorized vehicle disturbance for their viability.

Table J-3. Motorized trails un-authorized for motorized use with completed botanical surveys to date (TNF files)

Motorized trail	Miles surveyed	Acres surveyed
ARM-2	.5	30
ARM-5	.8	16
ARM-7	.8	8
SV-004	.2	2
SV-005	.6	6
SV-007	.5	6
SV-P5	.4	2
SV-P6	.2	5
SV-P7 e and w	1.4	12
SV-P8	.3	2
SV-P11	1.0	6
SV-P12	.6	86
SV-P13	.9	6
SV-P14 and 14a	.7	5
SV-P15	1.1	25
SV-P18	.6	6
TKN-003	.4	3
TKN-J2	.7	9
TKN-J3 and J3n	1.6	15
TKN-J4	1	15
TKN-J5	1.4	15
TKN-J6	.1	1
TKN-J9	1.7	49
TKN-J11	.9	6
TKN-J12	.7	3
TKN-J13	1.6	6
TKN-M1	3.6	43
TKN-M2	3.4	42
TKN-Q1	.9	6
TKS-11	.9	6
TKS-M9	3	20
Prosser	.5	5
YRN-001	.1	10
YRN-004	.2	1
YRN-005	.5	6
YRN-007	.8	18
YRN-008	.3	3
YRN-1	1.8	3
YRN-2	1.4	3
YRN-4	.6	12
YRN-5a, YRN-5c	.3	2
YRN-11	.2	6
YRN-509	.5	3
YRN-A1 - Eureka Diggings	1.7	60
YRN-M3b	2.7	30
YRM-M3	.3	6
YRM-M4	.5	3
YRS-003b	.3	1
YRS-B5	3.8	45
YRS-B7	.2	8
YRS-B10	.3	1
YRS-B12	.1	1
YRS-F1	.9	61
YRS-G3	.5	10
YRS-SF5	4	30
YRS-SF6	1.4	36
YRS-066 and YRS-066w	1.6	18
Cal Ida (25-9-P, 25-9-3-P, 35-3-P, 35-4-P, 35-4-1-P, 39-9-P, 491-3-P, 491-3-1-P, 491-3-2-P)	5.8	50
Totals	over **62**	about **845**[1]

[1] Some acres are surveyed more than once due to the difference in flowering times for some of the sensitive plants.

General description of the plant communities on the TNF: As mentioned previously, there are motorized trails proposed for addition to the NFTS on all districts in a variety of plant communities. In this analysis, the TNF landscape is described in two geographic subdivisions (Miles and Goudey 1997): Sierra Nevada Foothills Section (M261F) and Sierra Nevada Section (M261E). The geographic subdivision description is provided to give an overview of the landscape that is the TNF.

- **Sierra Nevada Foothills Section**: This section is located in the western portion of the TNF as a narrow belt dividing the Great Central Valley section and the Sierra Nevada section. The climate is considered Mediterranean, with dry, hot summers, and wet, cool winters. Average annual precipitation ranges from 8 inches in the south to 40 inches in the north falling primarily as rain. The average annual temperature ranges from 45°F to 64°F. This section consists of sedimentary, granitic, volcanic and ultramafic rocks formed during the Mesozoic Era. Principal land forms include river canyons, lava-capped mesas and mountain slopes formed by streams. The elevation ranges from 200 to 5,000 feet. Soils are typically well drained. Predominant potential natural vegetation includes the following vegetation alliances: blue oak, needle grasslands, mixed chaparral, foothill pine, and valley oak. Dominant vegetation in riparian plant communities includes various willow, Fremont cottonwood, and white alder.
- **Sierra Nevada Section**: The rest of the TNF falls in the Sierra Nevada Section. In this section, the climate is typically montane Mediterranean, with dry, warm summers and wet, cold winters. Temperatures range from very cold to temperate and moisture is semi-arid to subhumid. Temperature and climate are highly influenced by local topography, elevation, aspect and slope. Generally, precipitation is greatest at the mid to high elevations on the west side of the crest, occurring predominantly in the form of snow. The east side of the crest and lower westside elevations adjacent to the Foothill section receive the least rainfall of this section. Average annual precipitation ranges from 10 to 90 inches. Summer thunderstorms occur, but significant precipitation is usually localized. The average annual temperature is 42° F to 60°F. This section consists of granitic and ultramafic rocks, strongly metamorphosed sedimentary and volcanic rocks, and volcanic rocks. The principal landforms include river canyons, broad, gently sloping ridges; mountain slopes formed by glaciers and mountain slopes formed by streams. Elevation ranges from 1,000 to 14,495 feet. Eight of the twelve existing soil orders are represented in this section, reflecting the wide range of climatic, geologic and vegetation variables. Some of the most productive forest soils in the Pacific Southwest occur in this ecological section. Predominant potential natural vegetation includes: ponderosa pine, Jeffrey pine, big sagebrush, western juniper, mixed conifer, white fir, red fir, lodgepole pine, huckleberry oak, aspen, and mountain hemlock. Dominant vegetation in riparian plant communities includes various willow, black cottonwood, montane wetland shrub habitat, and mountain alder.

These geographic subdivisions contain a variety of plant communities. Four plant communities are impacted by motorized vehicle use and are considered limited on the TNF, i.e. aquatic/riparian, serpentine, older forest and oak woodland. In general terms, sensitive plants and fungi that are dependent on plant communities that are limited in amount and distribution are more at risk from motorized vehicle use than those that are not. However, the sensitive species that are not plant community specific (for

example those that occur in forest edges and openings) are also considered limited in amount and distribution.

The following discussion groups TNF sensitive plants and fungi by the types of plant community where they are known to occur. This grouping provides a rough approximation of the type of plant community each species needs and allows an evaluation of how the potential habitat is impacted by motorized vehicle use. The following discussion groups all 40 sensitive species within plant communities and/or places them into a non-specific plant community group. A summary of potential impacts to those plant communities is also included. Currently, the TNF has about 717,900 acres of land that is considered open to motorized vehicle use (where cross country travel is not already prohibited). However, some of those acres can not be accessed by motorized vehicles due to terrain and vegetation density.

Aquatic/riparian plant communities: For this analysis, these plant communities include wet meadows, seeps, fens, vernally wet areas, riparian areas (streamside/lakeside/reservoir edges), wet/moist rock cliffs, and spring habitats. Sensitive species that occur in/are dependent on aquatic/riparian plant communities include: *Botrychium ascendens, Botrychium crenulatum, Botrychium lunaria, Botrychium minganense, Botrychium montanum, Bruchia bolanderi, Epilobium howellii, Fissidens aphelotaxifolius, Helodium blandowii, Hydrothyria venosa, Ivesia aperta* var. *aperta, Ivesia aperta* var. *canina, Ivesia sericoleuca, Ivesia webberi, Lewisia cantelovii, Lewisia serrata, Meesia triquetra, Meesia uliginosa,* and *Pyrrocoma lucida*.

Hydrologic alteration is considered one of the biggest threats to sensitive species dependent on aquatic/riparian plant communities. According to TNF GIS records, about 867 miles of motorized vehicle use currently occurs on existing NFTS motorized roads and trails (NFS lands and private and other jurisdiction roads) within Riparian Conservation Areas (RCAs) for aquatic/riparian plant communities (within 150 feet of intermittent streams and 300 feet of perennial streams). For purposes of this analysis, impacts to sensitive species could occur if they are within 100 feet (generally indirect impacts such as dust) of a sensitive species occurrence or 100 feet of an unsurveyed aquatic/riparian plant community (NFS lands). About 219 miles of motorized vehicle use currently occurs on existing NFTS motorized roads and trails (NFS lands and private and other jurisdiction roads) within 100 feet of perennial and intermittent water sources. GIS analysis indicates that the TNF has about 2,787 miles of NFTS motorized roads/trails (NFS lands). Therefore, about 8 percent of NFTS motorized roads/trails are located within 100 feet of aquatic/riparian plant communities.

The condition of existing NFTS motorized roads and trails varies. Some appear stable with no obvious erosion problems. Some show extensive damage to aquatic/riparian plant communities along portions of the motorized road or trail. For example, along the Fordyce and Rubicon NFTS motorized trails there are several areas of wet soil that have been compacted by motorized vehicle use to depths of up to 4 feet deep. In some areas logs and slash have been placed in these damaged wetland areas to keep vehicles out. However, these areas continue to be mud holes with compacted soils that lack vegetation. These mud holes will continue to erode during peak flows unless other restoration measures are implemented. The significance of this erosion is unknown since the mud holes are not necessarily hydrologically connected (on the surface) to streams. However, where these conditions are noted, they are identified as restoration and rehabilitation needs.

Several motorized trails un-authorized for motorized use have portions located within RCAs and have water crossings. According to soil and water surveys (refer to section 3.02 of the DEIS), 33 percent of the motorized trails un-authorized for motorized use have stream crossings[2]. The condition of these crossings and the RCAs varies. Of the 37 crossings described in section 3.02, 46 percent were found to have acceptable resource impacts (resource impacts refers to soil and water resources). Forty nine percent of the 37 crossings were found to be contributing some level of sediment to the adjacent stream. About 5 percent of the 37 crossings had failed culverts and were in need of major repair.

Aquatic/riparian plant communities and the sensitive species dependent on them that are associated with motorized trails un-authorized for motorized use that act as drainages/cross perennial water are negatively impacted by changes to the pattern of water flow, reduced vegetative cover, compacted soil, increased erosion, deposited petroleum products, and/or introduced invasive non-native plants (weeds) that compete with native vegetation for food and water.

Aquatic/riparian plant communities are limited in amount and distribution, and provide extremely important ecosystem functions. Riparian plant communities have been significantly reduced by past human activities and are currently estimated to make up only about 1 percent of the landscape in the United States (Knopf 1988 in Bleich et al. 2005). Some reports estimate that over 90 percent of riparian habitats have been lost within the state of California. Riparian plant communities have significantly greater biodiversity than adjacent uplands (Kondolf et al. 1996), providing habitat for both aquatic and terrestrial plant species. They are important for rare or endemic plant species.

Serpentine and/or copper and heavy metal plant communities: These plant communities include rocks and the soils derived from serpentine (ultra mafic) and areas of rock outcrop with heavy metals. Serpentine rocks have iron magnesium silicate and impurities of chromium, nickel, and other toxic elements. As these rocks weather, soils develop that are high in magnesium and iron, low in calcium, and toxic to plants that are not specifically adapted to them. Therefore, they contain unique plant communities. Sensitive species that occur on serpentine soils or copper/heavy metal soils include: *Mielichhoferia elongata* and *Monardella follettii*. (Watchlist species that are dependent on these types of habitats include: *Allium sanbornii* var. *congdonii*, *Allium sanbornii* var. *sanbornii*, *Chlorogalum grandiflorum*, and *Perideridia bacigalupi* – refer to Appendix N (Watchlist Plant and Plant Community Report) of the DEIS). Many serpentine areas in California contain a high degree of plant endemism (Brooks 1987). TNF serpentines occur primarily along the lower western slopes of the forest (Kruckeberg 1984). The TNF has about 14, 412 acres of serpentine plant communities located primarily on the low to mid slopes of the western side of the forest.

Motorized vehicle use impacts these plant communities by reducing vegetative cover, creating disturbed soils that are vulnerable to increased erosion, and by introducing weeds. Many serpentine plant communities are open terrain lacking vegetation (Kruckeberg 1984). About 1,660 acres of serpentine soils are currently impacted by NFTS motorized roads and trails and motorized trails un-authorized for

[2] The number of crossings displayed in section 3.02 (Soils and Watershed) does not match the number of crossings in section 3.06 (Plant Communities), Appendix J (this document), or Appendix N (Watch List Report) because 3.02 displays native surface roads only.

motorized use (areas within 100 feet of roads and trails). This is about 12 percent of the total 14,412 acres that occur on the TNF. The significance of this percentage is unknown.

Older forest plant communities: Plant and fungi species that are dependent on older forest plant communities rely on shade, protected microclimates, and infrequently disturbed substrates that occur within these habitats. Because of mycorrhizal associations, species dependent on older forests are generally intolerant of edge effects that change the temperature, moisture, and other microclimate conditions. The TNF has about 353,631 acres of older forest (NFS lands CWHR 4 and above). About 29,900 acres of older forest are currently impacted by NFTS motorized roads and trails and motorized trails un-authorized for motorized use (areas within 100 feet). This is about 9 percent of the total older forest acres on the forest. The significance of this percentage is unknown. Sensitive species dependent on these habitats include: *Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa,* and *Phaeocollybia olivacea*.

Motorized vehicle use impacts older forest habitats in several ways. The most significant impacts sensitive plant and fungi species are those that damage/kill underground mycelia/mycorrhizal networks. Motorized vehicle use disturbs the litter/duff/soil organics, reduces soil shade/moisture, and creates openings. Openings such as trails/wheel tracks create breaks in the mycelial network. Reductions in leaf litter and organic material in soils affects the amount of nutrients and water available to plants dependent on mycorrhizal associations and fungi. Creation of bare soil also increases the risk of weed introduction and spread.

Oak woodland plant communities: California's oak woodlands are largely privately owned and are estimated to cover about 10 million acres (Ewing et al. in Bartolome and Standiford 1992). They provide shelter and food for wildlife, wood and fuel for humans, and feed for livestock (Jimerson and Carothers 2002). Oak woodlands contain some of the highest species diversity found in California native plant communities (Jimerson and others in Jimerson and Carothers 2002). The TNF manages about 13,886 acres of oak woodland. Oak woodlands on TNF system lands are generally at or below 3500 feet. These plant communities have experienced extensive historic disturbance through harvest of the oaks for fuelwood cutting, mining timbers, domestic and commercial construction, and widespread and heavy livestock grazing (ibid). No other ecosystem in the Sierra Nevada has experienced more human influence over a longer time period than the oak woodlands (Anderson in SNFPA 2001). Threats to oak woodlands across the State include: urbanization, conversion to agriculture, fragmentation, low rates of regeneration, competition from weeds, and sudden oak death. Motorized vehicles impact these ecosystems on TNF lands by: introducing and spreading weeds, damaging native vegetation, increasing soil erosion, and fragmenting habitats. The TNF does not have any sensitive plants or fungi that are entirely dependent on oak woodlands.

It is believed that oak woodlands are not regenerating in a sustainable fashion (McCreary 2004). The natural regeneration of some oak species is apparently inadequate to replace trees that are harvested or die naturally (Bartolome et al in McCreary 2004). Therefore, motorized trails un-authorized for motorized use located in oak woodlands that are no longer used by motorized vehicles may not experience a significant amount of oak regeneration. However, it is recognized that the best growing site for acorns is shaded, bare mineral soil (McDonald and Tappeiner in SNEP 1996). Acorns that fall onto the bare soil

(wheel track areas) created by these motorized trails from adjacent trees may have a better chance of becoming established. However, motorized trails un-authorized for motorized use will have changed soil porosity in the wheel track areas. The moisture content of soils under the wheel track areas declines even if the use is removed (Helvey and Kochenderfer 1990 in Trombulak and Frissell 2000) probably due to the changed soil porosity. In addition, the increase of sunlight to the ground in the motorized vehicle disturbed area may cause a change in ground cover from sparse grass to heavy grass and shrubs. However, the nature and rate of vegetative recovery will vary from site to site dependent on such factors as soil, slope, exposure to the sun and local microclimate (Johnson and Tietje – date unknown).

Forested edge/openings plant communities: Forests of all ages contain edges and openings. Plants dependent on edges and openings within forested plant communities are not considered habitat specific. Edges and openings are constantly being created as trees and other vegetation dies, and lost as vegetation grows into them. It is estimated that the TNF has about 543,300 acres of forested edge/opening plant communities. Sensitive species with potential habitat within edge and opening situations include: *Astragalus webberi, Calochortus clavatus* var. *avius, Clarkia biloba* ssp. *brandegeae, Fritillaria eastwoodiae, Lewisia kelloggii* ssp. *hutchisonii, Lewisia kelloggii* ssp. *kelloggii, Lupinus dalesiae, Penstemon personatus,* and *Phacelia stebbinsii*. Motorized vehicle use impacts these plant communities by increasing the risk of weed introduction and spread, reducing plant cover, increasing erosion, reducing photosynthetic ability by covering vegetation with dust, changing water flow patterns, and compacting soil.

High elevation opening and rocky areas plant communities: Some plants only grow in openings and rocky areas at high elevations. Trees may be present in the area, but they do not form closed canopy situations. It is estimated that the TNF has about 43,240 acres of high elevation opening and rocky area plant communities. *Erigeron miser* generally grows in cracks of granite boulders. *Arabis rigidissima* var. *demota, Eriogonum umbellatum* var. *torreyanum, Lewisia longipetala,* and *Tauschia howellii* generally grow in openings. Species with potential habitat within these types of plant communities include: *Arabis rigidissima* var. *demota, Erigeron miser, Eriogonum umbellatum* var. *torreyanum, Lewisia longipetala,* and *Tauschia howellii*. These habitats are generally steep and highly erosive, rock outcrops, and/or very high elevation rocky openings. The plants dependent on these plant communities do not appear to compete well with other vegetation. Therefore, weed introduction and/or spread is a significant risk. These plant communities are already subject to natural erosion and have a short growing period. Disturbance can increase erosion and cause significant impacts to the soil and water components of the plant community.

Sensitive plants and weeds: Motorized vehicle use is known to increase weed introduction by carrying weed seed from one place to another. Motorized vehicles are known to accelerate plant invasions and induce rapid changes in biodiversity patterns (Von der Lippe and Kowarik 2007). Refer to the weed risk assessment in Appendix M of the DEIS (incorporated by reference) for more information about how weeds spread. Weed infestation introduced by motorized vehicle use is known to negatively impact sensitive species. Table J-4 displays the proposed motorized vehicle trails and the weed occurrences known to occur within 100 feet of some portion of them (TNF weed occurrence records and surveys results). Table J-4 also displays the ecological rating for those weeds.

When an area is heavily infested with weeds, the weeds directly compete with native plants such as sensitive plant species and can cause their local displacement. Heavily infested areas have reduced aesthetic values, biological diversity, and ecosystem services (D'Antonio et al. 2004). Areas heavily infested with weeds have altered disturbance regimes, provide less forage for wildlife, and can experience increased erosion. Refer to the weed risk assessment located in Appendix M (Weed Risk Assessment) of the DEIS for more information.

Table J-4. Known weed occurrences within 100 feet of proposed motorized trails

Motorized trail ID	Weed occurrences known to occur within 100 feet of road/trail/area	Ecological impact rating (Cal IPC)
ARM-5	Large patches of cheatgrass are located adjacent to the trail	High
SV-P14	Musk thistle is within about 100 feet.	Moderate
TKN-J9	Wooly mullein and cheatgrass along motorized trail	High (cheat grass) wooly mullein limited
TKN-J13	Musk thistle is adjacent to the trail.	Moderate
TKN-M1	Cheatgrass is located in and adjacent to the trail	High
TKN-M2	Patches of cheatgrass adjacent to the north end of the trail	High
TKS-M9	Small amounts of bull thistle and orchard grass adjacent.	Moderate
YRM-M3	Scotch broom is adjacent	High
YRM-M4	Scotch broom and cheatgrass	High
YRN-008	Scotch broom	High
YRN-509	Scotch and Spanish broom and cheatgrass	High
YRN-M3b	Klamath weed	Moderate
YRS-SF6	Bull thistle and cheatgrass	Moderate
35-4-P (Cal Ida)	Cheatgrass and tumble mustard are adjacent	High

Description of Affected Sensitive Species Habitat

Introduction: Information about each of the TNF sensitive plants and fungi is generated within Region 5 and the adjacent Toiyabe National Forest as part of routine information sharing among agencies, organizations, and individuals dedicated to conservation of rare plants and fungi. New information about each of the sensitive plants and fungi evaluated in this document is also shared routinely amongst forest botanists within the Forest Service. In addition, the TNF submits data regularly to the California Natural Diversity Database, California Department of Fish and Game (CDFG), and the California Native Plant Society (CNPS) to gather and compile information about rare plant species. The TNF rare plant program documents provide more information about what is known about each of the sensitive plants and fungi known or suspected to occur on the TNF (TNF files 2008).

Existing Condition Summaries by Species

The following section provides information about each of the sensitive species being evaluated.

***Arabis rigidissima* var. *demota* (Carson Range rock cress)**: Most of the known occurrences of this plant are located within the state of Nevada on the Carson Range. Most occurrences are found on private lands and are not protected. There are only two occurrences known in California with no known

occurrences on TNF system lands. The California occurrences are located near Martis Peak in Placer and Nevada Counties. Carson Range rock cress is considered a geographically restricted regional endemic that is only found from the Carson Range of the Sierra Nevada. It is known to grow in sandy and rocky soils or outcrops derived from granitic or volcanic materials mostly on moderate to steep northerly aspects, often in drainages/meadow edges/dry openings. The elevational range of known occurrences is between 7,500 and 8,500 feet. These habitats are generally considered subalpine habitats. Subalpine habitats are limited in distribution and are fragile, i.e. they have a short growing season and not much resilience to disturbance. The trend for Carson Range rock cress is unknown. Threats to this plant from management activities include development (urban/ski area/facilities); timber harvest; roads; recreation trail construction, maintenance, and use; off-road vehicle use; livestock grazing, fire fighting/suppression activities; prescribed burning; and any activities that degrade air quality, cause erosion, or aid in illegal plant collection. Some of the proposed motorized trails go through unsurveyed potential habitat for this plant.

***Astragalus webberi* (Webber's milk-vetch)**: Webber's milk-vetch is a geographically restricted legume species that is known to occur in Plumas County. It has not been found in the TNF even though it was historically recorded as occurring in Sierra County in the Sierra Valley area. The Sierra Valley occurrence has not been relocated since it was first recorded by Lemmon and associates. It is possible that the historic collections by Lemmon and associates were collected in the Indian Valley area and not the Sierra Valley area (Barneby 1964, Ikeda and Witzman 1989). The Plumas NF (PNF) reports that this species is not habitat specific. It grows in the general openings guild. It is one of the few members of the genus that is native to the west slope of the northern Sierra Nevada. Most of the known occurrences are along highways on cutbanks or just within the forest edge. Webber's milk-vetch is declining in trend. Threats from management activities include road maintenance and construction, trash dumping, vehicle parking, reforestation, livestock grazing and trampling, and timber harvest. There are no occurrences of this plant known to occur on the TNF.

Botrychium species are described together in the DEIS document

***Botrychium ascendens* (Triangle-lobe moonwort)**: This moonwort is known to occur in Canada, Alaska, Nevada, California, and the Pacific Northwest. In California, it is known from Butte, El Dorado, Mono, Placer, Plumas, Nevada, Shasta and Tehama Counties. TNF occurrences are located in the Sagehen Creek area and in Duncan Peak Roadless area (Laeger 2002).

***Botrychium crenulatum* (Scalloped moonwort)**: This moonwort has the widest distribution of all the moonworts in California, but is not common anywhere. It is limited to the western United States, scattered from California to Montana. In California, it is known to occur in Butte, Colusa, Los Angeles, Nevada, Modoc, Mono, Placer, Plumas, Tehama, Tulare, San Bernardino, Shasta and Sierra Counties. This moonwort species occurs on the TNF.

***Botrychium lunaria* (Common moonwort)**: This moonwort is known to occur from Alaska to California, and in Arizona and the Great Lakes region. In California, it is known from Modoc, Mono, and Nevada Counties. It grows with many other species of *Botrychium* and occasionally hybridizes with them (www.eFloras.org, February 2006).

***Botrychium minganense* (Mingan moonwort)**: This moonwort is known to occur from Alaska throughout boreal Canada, southward into all of the western mountain states to Arizona, and eastward along the northern states to the Atlantic Canadian Provinces and New England. In California, it is known from Butte, Fresno, Modoc, Nevada, Plumas, Shasta and Tehama Counties.

***Botrychium montanum* (Mountain moonwort)**: This moonwort is known to occur from British Columbia, California, Montana, Oregon, and Washington. In California, it is known from Butte, Modoc, Nevada, Plumas, Shasta and Tehama Counties.

Botrychium species: These *Botrychium* species plants are found under riparian shrubs/vegetation or near it. Trend is unknown and hard to determine because sporophytes do not appear above ground each year. Occurrences of these *Botrychium* species are small and the numbers of plants known to occur in California is low. Moderate to heavy soil disturbance is detrimental. A small amount of disturbance may be tolerated; but heavy disturbance will kill individuals. Threats include grazing and trampling by livestock and vehicle activity. Changes in hydrologic regime (from erosion, roads, grazing, etc.) are also considered threats. Hot fires have been shown to be detrimental, especially if the soil conditions are very dry during the burn. All occurrences within the state and on the TNF are small and the number of plants per occurrence is low.

***Bruchia bolanderi* (Bolanders candle moss)**: This moss is endemic to California and Oregon (Christy and Wagner 1996). California populations are known from Fresno, Tehama, Madera, Mariposa, Nevada, Tuolumne, Tehama and Plumas counties (UC Berkeley Herbarium specimens, CNPS 2001). The California Native Plant Society (CNPS) considers this moss fairly endangered in California and rare outside of California (CNPS 2001). *Bruchia bolanderi* is reported to grow on moist soil, often along exposed edges of streams through meadows or in exposed and disturbed soils or under grasses; sometimes partially shaded by coniferous forests. On the TNF it has only been found on cutbanks of a road and streams. It grows from about 4,000 to above 9,000 feet. The species is opportunistic, taking advantage of disturbed sites and minimal competition from other vegetation (Christy and Wagner 1996). However, sporophytes are infrequently encountered in many California populations. The ephemeral nature of this species and its occurrence in disturbed sites allow some flexibility in management (ibid). The species is difficult to identify without a sporophyte, which may make surveys for this species problematic. This plant has been found on the TNF, in the Castle Valley, Round Valley, and upper Lola Montez areas. Trend is not determined. No population monitoring has occurred. Potential threats include direct impacts from management activities that directly damage the plants. Most of the proposed motorized trails go through unsurveyed potential habitat for this moss. The perennial crossing of proposed road TKN-J5 impacts the *Bruchia bolanderi* occurrence in Castle Valley indirectly. Mountain bikes are impacting the upper Lola Montez occurrence. The Round Valley occurrence is located along ephemeral/intermittent drainages that are near the Peter Grub hut.

***Calochortus clavatus* var. *avius* (Pleasant Valley mariposa lily)**: This plant is known to grow on the Eldorado NF (ENF) and adjoining private lands in the area between Union Valley Reservoir and the North Fork of the Mokelumne River. This plant grows on a variety of soils that include serpentine, volcanic, metamorphic, and sedimentary. These plants have been found in semi-open pine over bear-clover, and in areas with black oak, ponderosa pine, and canyon slopes, spurs, and ridges with southerly aspects. The

guild for this plant is general openings. The trend for this plant is that it appears to be stable on the ENF. Individual numbers can fluctuate year-to-year due to climatic triggers and disturbances such as fire. Threats from management activities include timber harvest, off-road vehicle use, livestock grazing and trampling, road construction and maintenance, reforestation (use of herbicides), fire fighting/suppression, hydro/gas/transmission lines, soil movement (land slides) and development. ARM-3, ARM-3a, ARM-5, and ARM-7 were surveyed and this plant was not found.

***Clarkia biloba* ssp. *Brandegeae* (Brandegee's fairyfan)**: This plant is known to occur in Butte, Nevada, and Eldorado Counties, in Chaparral and Cismontane Woodlands (Skinner and Pavlik 1994). This plant is assigned to the gap phase, and general opening guilds. Most known occurrences are located on road cutbanks. Most occurrences are on private land in areas subject to intense development pressures. General trends are unknown. Threats include road construction and maintenance, noxious weeds, timber harvest and related activities, reforestation, livestock grazing and trampling, fire fighting/suppression, spring prescribed burning, off-road vehicle use, mining, trails/hikers/camping, and development.

***Cudonia monticola* (Large Cudonia)**: This fungus is common under conifers in northern California and the Pacific Northwest. It is considered endemic to northwestern North America and is known from northern Washington, the Cascade Range, mountains of southern Oregon. In California it is known to occur on the Coast Range, in the Klamath Mountains, and northern Sierrans. It has been found on the TNF in the Yuba Pass area in a campground. It is usually found in the spring or summer scattered or in dense groups, growing in humus, soil, and on rotting wood (Arora 1986). It is a basidiomycete that is a saprophyte-decomposer. It is assumed that it is ectomycorrhizal (ECM) and that it has a broad host range including various members of the Pinaceae family. It is an epigeous ECM that is probably located within the top few centimeters of the soil. It is generally found in mature, moist coniferous forests. It has no adaptations to desiccation from loss of humidity in its micro-climate. General trends are unknown. Threats are evaluated in terms of negative impacts to the fungal mycelium and include any management activity that would significantly disturb the litter/duff/soil organics directly or indirectly. Ground-disturbing activities that reduce the amount of rotting wood and interrupt the addition of fresh wood to rot would impact this species. Other threats include activities that alter the humidity, light patterns and composition of its habitat.

***Cypripedium fasciculatum* (Clustered Lady's Slipper Orchid)**: This plant is known to occur in Butte, Del Norte, Humboldt, Nevada, Plumas, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, San Mateo, Tehama, Trinity, and Yuba Counties, and in the states of Colorado, Idaho, Montana, Oregon, Utah, Washington, and Wyoming. There are many occurrences, but most contain only a few plants. This plant is considered threatened in the States of Idaho and Washington. It is a candidate for State listing in Oregon and is known to occur on the Mendocino, Six Rivers, Shasta-Trinity, Klamath, Lassen, Plumas, and Tahoe NFs. This plant is most often found on north facing slopes in mixed-conifer forests with canopy closure greater than 60 percent (Kaye and Cramer 2005). It is found at elevations that range from 600 to 5,800 feet. It is placed in the interior forest and gap phase guilds. Formal studies of the response of *Cypripedium* species to disturbance are limited. However, it has been noted that when the vegetative stems of this plant are damaged, the plant showed reduced vigor the following year (Phelps 1996). A mycorrhizal symbiont(s) that is only found in mid-to-late successional forest communities may be necessary for

Cypripedium species viability. This species may be limited by the distribution of its fungal partners (Shefferson et al. 2005). More than ½ of the populations of this species have fewer than 10 plants, which places the species at high risk. Population declines and losses of this species have been significant over the last two decades and population extinction has occurred at a high rate (44 to 55 percent) for small populations (Kaye and Cramer 2005). Trend appears to be down based on what is known about the complicated life history, which includes mycorrhizal relationships, limited establishment factors, apparent intolerance to intense disturbance, and location (lands available to timber harvest). This orchid is sensitive to disturbances that damage their current year's growth, rhizomes, soil surrounding their root systems, and forest canopy (too much light appears to negatively affect them). A conservation assessment was completed in FY 2005 to determine the conservation status of clustered lady's slipper (*Cypripedium fasciculatum*) and Mountain lady's slipper (*C. montanum*) in Region 5, California. Threats from management activities were identified as noxious weeds, timber harvest and related activities, reforestation, livestock grazing and trampling, catastrophic fire, fire suppression activities, fuels reduction activities including prescribed burning, off-road vehicle use, trails/hikers/camping, illegal plant collection, mining, land development, and any activities that increase erosion.

***Cypripedium montanum* (Mountain lady-slipper orchid)**: The range of distribution for mountain lady slipper orchid includes many counties throughout California from Del Norte to Sierra County. It also occurs in 6 other western states. Its greatest abundance is in California is on the Klamath NF, but it is widely distributed throughout the National Forests of the Sierra Nevada except for the TNF (Kaye and Cramer 2005). The habitat for this plant is broad ranging from moist-conifer forests (Douglas-fir, white fir, mixed conifer) in partial shade (canopy closure is generally between 60 and 80 percent) to dry wooded slopes. It is most often found on north facing slopes in mixed conifer forests with canopy closure greater than 60 percent (Kaye and Cramer 2005). It is also known to occur in oak woodlands and riparian areas (along streams under or near dogwood). It is placed in the interior forest, riparian forest, and gap phase guilds. *Cypripedium montanum* grows at elevations ranging from 1,300-6,350 feet, with the majority of sites occurring between 2,500-4,000 feet. Aspect is primarily northerly, on slopes of 25 to 50 percent. More than ½ of the populations of this species have fewer than 10 plants, which places the species at high risk. Population declines and losses of this species have been significant over the last two decades and population extinction has occurred at a high rate (44 to 55 percent) for small populations (Kaye and Cramer 2005). Trend appears to be down based on what is known about the complicated life history, which includes mycorrhizal relationships, limited establishment factors, apparent intolerance to intense disturbance, and location (lands available to timber harvest). This orchid is sensitive to disturbances that damage their current year's growth, rhizomes, soil surrounding their root systems, and forest canopy (too much light appears to negatively affect them. A conservation assessment was completed in 2005 to determine the conservation status of clustered lady's slipper (*Cypripedium fasciculatum*) and Mountain lady's slipper (*C. montanum*) in Region 5, California.

***Dendrocollybia racemosa* (Branched Collybia)**: This is the only mushroom in this area (TNF) that has branches on the side of the stem. It is a small gray mushroom that is widespread in the Northern Hemisphere but is always locally rare. It grows on rotting or mummified remains of other mushrooms and

sometimes in the leaf litter. It is a fall fruiting mushroom. On the TNF it is known to occur on the YRRD in the Skillman Campground and Bullards Bar areas.

***Epilobium howellii* (Subalpine fireweed)**: The subalpine fireweed grows in margins of moist meadows and mossy seeps in subalpine coniferous forest, i.e. the meadow and seep guild. This plant is known from only 4 occurrences (documented from herbarium collections - no information given on numbers of plants in each occurrence. This species may have been overlooked in the past and therefore may be more common. However, based on current information, it is assumed to be very rare. It is known to occur in the Yuba Pass area in Sierra County, and 350 miles south to Fresno County, as well as the Twin Lakes area in Mono County near Mammoth Lakes, CA. These sites are within the Tahoe, Sierra, and Inyo NFs. The trend for this plant is unknown. Threats due to management activities include road maintenance, recreational trampling, off-highway vehicle use, livestock grazing and trampling, and any other activity that would alter the flow and/or amount of water in wet meadows/seeps. *Epilobium howellii* was found at the end of motorized trail YRN-001 near the dispersed camping area. Vehicle tracks were present in the *Epilobium howellii* occurrence (July 2008).

***Erigeron miser* (Starved daisy)**: This plant is known to occur in Nevada and Placer Counties. It is a localized endemic of the TNF that grows in the clefts between granite outcrops at high elevations. It is placed in the general outcrop guild. Trend is unknown. The habitats for this plant are limited and fragile, i.e. short growing season and not much resilience to disturbance. Threats to this plant include rock climbers, weeds, roads, off-road vehicles, plant collectors, rock collectors, and hydro/gas/transmission lines. Many of the motorized trails proposed for inclusion in the NFTS go through potential habitat for this plant. Surveys thus far have identified occurrences of this plant that are being impacted by motorized vehicle use of proposed roads TKN-J4 and TKN-J5. In addition, YRS-F1 is also impacting an occurrence of *Erigeron miser*.

***Eriogonum umbellatum* var. *torreyanum* (Donner Pass buckwheat)**: This plant is a perennial sub shrub forming large prostrate mats with glabrous leaves. The current known distribution of this buckwheat is a thin 34-kilometer long, 2-6 kilometer wide band along the eastern side of the Sierra Crest from Webber Mountain in the north to Silver Peak, just north of Squaw Valley in the south. Most plants occur in Placer and Nevada Counties, and 2 occurrences occur in Sierra County. The species is known from highly erosive volcanic soils (meiss) with sparse vegetation at 6,000 – 8,200 feet elevation in open subalpine habitats on shallow soil typically on steep east-facing slopes (Kan 1990). It occurs on the TNF where approximately 7,000 individual plants are scattered through sixteen occurrences. It has not been assigned to a guild. Initial evaluation of trend indicates a lack of stability, i.e. decline. Threats include mining, ski area development, livestock grazing and trampling (sheep), timber harvest and related activities, and other development.

***Fissidens aphelotaxifolius* (Brook pocket-moss)**: *Fissidens aphelotaxifolius* is known from the Pacific states of North America from California north to British Columbia. In California, it is known from Madera (Shevock collection 2000) and Siskiyou Counties (Klamath NF and Sierra National Forests). This moss grows on wet soil, humus and rocks along narrow streams in the vicinity of small waterfalls, and in damp or wet crevices of cliffs. It is not expected in areas where peak flows wash mosses away. The

species grows at elevations up to 6, 300 feet. Trend is unknown. Threats include: fuel reduction, timber harvest, and livestock grazing when these activities impact riparian areas.

***Fritillaria eastwoodiae* (Butte fritillary**): The known range of this plant has historically been Shasta, Butte, Tehama, and Yuba Counties in five distinct stable population centers. It is found on unprotected private land and NFS lands mostly on the PNF. The majority of occurrences are known from locations that have not been disturbed. A small number of plants are known from areas that are believed to have experienced a light disturbance. Forty-four occurrences are known from the PNF but some have not been relocated after more than ten years after the occurrence was first discovered. Nine small occurrences of *F. eastwoodiae* have been discovered on the TNF. One unconfirmed occurrence is reported from the LNF. This plant is known to grow in chaparral, mixed conifer, and ponderosa pine in open stands of timber. It grows on a variety of soils. Many of the flowers of the known *F. eastwoodiae* plants have only anthers present, thus seed production is not occurring in these plants. It is assigned to the gap phase guild. The trend for this plant is unknown. Threats include timber harvest, livestock grazing, off-road vehicle use, fire suppression, prescribed fire, and road construction.

***Helodium blandowii* (Blandow's bog-moss)**: *Helodium blandowii* is known from Europe, Asia and across northern United States from New Jersey and Ohio west to California and Nevada, and northwards to Canada (Flowers 1973). In California, it is known from Kings Canyon National Park in Fresno County and from the Inyo and Klamath NFs. It is also known from the Mount Rose area on the Nevada side of Lake Tahoe (Shevock collection), i.e. at Tahoe Meadows, along Ophir Creek on the Toiyabe side of the LTBMU. It grows in wet meadows and seeps in subalpine coniferous forest and alpine lakes (Flowers 1973). Trend is unknown. The two most critical factors affecting the abundance and distribution of species such as *Helodium blandowii* are hydrology and the nutrient concentration of incoming water. Changes in hydrology can occur through road or trail construction/maintenance/use.

***Hydrothyria venosa* (lichen)**: *Hydrothyria venosa* (now called *Peltigera hydrothyria*) is known from the mountains of western North America and the Appalachians in eastern North America. It grows on rock (occasionally on wood); in small, clear, cold streams and springs where it is submerged throughout most of the year (McCune et al. 2006). Its elevational range is about 1,150 to 7,000 feet. There are at least 89 known sites on federal lands in Washington to California. There are four known sites on the PNF. Although it has a broad distribution, its distribution is limited to isolated site clusters. It is considered rare throughout its Western range (McCune et al. 2006). Trend is unknown. Perennial water sources with little seasonal variation in water levels provide habitat. Threats include any activity that would kill or damage the habitat component of clear water.

Ivesia species are considered together

***Ivesia aperta* var. *aperta* (Sierra Valley Ivesia)**: *I. aperta* var. *aperta* is known from Plumas, Sierra, and Washoe and Storey Counties in California and Nevada. The majority of occurrences in California are located in the Sierra Valley area. Most of the known occurrences are located on private land. This plant is found at meadow edges, in ephemeral stream channels, in meadow flats, and on gentle, rocky up-slopes near springs. It occurs in sagebrush plant communities at the floor of the eastern Sierra Nevada's. The hydrology of these habitats is easily changed, and they are prone to rapid erosion. This plant is assigned to

the meadow/seep, vernally wet, and riparian woodland guilds. This plant appears to be in decline across its range. Reproduction does not appear to be occurring at levels that would maintain viability. Occurrences on private lands are threatened by habitat conversion, etc. The Tahoe, Plumas, and Humboldt-Toiyabe NFs have a conservation strategy in place for management of this plant. The most commonly recommended management prescription calls for protection from direct and indirect impacts.

***Ivesia aperta* var. *canina* (Dog Valley Ivesia)**: *I. aperta* var. *canina* is known only from the Dog Valley area, Humboldt-Toiyabe National Forest, in Sierra County. This location is about 2 miles from the eastern boundary of the TNF. The habitat for this plant appears to be similar to Sierra Valley Ivesia. The Humboldt-Toiyabe NF is currently in the process of developing a conservation agreement with the USFWS. This conservation agreement will outline management plans for keeping this plant from being listed as threatened or endangered. Some of the Sierra Valley Ivesia occurrences that are located on the PNF and the TNF may be Dog Valley Ivesia. This plant is assigned to the vernally wet guild. The trend appears to be down based on the need for a conservation agreement.

***Ivesia sericoleuca* (Plumas Ivesia)**: This plant is found in the vernally wet parts of meadows and alkali flats, and in vernal pools. These habitats are not widespread and are sensitive to changes in hydrology and to erosion. It is known to occur on NFS and private lands in Plumas, Placer, Sierra, and Nevada Counties. It is assigned to the meadow/seep and vernally wet guilds. This plant has a downward trend across its range due to lack of reproduction, and levels of disturbance that are occurring at known sites. The Tahoe, Plumas, and Humboldt-Toiyabe NFs have a conservation strategy in place for management of this plant. The most commonly recommended management prescription calls for protection from direct and indirect impacts. The proposed motorcycle trail – TKN-M2 goes through a known occurrence of this plant.

***Ivesia webberi* (Webber's Ivesia)**: *Ivesia webberi* was listed as a candidate for federal listing by USFWS February 21, 1990. It is assigned a listing priority number of 5. *Ivesia webberi* is a low, spreading, perennial herb and is restricted to shallow, clay type soils derived from andesitic rock on mid-elevation flats, benches or terraces above moderately large valleys (Witham 2000). It has been found on open summits and ridge-tops, and in meadow areas on drier, raised hummocks. Its habitat is comprised of sparse to moderately dense vegetation usually dominated or co-dominated by *Ivesia webberi* and low sagebrush or squirrel-tail grass in association with a wide variety of dwarfed, or cushion-like perennial herbs. It is known from 15 occurrences clustered in seven general locations in Lassen, Plumas, and Sierra Counties, California, and in Douglas and Washoe Counties, Nevada. Portions of potential habitat for this species (on the TNF and PNF) were surveyed as part of a cost-share agreement with The Nature Conservancy and the TNF and PNF (Survey of Historic Locations for *Ivesia webberi* on the PNF and TNF by Duron 1990). Only one occurrence of this plant was discovered within the TNF boundary. This occurrence is located in Sierra Valley on private property. The rest of the known occurrences for this species are located on the Humboldt-Toiyabe NF and PNF. The Humboldt-Toiyabe is working on a conservation assessment and strategy for Ivesia webberi (Bergstrom, 2008, in development). This plant is assigned to the meadow and seep guild. The trend for this plant is currently unknown. However, the habitat is similar to that of Sierra Valley and Plumas Ivesia. Therefore this plant may also be in a downward trend due to apparent lack of reproduction/recruitment of new plants.

Threats to these *Ivesia* species include: livestock grazing and trampling, road construction and maintenance, off-road vehicle activities and other dispersed recreation, mining, fire suppression activities (fire camps), prescribed fire, timber harvest support activities, reservoir proposals, fuelwood gathering, target shooting, military practice camps, land exchanged, wildlife introduction (turkeys), displacement by noxious weeds (especially cheatgrass), and any activity that changes the hydrology and/or increases erosion. Occurrences on private lands are threatened by habitat conversion, etc.

***Lewisia cantelovii* (wet-cliff Lewisia)**: This plant is known to grow on wet metamorphic and granitic rock cliffs and outcroppings in the Feather and Yuba River drainage systems in Plumas, Sierra, and Nevada Counties; and in Shasta County along the Sacramento River above Shasta Reservoir (Skinner and Pavlik 1994). This plant is typically associated with moss or club moss growing on rock formations within these river canyons. It is assigned to the riparian woodland and forest guilds. The trend for this plant appears to be stable. However, monitoring of known occurrences on the TNF in 1999 showed dramatic reductions in some locations due to poaching of the plants and/or herbivory by deer. If these plants continue to be impacted, the overall trend for this plant will decline. Threats to this plant from management activities include developed trails and other trails near occurrences (increases access), mining, reservoir/hydroelectric development, prescribed fire, road maintenance, rock sources, plant collecting, and dispersed camping. Many of the occurrences located on the TNF are in areas that are popular river recreation sites. The Eldorado, Plumas, Shasta-Trinity, and Tahoe NFs completed a conservation strategy for this plant in 1997. The most commonly recommended management prescription calls for protection from direct and indirect impacts.

***Lewisia kelloggii* ssp. *hutchisonii* and ssp. *kelloggii* (Hutchison's and Kellogg's Lewisias)**: *Lewisia kelloggii* ssp. *hutchisonii* is known to occur in Butte, Plumas, Sierra, and Siskiyou Counties in openings above 5,200 feet. *Lewisia kelloggii* is a highly variable species with genetic variation strongly structured by geography (Wilson et al, 2004). It grows on ridgelines in open areas on excessively drained, coarse-textured, granitic and volcanic soils. *Lewisia kelloggii* populations in California appear to be reproductively isolated (Wilson et al, 2004). Trend is unknown. Threats include road maintenance, off highway vehicle use, and fuel reduction activities. *Lewisia kelloggii* ssp. *hutchisonii* was discovered in July of 2008 immediately adjacent to the NFTS motorized trail that provides access to motorized trail YRN-11.

***Lewisia longipetala* (long-petaled Lewisia)**: This plant is endemic to the LTBMU, ENF, and TNF. They are known to occur in a narrow band of subalpine plant communities at the Sierra Nevada crest, west of Truckee and south to Desolation Wilderness in El Dorado, Fresno, Nevada, and Placer Counties (Halford 1992). The TNF occurrences are located at Basin Peak (northern extent) and two located above Pole Creek (southern extent). The habitat for this plant is the leeward (north to northeast) facing slopes or basins of the ridge-tops with high snow accumulations. Plants are most often found growing within gravelly snowmelt rivulets directly below snowbanks that persist late into the season. This plant is not assigned to a guild. The trend appears to be stable. Threats include ski area development; vegetation management; livestock grazing; trail development and use; and plant collection.

***Lewisia serrata* (saw-toothed Lewisia)**: The habitat for this plant is steep, metasedimentary bedrock outcrops in the American River watershed. Most plants are found in the inner gorges of perennial streams,

although a few occurrences are found near seeps and intermittent streams. The factors responsible for the limited distribution of this plant have not been identified. This plant is assigned to the riparian woodland and forest guilds. Trend for this plant appears to be stable. Monitoring on the TNF and ENF has shown no declines except for those sites that have experienced poaching (illegal collection of plants). Threats are very similar to those listed under wet-cliff Lewisia. The Eldorado, Plumas, Shasta-Trinity, and Tahoe NFs completed a conservation strategy for this plant in 1997. The most commonly recommended management prescription is for protection from direct and indirect impacts.

***Lupinus dalesiae* (Quincy lupine)**: This plant is known to occur in Butte, Plumas, Sierra, Yuba, and Nevada Counties in California. It occupies metasedimentary and metavolcanic open-canopy sites in mixed-conifer forest plant communities. It is assigned to the gap phase and general opening guilds. The trend for this plant is stable. Threats include road construction and maintenance; timber harvest, release, and site preparation activities; mining, and off-road vehicle use. Development is a threat on private lands.

Meesia moss species are considered together in this DEIS

***Meesia triquetra* (Three-ranked hump-moss)**: This moss is limited in distribution and numbers in California. Occurrences are known from Sierra, Sequoia, and Tahoe NFs and Sequoia National Park. This moss seems to prefer acidic meadows with *Sphagnum (*moss), *Drosera* (sundew), and *Vaccinium* (huckleberry) associates. Cold spring fed springs in the meadow also seem essential. It requires permanent saturation and is not found in meadows that dry out. It is assigned to fen and meadow and seep guilds. The elevation range is unknown. The overall trend for this moss is that it is in decline. Few meadows in the southern Sierra have this moss. It may be extremely sensitive to alterations in meadow hydrology.

***Meesia uliginosa* (Broad-nerved hump-moss)**: The range for this moss is disjunct, but it is known to occur from Siskiyou County south to Tulare County. Populations of *Meesia uliginosa* are reported to be small and infrequently encountered. On the TNF this moss grows in permanently wet, primarily spring fed plant communities called fens. This moss is assigned to fen and meadow and seep guilds. The elevation range is unknown. The trend is in decline since several historic sites have not been relocated and/or the habitat has been degraded.

Threats to these *Meesia* moss species from management activities are any that change the hydrology of habitats; i.e. timber harvest, road construction, construction of fuel breaks, recreation activities, livestock grazing, etc.

***Mielichhoferia elongata* (Elongate copper moss)**: This moss is known from three disjunct areas in the State of California. It is known from Mariposa, Placer, Fresno, Tulare, Siskiyou, Humboldt, Trinity, and Santa Cruz Counties. Of the 41 known occurrences, only 14 are known to occur on NFS lands. This moss grows on metamorphic, sedimentary, limestone, granite, and serpentine rock outcrops that often contain copper or other heavy metals and that are seasonally moist or less commonly on moist soil. Occurrences are generally small and isolated. Habitat is usually in foothill woodland areas dominated by oaks or chaparral and sometimes with scattered incense cedar, Douglas-fir, and ponderosa pine. It grows at elevations up to 3,550 feet. Trend is unknown. Threats include: road re-alignment, highway expansion, and mining.

***Monardella follettii* (Follett's Monardella)**: The known distribution of this plant is from the Northern Sierra Nevada in Plumas and Nevada Counties (Skinner and Pavlik 1994). There are 6 known occurrences at this time, 4 located on NFS lands on the PNF, one occurrence located on private lands west of the TNF, and one on the LNF. This plant is known to grow on serpentine soils that are open and partially under a canopy in mixed-conifer forest. It is assigned to the Ultra-mafic outcrop guild. The trend is unknown. Threats include timber harvest and associated activities such as landing placement; road construction and maintenance; and fire suppression. Development is the major threat on private properties.

***Penstemon personatus* (Closed-throated beardtongue**): This plant is known to occur in Butte, Nevada, Plumas, and Sierra counties. There are three known occurrences on or near TNF lands. Two occurrences are known from the LNF. On the PNF, this species is known from two large population centers east and south of Bucks Lake with thousands of plants and five smaller occurrences, the smallest with less than 10 plants on the western half of the PNF. This plant is known to grow in westside mixed conifer and/or red fir plant communities. It is assigned to the gap phase and general opening guilds. The trend appears to be stable. This plant appears to tolerate limited disturbance that does not change the microhabitat. Threats from management activities include road construction and maintenance, timber harvest activities, timber site preparation and release, high intensity burn piles, livestock grazing, mining, and off-road vehicle use.

***Phacelia stebbinsii* (Stebbins Phacelia)**: This plant is limited in distribution, i.e. the Rubicon and American River drainages. It is currently known to exist only within the greater boundaries of the TNF and ENF, with occurrences located on private and NFS lands. It is known to grow on a wide variety of soils. It is assigned to the gap phase and general outcrop guilds. On the ENF, the trend appears to be stable. On the TNF, the trend is unknown. Threats on the ENF are unlikely except for possible hydroelectric development due to remoteness of habitat. Threats on the TNF include mining; road and trail construction; and recreation activities such as fishing, off-road vehicle use, dispersed camping, hiking, and river access for swimming.

***Phaeocollybia olivacea* (Olive Phaeocollybia)**: This basidiomycete is a mycorrhizal fungus that functions in nutrient cycling. It is a fall-fruiting mushroom that is known to grow in conifer and oak forests. It is endemic to the western United States from the central Oregon coast south to Santa Cruz County. On the TNF it is known to occur on the Yuba River Ranger District in the Hornswoggle Campground area near Bullards Bar Reservoir and along the Schoolhouse Trail near Schoolhouse Campground. Many of the proposed motorized trails have unsurveyed potential habitat for this fungus. Absence of the fungus cannot be determined during surveys since there is no way to determine whether the underground portion of the fungus (i.e. the mycelia) is present or not.

***Pyrrocoma lucida* (Sticky Pyrrocoma)**: This plant is found in meadows and alkali flats in Plumas, Sierra, and Yuba Counties. Occurrences are found on PNF and TNF and private lands. It is assigned to the meadow and seep, vernally wet, and riparian woodland guilds. The trend for this plant is that it appears to be in decline due to lack of reproduction. Sticky Pyrrocoma grows in habitats similar to *Ivesia sericoleuca*. These habitats have been reduced in number by a variety of activities. Most of the known occurrences are either unprotected on private land, are repeatedly grazed on NFS lands, and/or impacted

by road management agencies during maintenance activities within road right-of-ways. Threats from management activities include livestock grazing, reservoir development, meadow restoration, off-road vehicle use, recreation activities, fire suppression camps, military camps, prescribed burning and other fuel treatments, timber harvest associated activities such as landings, fuelwood gathering, and land exchange.

***Tauschia howellii (*Howell's Tauschia)**: This plant is found in subalpine coniferous forest and upper montane coniferous forest. It is known in California from only five occurrences. It is known to occur on the TNF in the Keystone Gap area. Trend is unknown, but it is a candidate for state listing in Oregon. Threats include recreational activities on steep, erosive slopes.

Table J-7 provides an indication of the number of occurrences and individual plants known to occur on the TNF by species.

Table J-5. Number of sensitive plant and fungi occurrences on the TNF by species

Scientific Name	Known Occurrences on TNF system lands	Estimated number of plants
Arabis rigidissima var. *demota*	None	0
Astragalus webberi	None	0
Botrychium ascendens	4	Less than 80
Botrychium crenulatum	8	Less than 500
Botrychium lunaria	None	0
Botrychium minganense	None	0
Botrychium montanum	None	0
Bruchia bolanderi	4	Number of moss plants not estimated
Calochortus clavatus var. *avius*	None	None
Clarkia biloba ssp. *Brandegeae*	4	Varies by year – this is an annual plant – less than 4,000
Cudonia monticola	1	Not estimated – most of the fungus is underground.
Cypripedium fasciculatum	6	Less than 500
Cypripedium montanum	None	None
Dendrocollybia racemosa	1	Not estimated
Epilobium howellii	4	Less than 1,500
Erigeron miser	14	8,100 +
Eriogonum umbellatum var. *torreyanum*	11	7,000
Fissidens aphelotaxifolius	None	Number of moss plants not estimated
Fritillaria eastwoodiae	7	Less than 1,000
Helodium blandowii	None	Number of moss plants not estimated
Hydrothyria venosa	None	Number of lichen not estimated
Ivesia aperta var. *aperta*	5	Less than 5,000
Ivesia aperta var. *canina*	None	None
Ivesia sericoleuca	28	50,000
Ivesia webberi	None	None
Lewisia cantelovii	16	Less than 5,000
Lewisia kelloggii ssp. *hutchisonii*	5	Less than 1,500
Lewisia kelloggii ssp. *kelloggii*	None	None

Scientific Name	Known Occurrences on TNF system lands	Estimated number of plants
Lewisia longipetala	4	Less than 1,000
Lewisia serrata	5	Less than 500
Lupinus dalesiae	2	Less than 500
Meesia triquetra	20	Number of moss plants not estimated.
Meesia uliginosa	25	Number of moss plants not estimated.
Mielichhoferia elongata	None	Number of moss plants not estimated
Monardella follettii	None	None
Penstemon personatus	2	Less than 1,000
Phacelia stebbinsii	19	Varies by year – this is an annual plant
Phaeocollybia olivacea	2	Not estimated – most of the fungus is underground.
Pyrrocoma lucida	12	Less than 25,000
Tauschia howellii	2	Less than 5,000

Implementation of the Alternatives

Introduction: This Biological Evaluation used presence of sensitive species detected in on-the-ground surveys and an analysis of unsurveyed potential habitat to make final determinations of effects to sensitive plants/fungi. Since surveys of motorized trails un-authorized for motorized use are not complete, this analysis assumes that the species is present within the identified potential habitat until surveys are complete. (Note: surveys of NFTS motorized roads and trails are not planned.) Sensitive species may or may not be in unsurveyed potential habitat. In addition, it is possible for certain sensitive species to go undetected in any given area because the species did not produce above-ground structures that were visible at the time of the survey. For example, sensitive fungi and *Botrychium* species do not produce fruiting structures every year - they could be present along or within a road/trail/area and not be detected. In another example, *Lewisia kelloggii* var. *hutchisonii* is only visible for a few weeks after the snow melts. In many instances, the access to those potential habitats is not open because the snow has not melted in the more shaded areas of the road or trail that provides access. If the timing of the survey isn't right, the sensitive plant could go undetected.

Indicator Measures: The following general indicator measures were used to compare alternatives. These indicator measures were selected based on literature review of possible impacts to sensitive plants/fungi, and native plant connectivity; and profession judgment.

1. Number of perennial and intermittent water crossings.
2. Proposed motorized trail additions to the NFTS located within 100 feet of unsurveyed potential habitat.
3. Sensitive species within 30 feet of proposed NFTS additions (direct effects).
4. Sensitive species within 100 feet of proposed NFTS additions (indirect effects)
5. Weed infestations within 100 feet of the proposed NFTS additions. In this analysis, 100 feet was chosen to define the distance that weed seed could travel on tires. In reality the distance is probably further than 100 feet and/or less than 100 feet dependent on many factors.
6. Miles of proposed additions to the NFTS within inventoried roadless areas.

Elements of the proposal: In addition to the indicator measures, the alternatives are compared by plant community with a focus on the four major parts of the proposal:

1. Prohibition of cross country travel (including closure of motorized trails un-authorized for motorized use).
2. Additions to the National Forest Transportation System (NFTS).
3. Changes to the class of vehicle and season of use.
4. Cumulative effects including all of the above and the reasonably foreseeable.

List of Assumptions: This Biological Evaluation is also based on several assumptions to help analyze direct, indirect, and cumulative effects. These assumptions are listed below:

1. Impacts to sensitive species are assumed to be limited to the motorized trail footprint and the area within 30 and 100 feet located adjacent to it. Sensitive species located within 100 feet of a proposed motorized trail may be (at least) indirectly impacted by motorized vehicle use - regardless of the alternative selected.
2. Sensitive species located within 30 feet of a motorized trail proposed for addition to the NFTS may be directly impacted by motorized vehicle use regardless of the alternative selected.
3. Sensitive species occur within the identified potential habitat that has not been surveyed. Occurrence is assumed until surveys are completed.
4. Non-native plants (weeds) will continue to spread along and within surfaced and unsurfaced motorized trails.
5. NFTS motorized roads and trails and motorized trails proposed for addition to the NFTS could have increased use which may increase impacts to sensitive species through production of dust, etc.
6. The projects identified in Table J-6 will be analyzed and implemented on TNF system lands within the next 5 to 10 years.
7. All vehicles are assumed “equal.” Hence the impacts to sensitive species from a motorcycle are assumed equal to those impacts from a 4 wheel drive vehicle. [The type of motorized vehicle is not a factor since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007)].
8. Volunteers can effectively maintain adopted motorized trails over the long term.

Reasonably foreseeable actions: When past impacts and the impacts of implementing the various alternatives are added to the impacts of those actions identified in Table J-6, there is even more risk to sensitive species. In addition, over the long term, with continued disturbance, some of the native plant communities could be converted to other types of plant communities, such as conversion of fens/peatlands to wet meadows.

Table J-6. Reasonably foreseeable activities considered in cumulative effects analysis

Project	Description
Renew Pacific Bell’s expired phone line easements and special use permits	Renew phone line permits, including removing abandoned poles and cables and possible burying and/or co-locating phone lines with power lines in some areas.

Project	Description
Gold Valley resource protection plan	Implement actions proposed to improve Gold Valley and reduce erosion from specific roads/trails.
Carvin aspen enhancement	Remove conifers to improve condition of an aspen clone.
Canyon Forest Health	Reduce fuels, thin forest stands, decommission roads.
Tahoe Truckee Sanitary Agency permit renewal	Issue a special use permit to the Tahoe Truckee Sanitary Agency to operate and maintain a sewage interceptor and export conduit pipeline on a strip of NFS lands – 3.73 miles long and 20 feet wide.
Sugarplum	Remove dead, dying, and hazard trees near improvements, thin forest stands.
Legacy Trail	Construct nonmotorized multiple use trail from private land in the town of Truckee to Glenshire subdivision.
Glenshire Drive re-alignment	Construct a portion of Glenshire Drive on NFS lands to make room for the repositioning of the railroad track.
Donner Summit PUD permit renewal	Renew/reissue a permit to Donner Summit PUD for operation/maintenance of the existing sewer treatment plant. Permit includes buildings on NFS lands which house PUD administrative offices and a fire station.
DMB Highlands Siller Ranch fire access road	Designate about 400 feet of an un-authorized road as a special use road to be used by Siller Ranch for emergency access to a subdivision.
Truckee Donner PUD Alder Creek road powerline tie	Construct about 500 feet of distribution powerline to connect existing systems both east and west of Highway 89 north to reduce the risk of spot outages.
Phoenix	Thin and reduce fuels on about 5,058 acres in areas formerly analyzed in the Euro and Checkmate Project EAs using HFQLG direction.
Montez	Thin and reduce fuels on about 180 acres using HFQLG direction.
Little Truckee River Trail	Construct about 1 miles of multiple use trail between highway 89 north and FS road #450-10-20 – connect to Upper Little Truckee River campground.
Kangaroo	Mechanically thin 44 acres, group select 47 acres, thin 7 acres of conifer in an aspen clone, construct ½ mile of temporary road.
Jackson Meadows hazard tree	Remove hazard trees from campgrounds, along NFS and county roads from Jackson Meadows Reservoir to Little Truckee Summit.
Dinkum	Thin 229 acres, group select 72 acres; remove conifers form 7 acres of aspen, construct ¾ mile of temporary roads.
Coppins	Construct fish/frog passage at stream crossing below NFS road 07.
Carman II watershed restoration	Implement watershed restoration activities
Brumby	Mechanically thin 530 acres, group select 30 acres, remove conifers for 3 acres of aspen, construct 1.3 miles of new permanent road, and about 1 mile of temporary road.
Mears	Thin, salvage and sanitize dead and dying trees
Last Chance	Thin and reduce fuels as a collaborative project – Sierra Nevada Adaptive management project.
Foresthill genetic center plantation	Thin and remove surplus trees in the Foresthill Genetic Resource Center.
East Fork	Thin and remove trees.
Casa Loma	Hand thin trees and brush to reduce fuels
Sierra Pacific power line permit	Re-issue a special use permit for all existing Sierra Pacific power lines.
PG&E distribution line permit	Renew the special use permit for existing lines and facilities
BKS grazing allotment management plans	Update the allotment management plans for the Boca, Kyburz, Sagehen, Sierra Crest and Summit grazing allotments.
Designate energy corridors on federal land in 11 western states.	In accordance with section 368 of the Energy Policy Act of 2005, “The Sec of Agriculture, Commerce, Defense, Energy and Interior, in consultation with FERC, States, tribal or local units of government will designate energy corridors on federal land.

Aquatic/Riparian Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres open to cross country travel (including motorized trails un-authorized for motorized use).

No Action: Alternative 1 does not prohibit cross country travel. The TNF currently has 717,900 acres of aquatic/riparian habitat located within 100 feet of aquatic/riparian plant communities. Cross country travel is prohibited on 73,500 of the 717,900 acres. Currently the 717,900 acres includes 1,400 miles of motorized trails un-authorized for motorized use. Under implementation of Alternative 1 impacts to known occurrences of sensitive species dependent on aquatic/riparian plant communities would likely increase over time as motorized vehicle use increased. As yet undiscovered sensitive species occurrences would be at risk as new motorized trails were created. Cross country use would damage at least some sensitive species occurrences and it is reasonable to expect that some occurrences would be lost. Those sensitive species considered in downward trend would be most at risk for loss of viability. TNF sensitive plants in a downward trend that are dependent on aquatic/riparian plant communities include: *Ivesia aperta* var. *canina* and *Ivesia webberi*. Since *Ivesia aperta* var. *canina* and *Ivesia webberi* are experiencing a downward trend across their range of occurrence, impacts to them could be significant if they are found on TNF system lands.

Direct impacts could be significant at least at the local, site specific level. Possible direct impacts include killing and/or injuring sensitive plants and the above ground portions of sensitive fungi by running over them. (In addition, soil compaction could kill the under-ground portion of the fungal species.) Possible direct impacts also include damaging native vegetation within aquatic/riparian plant communities. Severe[3] and persistent disturbance to aquatic/riparian plant communities could convert them to a different type of plant community. The significance of these direct impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, and in some cases, the season when the disturbance takes place. For example, running over a sensitive plant while it is in bloom could negatively impact reproduction - at a minimum. Running over the same plant while it is dormant and underground would not have the same impacts - especially if the soil health is not reduced. The significance of impacts is also dependent on the number of sensitive species that occur in a specific location and how many of them are damaged. In addition, the significance of impacts is dependent on the amount and condition of the type of habitat needed by a particular sensitive species across its range of distribution.

When a sensitive species is dependent on plant communities that are limited (for example *Meesia uliginosa* is usually found in fens and fens are plant communities of limited distribution), impacts could be significant. The type of motorized vehicle is not a factor since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007). It is impossible to know when or where cross country motorized vehicle use would occur, but since it would not be prohibited in Alternative 1, the risk of significant direct and indirect impacts is higher than in the action alternatives.

[3] Severe disturbance refers to any disturbance that changes the hydrology, soil health, or vegetative cover within the plant community.

Implementation of Alternative 1 could indirectly impact sensitive species when cross country motorized vehicles reduce soil health through compaction, increase erosion, change water flows, and/or introduce weeds. Indirect impacts could be significant. Undesirable impacts include severely eroded soils, hydrologically disrupted wetland ecosystems, general habitat destruction, and degraded water quality (Foltz 2006). The significance of possible indirect impacts is unknown due to the factors listed under the direct impacts section. However, in most cases, recommendations for sensitive species – especially aquatic/riparian plant communities are for protection from indirect impacts. Most TNF sensitive species are considered aquatic/riparian dependent and are limited in distribution. Reductions in the health of the soil and/or changes to the amount or health of water/air/vegetation components of the habitats for sensitive plants prevent those habitats from maintaining and performing their natural prescribed functions (Foltz and Meadows 2007). Refer to section 3.02 of the DEIS for more information regarding soil and water. Allowing unrestricted motorized vehicle use across the forest greatly increases the risk of negative indirect impacts to sensitive species.

Action alternatives: All of the action alternatives prohibit cross country travel. This prohibition is expected to stop/reduce the proliferation of new motorized trails un-authorized for motorized use. The prohibition of cross country travel also includes prohibiting use on some portion of the 114 miles of motorized trails un-authorized for motorized use that are located within 100 feet of riparian vegetation. The prohibition of cross country travel also results in fewer perennial and intermittent stream crossings. Therefore, the risk of direct and indirect impacts to sensitive species and aquatic/riparian plant communities (from cross country travel) is less than under implementation of the no action alternative. Under implementation of the action alternatives impacts to known occurrences of sensitive species and aquatic/riparian plant communities would likely be mitigated by implementation of actions to reduce/eliminate negative impacts. As yet undiscovered occurrences of sensitive species would most likely be discovered during motorized trail surveys and mitigations would be developed to reduce negative impacts to them. [Note: The Management Level 1 roads and temporary roads proposed in Alternative 5 (refer to the alternative description in Chapter 2 of the DEIS for a listing) do not have current botanical surveys.] It is standard practice to reduce/eliminate impacts to sensitive species. Aquatic/riparian plant community impacts would be reduced due to mitigations developed to reduce erosion. Refer to Appendix A (Road Cards) of the DEIS for mitigations that will be applied to site specific motorized trails. The loss/conversion of aquatic/riparian plant communities due to motorized vehicle cross country use would not occur.

The action alternatives prohibit use on some motorized trails un-authorized for motorized use that are located within 100 feet of aquatic/riparian plant communities and perennial and intermittent water crossings of motorized trails un-authorized for motorized use – compared to the no action alternative. Tables J-7 and J-8 display the number of perennial and intermittent water crossings and the number of miles (NFS lands) of motorized trail un-authorized for motorized use located within 100 feet of aquatic/riparian plant communities (riparian vegetation) by alternative.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trails proposed to be added to the NFTS within 100 feet of aquatic/riparian plant communities
- Number of proposed perennial and intermittent water crossings
- Sensitive species occurrences (associated with aquatic/riparian plant communities) located within 100 feet of proposed motorized trails
- Weed sites located along proposed motorized trails within 100 feet of sensitive species occurrences

No Action: Alternative 1 does not add motorized trails to the NFTS but it does not prohibit use of motorized trails un-authorized for motorized use either. Refer to the discussion under effects of cross country use under the no action alternative above. Direct and indirect impacts could be significant at least at the local level.

Surveys of about 62 miles of motorized trails un-authorized for motorized use have been completed to date. Aquatic/riparian dependent sensitive species were discovered within 100 feet of several motorized trails; *Bruchia bolanderi* along TKN-J5, *Epilobium howellii* at the end of YRN-001, and *Ivesia sericoleuca* along TKN-M2. Cheatgrass is known to occur within 100 feet of the TKN-M2 *Ivesia sericoleuca* occurrence.

Action Alternatives: For those proposed additions to the NFTS, Tables J-7, J-8, and J-9 display the number of perennial and intermittent water crossings by alternative, the number of miles of road/trail/area on NFS lands that are within 100 feet of aquatic/riparian plant communities (riparian vegetation) by alternative, and the motorized trails that are located (at least in part) within aquatic riparian plant communities by alternative.

TKN-J5 is proposed in Alternatives 2, 5, 6, and 7. TKN-M2 is proposed in Alternatives 2, 5 and 6. Barriers will be placed along the motorized trail where it passes through the aspen/spring area. YRN-001 is proposed in Alternatives 2, 5, and 6. Barriers will be placed between YRN-001 and the *Epilobium howellii* to reduce impacts to this sensitive plant. Of the action alternatives, implementation of Alternative 5 has the greatest number of perennial water crossings and the most miles associated with proposed additions to the NFTS within 100 feet of riparian vegetation. Therefore, of the action alternatives, Alternative 5 has the greatest risk to water quality and aquatic/riparian plant communities (or conversely the smallest improvement in water quality conditions and aquatic/riparian plant community conditions). Therefore, of the action alternatives, implementation of Alternative 5 would have the greatest risk of negative impacts to sensitive species dependent on aquatic/riparian plant communities.

Alternative 2 differs from Alternative 5 in that Alternative 2 proposes Reservoir access and Alternative 5 does not; and Alternative 5 proposes the networks (Cal-Ida, Boca, Mosquito, and French Meadows) and Alternative 2 does not. In addition, Alternative 5 proposes adding numerous existing NFTS Maintenance Level 1 and temporary roads (refer to the alternative descriptions in Chapter 2 for a listing) to the NFTS as motorized trails `that are not proposed in Alternative 2. Table J-7 also shows that the action alternatives propose the addition of 127 crossings in Alternative 5, 35 and 37 crossings in

Alternatives 2 and 6 respectively, 18 and 19 crossings in Alternatives 4 and 7 respectively, and no crossings in Alternative 3. Table J-8 shows that the action alternatives propose the addition of 19 miles of motorized trail within 100 feet of riparian vegetation in Alternative 5, 6 and 7 miles in Alternatives 2 and 6 respectively, 3 miles in Alternatives 4 and 7, and no miles in Alternative 3.

Bruchia bolanderi along TKN-J5 and *Ivesia sericoleuca* along TKN-M2 are at higher risk in Alternatives 2, 5, 6, and 7 because both of those motorized trails are proposed in those alternatives. *Epilobium howellii* at the end of YRN-001 is at higher risk in Alternatives 2, 5, and 6. Since mitigations will be implemented to reduce impacts to all sensitive species occurrences, the risk is not considered significant. However, over the long term, the risk of cheatgrass spreading and out competing native vegetation including *Ivesia sericoleuca* along TKN-M2 is high. Refer to Appendix M (Weed Risk Assessment) for more information. Alternatives 3 and 4 do not propose motorized trails TKN-J5 and TKN-M2 and cheatgrass would not be spread along TKN-M2 through motorized vehicle use of the motorized trail. The occurrences of *Bruchia bolanderi* along TKN-J5 and the *Ivesia sericoleuca* located along TKN-M2 would therefore benefit. The *Bruchia bolanderi* along TKN-J5 and the *Epilobium howellii* along YRN-001 would also benefit.

Of the action alternatives, Alternatives 3, 4, and 7 have the largest potential improvement in water quality conditions (and the least risk to sensitive species dependent on aquatic/riparian plant communities) because additions to the NFTS under these alternative would result in the fewest perennial and intermittent water crossings, and fewer miles of motorized trails within 100 feet of riparian vegetation.

Of the action alternatives, the proposed addition of motorized trails under Alternative 5 would impact the most aquatic/riparian plant communities (and possibly impact sensitive species that are currently unknown). Alternatives 4 and 7 carry less risk related to the addition of motorized trails to aquatic/riparian plant communities than implementation of Alternatives 6 and 2. Alternative 1 does not propose to add any motorized trails to the NFTS, so while it has the least impact relative to this aspect of the alternatives; it has the greatest overall risk to sensitive plants through absence of a prohibition on cross country travel, as previously described. Alternative 3 does not propose the addition of any motorized trails to the NFTS and provides the most benefits to sensitive species and aquatic/riparian plant communities.

3. Changes in class of vehicle and season of use

Indicator(s) used to measure effects: No indicators were chosen to measure effects of changing the class of vehicle or season of use. Refer to the following discussion.

No Action: Alternative 1 does not change the class of vehicle or the season of use of motorized trails located within aquatic/riparian plant communities. It is expected that implementation of Alternative 1 would have the greatest amount of motorized trail damage and associated erosion since it does not prohibit use of the motorized trails un-authorized for motorized use and does not have wet weather restrictions.

Action Alternatives: Changing the class of vehicle that is allowed to use a motorized trail does not differ by action alternative since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007).

Impacts to sensitive species dependent on aquatic/riparian plant communities from changing the season of use is difficult to quantify. Refer to section 3.02 (Soils and Watershed) of the DEIS. Implementing seasonal restrictions could help to reduce rutting and subsequent channeling of surface water and runoff since it is believed that much of the damage to motorized trails is caused during the wet season. It is reasonable to assume that those motorized trails that have aquatic/riparian dependent sensitive species within 30 or 100 feet of the motorized trail would benefit from a seasonal closure of the motorized trail because the occurrence would experience fewer effects from erosion of the motorized trail. Aquatic/riparian dependent sensitive species are always subject to erosion and/or soil rutting because those native plants grow in soils that are wet/moist year-around. However, sensitive species dependent on aquatic/riparian plant communities could benefit when surface water is not channeled down a motorized trail to a stream where they occur, etc. It is impossible to quantify when and where erosion will occur, and how much erosion will occur. This analysis assumes that motorized trails will be maintained and erosion from motorized trails will be reduced and/or eliminated.

Wet weather seasonal restrictions are proposed in Alternatives 4, 5 and 6. Alternative 3 would continue the seasonal restrictions as specified in the TNF LRMP and contained in existing Forest Orders. Of the action alternatives, Alternatives 2 and 7 have the most native surface motorized trails open year round.

The conditions of NFTS motorized roads and trails and motorized trails un-authorized for motorized use can change rather quickly in aquatic/riparian plant communities - especially when climatic conditions and motorized vehicle use combined change the condition of the soil/water/vegetation. It is expected that implementing wet weather restrictions will reduce but not eliminate the amount of rut formation. Implementation of the mitigations listed in Appendix A (Road Cards) of the DEIS will further reduce erosion from motorized trails un-authorized for motorized use (motorized trails). Regular maintenance of motorized trails that pass through aquatic/riparian plant communities will be very important in regard to reducing the amount of native aquatic/riparian vegetation loss. Surveys to date have shown that when vehicles go around wet areas (areas that are seasonally wet or perennially wet) because the motorized trails are rutted, there is a loss of riparian vegetation and an increase in soil movement/erosion at those sites.

Table J-7. Number of perennial and intermittent water crossings by alternative*

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Perennial Stream Crossings							
Existing NFTS roads and motorized trails	670	670	670	670	670	670	670
Private and other jurisdiction roads	630	630	630	630	630	630	630
Cross country travel (motorized trails un-authorized for motorized use)	355	0	0	0	0	0	0
Additions to the NFTS	0	19	0	9	59	18	9
Total Motorized	**1655**	**1319**	**1300**	**1309**	**1359**	**1318**	**1309**

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Intermittent Stream Crossings							
Existing NFTS roads and motorized trails	790	790	790	790	790	790	790
Private and other jurisdiction roads	520	520	520	520	520	520	520
Cross country travel (motorized trails un-authorized for motorized use)	373	0	0	0	0	0	0
Additions to the NFTS	0	16	0	9	68	19	10
Total Motorized	**1683**	**1326**	**1309**	**1319**	**1378**	**1329**	**1320**

*Crossings include lands under all ownerships.

Table J-8. Miles* of motorized use on NFS lands within 100 feet of riparian vegetation by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross country travel (acres)	73,500	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	114	0	0	0	0	0	0
Existing NFTS roads and motorized trails	172	172	172	172	172	172	172
Private/other jurisdiction roads	59	59	59	59	59	59	59
Additions to the NFTS	0	6	0	3	19	7	3
Total Motorized	**345**	**237**	**231**	**234**	**250**	**238**	**234**

***** Miles are approximate

Table J-9. Motorized trails that pass through aquatic/riparian plant communities by alternative

Motorized trail ID	Alt 2	Alt 3	Alt 4	Alt 5*	Alt 6	Alt 7
SV-P5	Yes	No	No	Yes	Yes	Yes
SV-P6	Yes	No	Yes	Yes	Yes	Yes
SV-P7e	Yes	No	Yes	Yes	Yes	Yes
SV-P7w	Yes	No	Yes	Yes	Yes	Yes
SV-P8	Yes	No	No	Yes	Yes	Yes
SV-P12	Yes	No	No	Yes	Yes	Yes
SV-P14	Yes	No	Yes	Yes	Yes	Yes
SV-P14a	Yes	No	Yes	Yes	Yes	Yes
SV-P15	Yes	No	Yes	Yes	Yes	Yes
TKN-001	Yes	No	No	Yes	No	No
TKN-003	Yes	No	No	Yes	Yes	No
TKN-J5	Yes	No	No	Yes	Yes	Yes
TKN-J9	Yes	No	Yes	Yes	Yes	Yes
TKN-J13	Yes	No	No	Yes	Yes	No
TKN-J14	Yes	No	No	Yes	No	Yes
TKN-M2	Yes	No	No	Yes	Yes	Yes
TKS-6	Yes	No	No	Yes	No	No
TKS-11	Yes	No	No	Yes	Yes	Yes
YRM-M3	Yes	No	No	Yes	Yes	No
YRN-001	Yes	No	No	Yes	Yes	No
YRN-007	Yes	No	No	Yes	Yes	No
YRN-008	Yes	No	No	Yes	Yes	No
YRN-1	Yes	No	No	Yes	Yes	Yes
YRN-5a	Yes	No	No	Yes	Yes	Yes
YRN-5c	Yes	No	No	Yes	Yes	Yes
YRN-M2	Yes	No	No	Yes	No	No
YRN-M3b	Yes	No	No	Yes	Yes	No
YRS-003b	Yes	No	No	Yes	Yes	No
YRS-066	Yes	No	No	Yes	Yes	No
YRS-AF	Yes	No	Yes	Yes	Yes	Yes
YRS-B12	Yes	No	Yes	Yes	Yes	Yes
YRS-F1	Yes	No	No	Yes	Yes	Yes
YRS-F1b	Yes	No	No	Yes	No	No
YRS-F1c	Yes	No	No	Yes	No	No
YRS-SF4	Yes	No	No	Yes	Yes	No
YRS-SF5	Yes	No	Yes	Yes	Yes	Yes
YRS-SF6	Yes	No	Yes	Yes	Yes	Yes
Greenhorn	Yes	No	No	Yes	No	No
Reservoir access	Yes	No	No	No	No	No

In addition, Alternative 5 proposes the following that also pass through aquatic/riparian plant communities: H19-5, H20-16, H20-2, H21-5-3, H25-11-3, H25-18, H27-19, H293-4-4, H3004-8, H301-6, H329c, H3-4-4, H38, H39-12, H45-4, H54-9, H613-8, H652-5-5, H72-18, H860-40-20-3-30, H889-28, H889-3-18-5, H889-3-30-10, H889-8, H894-5-1, H89-99-10, H96-114, H96-49, N25-13, N25-15-2, N25-18-1, N25-2, N25-20, N25-21, N25-22, N25-2-3, N25-24, N25-26-2, N25-28-2, N25-28-4, N25-29-2, N25-29b, N25-30, N25-32-1, N25-32-4, N25-32-5, N25-4-2, N25-4-4, N25-4-6, N25-6-1, N25-8-1-1, N25-8-2, N25-8-6, N25-8-8, N25-9-1, N261-5-2d, N261-8-15-2, N27-3, N33-6, N33-7, N35-10, N35-11, N35-13, N35-2, N35-20-3, N35-21, N35-23, N35-3-1, N35-3-2, N35-8, N35-9, N39-4, N39-5, N39-5-1, N39-8-1, N42-17, N42-24, N43-14, N43-14-4, N43-16, N44-32, N48-4, N491-3-1, N55-2, N68-22, N860-10-10, N860-15-6, N886-18-10, N886-20-10, N96-108, N96-110-6, N96-114, N96-12c, N96-63-8-2, N96-77, and N96-83.

4. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially affect aquatic/riparian plant communities and the sensitive species dependent on them as well as the benefits from prohibiting use on motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid significant long term cumulative impacts by implementing frequent and consistent evaluation of motorized trail perennial and intermittent water crossings, mitigations implemented to reduce impacts to sensitive species, and detection/treatment of weeds. This motorized trail evaluation combined with rapid mitigation of resource damage avoids significant impacts to aquatic/riparian plant communities and the sensitive species dependent on them in the long term.

Past: Management activities have occurred on TNF system and privately owned lands for over a century. Historic management activities on TNF system lands include: gold mining, gravel mining, hydroelectric development, land clearance, diversions of water for irrigation, land drainage, timber harvest, construction of roads and railroads, urbanization, livestock grazing, ground water abstraction, and others (Kondolf et al. 1996). This long history of disturbance to aquatic/riparian plant communities has contributed to the lack of an undisturbed reference for most aquatic/riparian dependent sensitive species. Therefore, it is not possible to quantify how these past management activities have impacted them. Historically, springs, creeks, and rivers were altered by diversion of water; meadows and fens were converted to other types of habitats due to human activity that dried them out; aquatic/riparian areas were repeatedly and heavily grazed by domestic livestock; and numerous roads were built in areas that changed the hydrology of those habitats. These activities and others have cumulatively reduced the amount of aquatic/riparian plant communities within TNF watersheds that would be suitable habitat for: *Botrychium ascendens, Botrychium crenulatum, Botrychium lineare***,** *Botrychium montanum, Bruchia bolanderi, Epilobium howellii, Fissidens aphelotaxifolius, Helodium blandowii, Hydrothyria venosa, Ivesia aperta* var. *aperta, Ivesia aperta* var. *canina, Ivesia sericoleuca, Ivesia webberi, Lewisia cantelovii, Lewisia serrata, Meesia triquetra, Meesia uliginosa,* and *Pyrrocoma lucida.* The amount of habitat reduction is unknown.

In addition, past management has created conditions on the landscape that frequently contribute to cross country travel. For example, skid trails that were created during a fuel reduction/timber harvest project are generally blocked off where they connect to NFTS motorized roads and trails once the project has been implemented. However, in a number of areas motorized vehicle users have removed the barriers blocking the skid trail and/or have gone around the barriers. Continued use of the old skid trail creates a motorized trail that has not been designed for the use, and may be located in an area that is not best suited to that use. Trail planning and design – especially location – are important considerations for limiting disturbances to natural resources (Foltz and Meadows 2007) such as sensitive species.

Current: Current impacts to aquatic/riparian plant communities come from a variety of management activities including motorized vehicles. Motorized vehicle use within aquatic/riparian plant communities and their zones of influence (RCAs) negatively impacts the soil/vegetation/water in those areas. Use of existing motorized trails while they are wet can cause the formation of ruts/wheel tracks that can

channel water altering area hydrology and causing erosion of soil. Vegetation in and adjacent to areas of use is negatively impacted when it is run over and/or covered in dust. Water quality is also negatively impacted when motorized vehicles add sediment and other pollutants to it. (Refer to section 3.02 (Soils and Watershed) of the DEIS.) Motorized vehicle use within aquatic/riparian plant communities and their RCAs does not benefit soil, water and native vegetation within those areas. However, the significance of the negative impacts to soil/vegetation/water within specific aquatic/riparian plant communities can not be determined at the landscape level – it must be done site specifically. Refer to Appendix A (Road Cards) for additional information about aquatic/riparian plant communities that are impacted by motorized vehicles.

Other on going projects on the forest that impact aquatic/riparian plant communities include: special uses projects such as utility corridor construction and maintenance that pass through and impact many different types of plant communities including aquatic/riparian; minerals operations that remove native vegetation and recontour the landscape; and livestock grazing projects that allow impacts to aquatic/riparian plant communities as livestock eat the vegetation and punch hoof holes into the soil.

Reasonably foreseeable: When past and current impacts are added to the impacts of the reasonably foreseeable future actions identified in Table J-6, risks to aquatic/riparian dependent sensitive species increase. Over the long term, with continued disturbance, some of the aquatic/riparian plant communities could be converted to other types of plant communities, such as conversion of fens/peatlands to wet meadows.

Some current and reasonably foreseeable management actions do not impact aquatic/riparian plant communities while others are expected to have minimal direct impacts. For example, westside fuel reduction/timber harvest/aspen improvement projects routinely establish a 100 foot buffer around aquatic/riparian plant communities (such as riparian vegetation along streams, fens, springs, and seeps) where no management activities are implemented. Many eastside fuel reduction/timber harvest/aspen improvement projects contain a 50 foot no treatment buffer. Some eastside fuel reduction/timber harvest/aspen improvement projects establish a 25 foot tractor keep out zone near aquatic/riparian communities such as fens where trees can be felled away from fens and removed. For example, Montez and Billabong are both projects with 25 foot tractor keep out zones in aspen clones that are adjacent to fens. The Montez Biological Evaluation (BE) finds that “Minimal direct effects to the fen are expected from harvesting conifers to release an aspen stand near the fen because mitigations would be implemented to minimize impacts… Indirect effects of harvesting trees uphill from the fen would be that more water would be available to the fen because conifer trees would no longer be transpiring water into the atmosphere above the fen. The reduction of shade to the site is expected to be minimal and somewhat temporary because threes that provide most of the shade during the summer months would be left in place…An increase amount of water would help keep the saturation level high and would maintain an anaerobic system for a longer period during the summer season” (Montez Project Sensitive Plant Biological Evaluation, Susan Urie, Page 8).

Projects other than fuel reduction/timber harvest/aspen improvement also impact aquatic/riparian plant communities. Some projects are designed to improve the health of specific aquatic/riparian plant

communities by restoring the hydrology of areas such as the Carmen project. Others are designed to improve the reproduction of aspen clones by removing conifers - such as the Carvin and Brumby projects.

No Action: Implementation of Alternative 1 carries the highest risk of cumulative impacts to sensitive species dependent on aquatic/riparian plant communities. Since (in general terms) no restrictions would be in place to limit where motorized vehicle use could occur, all aquatic/riparian sensitive species that grow in areas that are accessible by motorized vehicle would be at risk. Since complete surveys for the forest are not available, and an undisturbed reference for aquatic/riparian plant community dependent sensitive species is also lacking, this analysis focuses on cumulative impacts to aquatic/riparian plant communities with discussion of cumulative impacts to individual species where cross country travel/ motorized vehicle use is known to impact aquatic/riparian dependent sensitive species.

When the impacts of all past, current and reasonably foreseeable management actions are added to the possible impacts of implementing Alternative 1, (especially cross country travel) the potential to significantly impact aquatic/riparian plant communities and the sensitive plant species dependent on them is high. Cumulative impacts could be significant over the long term and include conversion of fens and other wetlands to other types of plant communities. Aquatic/riparian plant communities lack the vegetative barriers to keep motorized vehicle use from accessing them and significantly impacting their hydrology.

Several aquatic/riparian dependent sensitive species are currently impacted by use of NFTS motorized roads and trails, the motorized trails un-authorized for motorized use, and through cross country use. These impacts are discussed below:

Meesia triquetra and *Meesia uliginosa* occurrences are located in plant communities called fens that are directly and indirectly impacted by cross country motorized vehicle travel. Cross country use is also negatively impacting known fens/peatlands that may contain these mosses. *Meesia uliginosa* is currently being impacted by cross country motorized vehicle travel in the Summit fen area. In this example, cross country travel onto the fen created bare soil by killing the vegetation where the wheel tracks occurred. The aquatic/riparian plant community at Summit fen is also currently indirectly impacted by use of the NFTS motorized trail located above it. The NFTS motorized trail is channeling water and sediment into the fen and may be changing the acidity of the water (PH) of the fen. Damage to fens/peatlands from motorized vehicle use alters surface and subsurface flow patterns and can result in areas of bare peat and soil. Areas of exposed peat are at increased risk from drying out and being lost. Wheel tracks can also weaken or destroy the rhizomatous root network of the clonal peat forming plants. Bare ground exposes the organic soils to the atmosphere allowing their decomposition. Functioning fens/peatlands store carbon. Loss of moisture to the fen/peatland can cause the plants that make up these plant communities to die. Peat forming wetlands provide important benefits within TNF watersheds by improving water quality and providing habitat for unique plant communities. Because of the large historical loss of this type of plant community, remaining fens are considered rare. As described in Chapter 2, forest plan direction is as follows: “During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and vehicles.”

Implementation of Alternative 1 increases the risk of disturbance within aquatic/riparian plant communities because it allows cross country travel and does not prohibit use of motorized trails un-

authorized for motorized use. Cross country and un-authorized motorized trail use have contributed to cumulative impacts to fens and *Meesia uliginosa* on the TNF. If the cross country use continues, the sensitive moss *Meesia uliginosa* located in Summit fen could be lost. In addition fens/peatlands and other aquatic/riparian plant communities could be converted to wet meadows or other types of plant communities.

Bruchia bolanderi is a sensitive moss that occurs along Castle Creek about 50 feet upstream and about 30 feet downstream from the Castle Creek crossing area along proposed road TKN-J5. As of August 2007 it has also been reported from the Summit fen, Round Valley meadow, and Upper Lola Montez areas. The Upper Lola Montez and Castle Creek areas are being impacted indirectly by motorized vehicle use of TKN-J5. Impacts are not currently considered significant since they are indirect impacts and this moss can tolerate some disturbance. However, if disturbance from motorized vehicle use is too frequent or the use causes significant soil compaction, the moss occurrences could be lost. All occurrences are small in area and could be significantly reduced by one vehicle pass. Implementation of Alternative 1 carries a high risk (short and long term) that motorized vehicles could significantly impact these mosses since they are all located in areas that are fairly accessible to motorized vehicles.

Ivesia sericoleuca and *Ivesia aperta* var. *aperta* occurrences are located on the eastside of the forest in meadows and vernally wet areas. Cross country motorized vehicle use has impacted them in several locations. Motorized vehicles have created ruts in these habitats that act as drains and/or channels that change the hydrology of the plant community. They also introduce/spread weeds such as cheatgrass that can crowd out these native plants over time. Direct impacts to these sensitive plants from motorized vehicle use have killed and/or injured them. Most of the known occurrences are known to be impacted by a combination of motorized and non-motorized vehicles, livestock grazing and/or cheatgrass invasion. Even though the TNF has a number of occurrences of each sensitive plant, the majority of them are being negatively impacted. Cross country travel within these plant communities – especially those that have sensitive plant occurrences - will increase the risk of loss of viability of these plants over the long term. For example, there are tens of thousands of *Ivesia sericoleuca* plants known to occur on TNF system lands at this time. *Ivesia sericoleuca* plants grow in meadow plant communities where terrain and vegetation do not provide obstacles to cross country travel. Currently, TNF occurrence records for the 28 known occurrences indicate that 18 of the known occurrences are negatively impacted by off highway vehicles (OHVs). Only two occurrence records indicate no disturbances. Twenty of the 28 occurrence records indicate that livestock grazing is a negative disturbance. Cross country travel by motorized vehicles in these plant communities could significantly reduce the number of *Ivesia sericoleuca* plants on the TNF.

An occurrence of *Epilobium howellii* is located at the end of YRN-001. Cross country motorized travel has impacted these sensitive plants at this site by driving over them causing them to be injured or killed. This plant grows in areas that are moist to wet – areas with soils that can be easily compacted due to their wetness. If disturbance from motorized vehicle use is too frequent or the use causes significant soil compaction, the *Epilobium howellii* in this occurrence could be lost. Over time, extensive cross country travel in wet meadow areas could cause a loss of viability for this species in the TNF planning area. These plants grow in areas that are relatively accessible by motorized vehicles.

Other factors also add to the risk of negative impacts to aquatic/riparian dependent species from motorized vehicle and cross country use. For example, some of the NFTS motorized roads and trails and the motorized trails un-authorized for motorized use, end at aquatic/riparian plant communities such as wet meadows. This situation increases the risk of negative impacts to aquatic/riparian dependent resources such as sensitive species especially when cross country travel is allowed, as in Alternative 1. For example, YRN-11 is a short motorized trail un-authorized for motorized use that ends at a wet meadow plant community. It does not have barriers to keep users from driving onto the meadow. Placing barriers at the end of YRN-11 (as proposed in the action alternatives – refer to Appendix A (Road Cards) of the DEIS would reduce the risk of cross country travel across this meadow. When motorized vehicle use occurs in wet meadows, soils are compacted, the hydrology is changed, and vegetation is killed. Restoration of aquatic/riparian plant communities is often time consuming and expensive. As mentioned above, many sensitive species are dependent on aquatic/riparian plant communities.

Alternative 1 has the greatest number of perennial and intermittent water crossings, the most miles of motorized trails within 100 feet of riparian vegetation, and allows cross country travel. Refer to Tables J-7 and J-8. Implementation of Alternative 1 has the greatest risk of introducing and spreading weeds into aquatic/riparian habitats. Implementation of the temporary order that prohibits cross country travel for up to two years will limit the negative impacts of new motorized trails un-authorized for motorized use – at least during the temporary order time frame.

Action Alternatives: Implementation of the action alternatives will cumulatively impact aquatic/riparian plant communities and the sensitive species dependent on them. Those cumulative impacts are not considered significant due to the mitigations listed by motorized trail in Appendix A (Road Cards). However, when the impacts of all past, current and reasonably foreseeable management actions are added to the possible impacts of the implementing the various action alternatives, there is a difference in the potential amount of impacts to aquatic/riparian plant communities and the sensitive plant species dependent on them.

Mitigations have and will be developed to reduce impacts to sensitive species that are known to occur along motorized trails, or are discovered in future surveys. However, sensitive species occurrences located along motorized trails are at risk from indirect impacts such as being covered in dust and/or having weeds introduced into their location. There are currently no effective mitigations in place to reduce dust along motorized trails or to prevent the introduction of weeds along those motorized trails. Therefore, those action alternatives that add the most miles of trail, and prohibit use of the least miles of trail have a greater risk of indirect impacts to sensitive species.

Alternative 5: Implementation of Alternative 5 cumulatively impacts aquatic/riparian plant communities and the sensitive species dependent on them. Implementation of Alternative 5 has the greatest number of perennial and intermittent water crossings and the most miles of motorized trail within 100 feet of riparian vegetation added to the NFTS of all of the action alternatives. Alternative 5 adds the greatest number of perennial and intermittent water crossings to the NFTS and prohibits use on the fewest miles of motorized trail located within 100 feet of riparian vegetation. Therefore implementation of Alternative 5 has the greatest risk of negatively impacting aquatic/riparian plant communities and the sensitive species dependent on them.

About 149 miles of Maintenance Level 1 and temporary roads are proposed as additions to the NFTS. These roads do not have current botanical surveys. It is possible that they have occurrences of sensitive species and weeds. Therefore, occurrences of sensitive species may exist along these motorized trails that are being impacted by motorized vehicles.

Implementation of Alternative 5 would also impact known occurrences of sensitive species along proposed additions to the NFTS. The significance of those impacts varies by such factors as the location of the species, the number of species in that location, and the amount of disturbance. For example, *Ivesia sericoleuca* is currently being directly and indirectly impacted along a portion of TKN-M2. Individual plants are being killed and injured. Currently, there are tens of thousands of *Ivesia sericoleuca* plants known to occur on the TNF. However most of the 28 occurrences are experiencing multiple impacts. TNF occurrence records for the 28 known occurrences indicate that 18 of the known occurrences are negatively impacted by off highway vehicles (OHVs). Only two occurrence records indicate no disturbances. Twenty of the 28 occurrence records indicate that livestock grazing is a negative disturbance. As mentioned previously, mitigations to reduce and/or eliminate direct impacts to sensitive species will be developed and implemented wherever they are found. However, there are no mitigations available that effectively reduce the indirect impacts of weed introduction/spread and dust. Cheatgrass also occurs along TKN-M2 that is within 100 feet of *Ivesia sericoleuca* plants. Motorized vehicle use along this motorized trail will continue to spread cheatgrass and create dust that will cover some of the *Ivesia sericoleuca* plants during part of the growing season. Dust covered plants do not reproduce or grow as effectively as non dust covered plants. Over the long term, competition for soil and water due to cheatgrass invasion and weakening of plants due to being covered with dust could kill plants. Over the long term, it is possible that the cumulative impacts to sensitive species such as *Ivesia sericoleuca* could be significant; however, frequent field observations with rapid implementation of mitigations to reduce/eliminate impacts to sensitive species would reduce the significance of these possible long term impacts. The *Ivesia sericoleuca* occurrence located along TKN-M2 will be monitored to determine if and/or when cheatgrass infests the occurrence and actions will be developed to remove the cheatgrass.

Bruchia bolanderi occurrences along TKN-J5 are currently being impacted indirectly by motorized vehicle use. *Bruchia bolanderi* occurrences at this location could also be lost over the long term if hydrology is significantly changed at the crossing of Castle Creek. With routine maintenance of the proposed motorized trails, significant changes in the hydrology of Castle Creek (caused by motorized vehicle use) are not expected. Over the long term, weeds may be introduced into the aquatic/riparian plant community containing *Bruchia bolanderi*. If aquatic/riparian weeds were to become established in the *Bruchia bolanderi* locations, the sensitive moss plants would be lost. Loss of sensitive species such as *Bruchia bolanderi* is considered a significant effect. When, where, and if aquatic weeds will become established is unknown. Again, the assumption that frequent field observations with rapid implementation of mitigations to reduce/eliminate impacts to sensitive species reduces the significance of these possible long term impacts.

Epilobium howellii plants are currently being impacted directly and indirectly by motorized vehicles using YRN-001. Plants are being killed and/or injured as motor vehicles turn around and/or park on top of

them. Soil compaction caused by motorized vehicles has reduced the amount of area suitable for this rare plant to grow at this site.

Implementation of Alternative 5 would continue to impact special aquatic features along TKN-J5 and TKN-M2, continue to spread cheatgrass through motorized vehicle use of TKN-M2, and continue to impact the *Epilobium howellii* at the end of YRN-001.

Alternatives 2 and 6: Implementation of Alternatives 2 and 6 would have cumulative impacts on aquatic/riparian plant communities and the sensitive species dependent on them. Since Alternatives 2 and 6 have fewer miles of motorized trails open for use within 100 feet of riparian vegetation and have fewer perennial and intermittent crossings than Alternatives 1 and 5, the risk of impacts to aquatic/riparian plant communities is less than those discussed under implementation of Alternatives 1 and 5. Alternatives 2 and 6 also proposed fewer additions to the NFTS within 100 feet of riparian vegetation and perennial and intermittent crossings. As previously mentioned, Alternative 2 differs from Alternative 5 in that Alternative 2 proposes Reservoir access and Alternative 5 does not. Alternative 6 does not propose Reservoir access. In addition, Alternative 5 proposes numerous motorized trails (refer to Chapter 2 of the DEIS for a listing) that are not proposed in Alternatives 2 and 6. Alternatives 2 and 6 reduce by 95 percent motorized use of perennial and intermittent crossings and about 95 percent of the miles of motorized use within 100 feet of riparian vegetation.

Alternative 6 has less miles of motorized trail that pass through aquatic/riparian plant communities than Alternative 2 primarily due to Reservoir access. Under implementation of Alternatives 2 and 6, cross country travel by motorized vehicle users would be prohibited. Implementation of Alternatives 2 and 6 would continue direct/indirect/cumulative impacts to special aquatic features along TKN-J5 and TKN-M2; and cheatgrass would continue to be spread through motorized vehicle use of motorized trail TKN-M2. *Bruchia bolanderi* along TKN-J5 and *Ivesia sericoleuca* along TKN-M2 would continue to be indirectly impacted by dust and possible weed invasion. Implementation of Alternatives 2 and 6 would continue to impact the *Epilobium howellii* at the end of YRN-001.

Implementation of Alternatives 2 and 6 is not expected to produce significant impacts in the short term (5 years or less) (to aquatic/riparian plant communities or the sensitive species dependent on them) because users would be required to stay on NFTS motorized trails and cross country use would be prohibited. Implementation of Alternatives 2 and 6 is not expected to produce significant impacts in the long term due to the assumption of frequent field observations of resource problems with rapid mitigations of those problems.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 cumulatively impacts aquatic/riparian plant communities and the sensitive species dependent on them. Alternatives 4 and 7 proposed fewer additions to the NFTS within 100 feet of riparian vegetation and propose fewer perennial and intermittent crossings than Alternatives 1, 2, 5, and 6. Alternatives 4 and 7 also allow motorized use on fewer miles of motorized trail within 100 feet of riparian vegetation and have less motorized perennial and intermittent crossings than Alternatives 1, 2, 5, and 6. Alternatives 4 and 7 reduce (by about 90 percent) the number of perennial and intermittent water crossings and reduce (by about 88 percent) the number of motorized trail miles located within 100 feet of riparian vegetation.

Implementation of Alternative 4 would not continue to indirectly impact *Bruchia bolanderi* along TKN-J5, *Ivesia sericoleuca* along TKN-M2, and *Epilobium howellii* at the end of YRN-001, through dust and possible weed invasion. Implementation of Alternative 4 would not impact the *Epilobium howellii* located at the end of YRN-001. Alternative 4 does not propose adding TKN-J5, TKN-M2, or YRN-001 to the NFTS. In addition, implementation of Alternative 4 would not spread cheatgrass along motorized trail TKN-M2 through motorized vehicle use since use of that trail would be prohibited. Alternative 7 would continue to indirectly impact *Bruchia bolanderi* along TKN-J5 and *Ivesia sericoleuca* along TKN-M2 and continue to spread cheatgrass along TKN-M2. Alternative 7 would not impact the *Epilobium howellii* at the end of YRN-001. Cross country travel by motorized vehicle users would be prohibited (as compared to Alternative 1). Alternatives 4 and 7 are not expected to produce significant impacts in the long term due to the assumption of frequent field observations of resource problems with rapid mitigations of those problems.

Alternative 3: Implementation of Alternative 3 would cumulatively impact aquatic/riparian plant communities and those sensitive species dependent on them through use of NFTS motorized trails. Since implementation of Alternative 3 does not add any new motorized trails to the NFTS, and prohibits cross country use, it is not expected to add to direct and indirect impacts to aquatic/riparian plant communities and the sensitive species dependent on them. Implementation of Alternative 3 would not continue to indirectly impact *Bruchia bolanderi* along TKN-J5, *Ivesia sericoleuca* along TKN-M2, or *Epilobium howellii* along YRN-001 since use of those trails would be prohibited Implementation of Alternative 3 would not spread cheatgrass along motorized trail TKN-M2 through motorized vehicle use. Implementation of Alternative 3 provides the greatest benefit to aquatic/riparian plant communities and those sensitive species dependent on them primarily through reducing impacts to them.

Serpentine and/or Copper and Heavy Metal Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres of serpentine soils where cross country travel is prohibited. (Areas of copper/heavy metal soils are usually small and not identified as distinct soil mapping units. Therefore, the areas of copper/heavy metal are identified during on the ground surveys. For this analysis, the sensitive species with potential habitat in copper/heavy metal areas are represented by miles within serpentine plant communities.)

No Action: Alternative 1 does not prohibit cross country travel on 13,400 acres of serpentine soils that contain 35 miles of motorized trails un-authorized for motorized use. Under implementation of Alternative 1 as yet undiscovered sensitive species occurrences dependent on serpentine/copper/heavy metal plant communities would be at risk as new motorized trails were created. It is expected that cross country use would damage at least some sensitive species occurrences (if they are present on TNF system lands) and it is reasonable to expect that some occurrences would be lost.

Direct impacts could be significant at least at the local, site specific level and include killing and/or injuring the sensitive species. Cross country use would also damage other native vegetation in these plant

communities increasing the risk of erosion. The significance of direct impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of sensitive species that occur in a specific location and how many of them are damaged.

Mielichhoferia elongata and *Monardella follettii* have not been found on TNF system lands. If they are found on TNF system lands in/along motorized trails un-authorized for motorized use, the occurrence will be considered significant. *Mielichhoferia elongata* and *Monardella follettii* are dependent on plant communities that are also considered limited - serpentine/copper/heavy metal plant communities. Severe impacts to these plant communities can also be significant. It is impossible to know when or where cross country motorized vehicle use would occur, however, serpentine/copper/heavy metal plant communities are frequently open terrain with scattered vegetation that allows motorized vehicle access. Since Alternative 1 allows cross county travel, the risk of significant impacts to *Mielichhoferia elongata* and *Monardella follettii* that may occur within unsurveyed potential habitats is higher than the action alternatives. In most cases, recommendations for sensitive species are for reduction/elimination of impacts. Surveys of all potential habitats for *Mielichhoferia elongata* and *Monardella follettii* that occurs on the TNF would need to be done to locate if/where these sensitive plants occur. Occurrences of *Mielichhoferia elongata* and *Monardella follettii* could be lost through the effects of cross country travel if forestwide surveys of all potential habitats are not done. Mitigations to reduce/eliminate impacts are implemented when occurrences are found. Reducing and/or eliminating impacts to sensitive species are considered an effective method of reducing cumulative impacts to them. However, flag and avoid is not a practical mitigation under the no action alternative.

Implementation of Alternative 1 could indirectly impact *Mielichhoferia elongata* and *Monardella follettii* if cross country motorized vehicles reduce soil health through compaction, increase erosion, change water flows, and/or introduce weeds. Indirect impacts could also be significant. Allowing unrestricted motorized vehicle use across the forest greatly increases the risk of negative indirect impacts to sensitive species.

TNF system lands contain about 14,412 acres of serpentine/copper/heavy metal plant community. About 1,660 acres of these plant communities are impacted by NFTS motorized roads and trails and motorized trails un-authorized for motorized use. No *Mielichhoferia elongata* and *Monardella follettii* occurrences have been found in the surveys of over 62 miles of motorized trail un-authorized for motorized use. The TNF has 35 miles of motorized trail un-authorized for motorized use and 58 miles of NFTS roads and trails located within these plant communities.

Action alternatives: All of the action alternatives prohibit cross country travel on 13,400 acres containing 35 miles of motorized trails un-authorized for motorized use. Therefore, direct/indirect impacts to sensitive species dependent on serpentine/copper/heavy metal plant communities from cross country travel would not occur. Motorized trails un-authorized for motorized use are considered an expression of cross country travel.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of proposed additions to the NFTS that pass through serpentine (ultra mafic)/copper/heavy metal soils (plant communities).

No Action: Alternative 1 does not add motorized trails to the NFTS. Refer to Table J-10 which shows the miles of motorized trail within these plant communities by alternative. Implementation of Alternative 1 could also directly and indirectly impact sensitive species through use of about 58 miles of NFTS motorized trails located within these plant communities. Unknown occurrences of serpentine dependent sensitive plants may occur along NFTS motorized trails. Impacts along NFTS motorized trails could be direct – especially within the 30 foot band along either side of the motorized trail, and indirect – primarily from dust and increased risk of weed introduction and spread. Direct and indirect impacts could be significant dependent on the species of plant.

Surveys of over 62 miles of motorized trails un-authorized for motorized use have been completed to date. *Mielichhoferia elongata* and *Monardella follettii* were not found in those surveys. No weed occurrences were found within 100 feet of serpentine/copper/heavy metal plant community dependent sensitive species during those surveys.

Table J-10. Miles* of motorized use within serpentine plant communities by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	48	48	48	48	48	48	48
Private/other jurisdiction roads	12	12	12	12	12	12	12
Cross country travel (acres)	13,400	0	0	0	0	0	0
Motorized trails un-authorized for motorized use (miles)	35	0	0	0	0	0	0
Additions to the NFTS	0	4	0	2	4	3	3
Total Motorized	**94**	**64**	**59**	**62**	**64**	**63**	**63**

*Miles are approximate

Action Alternatives: Alternatives 2 and 5 propose the most additions to the NFTS in these plant communities - 4 miles. Therefore, implementation of Alternatives 2 and 5 have the greatest risk of negative impacts to sensitive species dependent on serpentine/copper/heavy metal plant communities of the action alternatives. However, all Alternative 2 motorized trails will be surveyed in FY 2008. Many of the motorized trails proposed under Alternative 5 will not receive additional surveys. Therefore, the risk of impacts to *Mielichhoferia elongata* and *Monardella follettii* occurrences (should they occur in the unsurveyed habitat) are less in Alternative 2 than in Alternative 5. Sensitive plant occurrences found in the FY 2008 surveys will be protected from the direct impacts of motorized vehicles. Indirect impacts such as covering them in dust and increased risk of weed introduction and spread would still occur. However, if these plants occur within 30 or 100 feet of the motorized trail without current surveys proposed in Alternative 5 (refer to the alternative description section of this document for a listing) they will remain undetected and will continue to be directly and indirectly impacted.

Alternatives 6 and 7 propose the addition of about 3 miles of motorized trails un-authorized for motorized use within these plant communities and propose fewer in these plant communities than Alternative 5. Alternative 4 proposes the addition of 2 miles of motorized trails un-authorized for motorized use in these plant communities. Alternative 3 does not propose the addition of any motorized trails un-authorized for motorized use within serpentine/copper/heavy metal plant communities.

3. Changes in class of vehicle and season of use

Indicator(s) used to measure effects: No indicators were chosen to measure effects of changing the class of vehicle or season of use. Refer to the following discussion.

No Action: Alternative 1 does not change the class of vehicle or the season of use of motorized trails located within serpentine/copper/heavy metal plant communities. It is expected that implementation of Alternative 1 would have the greatest amount of motorized trail damage and associated erosion since it does not prohibit use of the motorized trails un-authorized for motorized use and does not have wet weather restrictions.

Action Alternatives: Changing the class of vehicle that is allowed to use a motorized trail does not differ by action alternative since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007).

Impacts to sensitive species dependent on serpentine/copper/heavy metal plant communities from changing the season of use is difficult to quantify. Refer to section 3.02 (Soils and Watershed) of the DEIS. Implementing seasonal restrictions could help to reduce rutting and subsequent channeling of surface water and runoff since it is believed that much of the damage to motorized trails is caused during the wet season. It is reasonable to assume that those motorized trails that have serpentine/copper/heavy metal dependent sensitive species within 30 or 100 feet of the motorized trail would benefit from a seasonal closure of the motorized trail because the occurrence would experience fewer effects from erosion of the motorized trail. It is impossible to quantify when and where erosion will occur, and how much erosion will occur. This analysis assumes that motorized trails will be maintained and erosion from motorized trails will be reduced and/or eliminated.

Wet weather seasonal restrictions are proposed in Alternatives 4, 5 and 6. Alternative 3 would continue the seasonal restrictions as specified in the TNF LRMP and contained in existing Forest Orders. Of the action alternatives, Alternatives 2 and 7 have the most native surface motorized trails open year around.

The conditions of NFTS motorized roads and trails and motorized trails un-authorized for motorized use can change rather quickly especially when climatic conditions and motorized vehicle use combined change the condition of the soil/water/vegetation. It is expected that implementing wet weather restrictions will reduce but not eliminate the amount of rut formation. Implementation of the mitigations listed in Appendix A (Road Cards) of the DEIS will further reduce erosion from these motorized trails.

4. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact serpentine/copper/heavy metal plant communities as well as the sensitive species

dependent on them as well as the benefits from prohibiting use of motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid significant long term cumulative impacts by implementing frequent evaluation of motorized trails, mitigations implemented to reduce impacts to sensitive species, and detection/treatment of weeds. This motorized trail evaluation combined with rapid mitigation of resource damage avoids significant impacts to serpentine/copper/heavy metal plant communities and the sensitive species dependent on them in the long term.

Past: Serpentine habitats in the Sierra Nevada have been reduced in area and/or have had their functions impaired. Gold mining, timber harvest, road construction, recreational uses, and gravel mining are a few of the management activities that have impacted the serpentine habitats on the TNF. Serpentine habitats are frequently open terrain (Kruckeberg 1984). Therefore they lack vegetation to prevent cross country travel by OHVs. *Mielichhoferia elongata* and *Monardella follettii* are sensitive species that are considered endemic to serpentine/heavy metal habitats. Historic activities have cumulatively reduced the quality of serpentine habitat that would be suitable for *Monardella follettii* within TNF watersheds and heavy metal habitats that would be suitable for *Mielichhoferia elongata*. The amount of reduction is unknown.

Current: Current management (2004 on) has added to cumulative impacts to serpentine/ copper/heavy metal plant communities primarily through continued mining operations and motorized vehicle use. Current management for sensitive species being negatively impacted by motorized vehicle use has involved blocking the access with wooden and/or rock barriers. This method has not always been effective. This method is most effective when vegetation is available to also help block access. This analysis assumes that users will stay on NDTS roads and motorized trails.

Reasonably foreseeable: Serpentine plant communities are cumulatively impacted when past impacts and the impacts of implementing the alternatives are added to the impacts of those actions identified in Table J-6.

Generally, fuel reduction/timber harvest activities are not implemented on serpentine/copper/heavy metal soils due to the lack of vegetation in those plant communities. However, disturbance adjacent to serpentine plant communities could change the hydrology of the serpentine plant communities (in the short term) and cause increased erosion and introduce weeds. This could be locally significant and may be regionally significant over the long term since serpentine plant communities are limited in distribution and are known to have a high number of endemic plants. None of the fuel reduction/timber harvest projects displayed in Table J-6 are known to be located immediately adjacent to serpentine/copper/ heavy metal plant communities.

Projects other than fuel reduction/timber harvest can also impact serpentine/copper/heavy metal plant communities. Special uses projects such as utility corridor construction and maintenance pass through and impact many different types of plant communities including serpentine/copper/heavy metal. Mining/minerals projects are also known to impact serpentine/copper/heavy metal plant communities – and eliminate significant amounts of vegetation in some areas. Livestock do not usually spend much time in serpentine/copper/heavy metal plant communities due to the lack of forage and canopy to provide shade. Projects designed to improve the health of specific aquatic/riparian plant communities by restoring the hydrology of areas such as the Carmen project and others designed to improve the reproduction of

aspen clones by removing conifers - such as the Carvin and Brumby projects do not significantly impact serpentine/copper/heavy metals plant communities.

No Action: Implementation of Alternative 1 carries a high risk of cumulative impacts to sensitive species dependent on serpentine/copper/heavy metal plant communities. Since (in general terms) cross country travel would not be prohibited, all serpentine/copper/heavy metal plant community dependent sensitive species would be at risk because these areas are accessible by motorized vehicles. Since complete surveys for the forest are not available, an undisturbed reference for serpentine/copper/heavy metal plant community dependent sensitive species is lacking; and *Mielichhoferia elongata* and *Monardella follettii* have not been found on TNF system lands**;** this analysis focuses on cumulative impacts to serpentine/copper/heavy metal plant communities.

Alternative 1 has the most miles of motorized vehicle use within serpentine/copper/heavy metal plant communities (93 miles) and does not prohibit cross country travel. Implementation of the temporary order that prohibits cross country travel for up to two years will limit the negative impacts of use of motorized trails un-authorized for motorized use – at least during the temporary order time frame. After this temporary order expires, implementation of Alternative 1 would again allow cross country travel. Since these plant communities are frequently open terrain (Kruckeberg 1984) and lack vegetation to prevent cross country travel by motorized vehicles, the risk of resource damage from cross country travel is high. Cross country travel could impact *Mielichhoferia elongata* and *Monardella follettii* occurrences if they occur on the TNF and are growing in areas accessible by motorized vehicles. These impacts would be considered significant since neither species has been found on the forest.

When the impacts of all past, current and reasonably foreseeable management actions are added to the possible impacts of cross country travel, implementation of Alternative 1 has the potential to significantly impact serpentine/copper/heavy metal plant communities and the sensitive species dependent on them – over the long term (5 years plus).

Action alternatives: All action alternatives would reduce the number of motorized trails un-authorized for motorized use miles open for motorized vehicles in serpentine/copper/heavy metal plant communities However, implementation of the action alternatives could cumulatively impact sensitive species dependent on serpentine/copper/heavy metal plant communities. Surveys to date have not detected any sensitive species along proposed motorized trails that are serpentine/copper/heavy metal plant community dependent. However, some of the unsurveyed motorized trails pass through serpentine soils that have not yet been surveyed (YRN-7 and YRN-M2).

None of the reasonably foreseeable actions listed in Table J-6 are expected to significantly impact serpentine/copper/heavy metal plant communities because the reasonably foreseeable projects listed are not located within serpentine plant communities. Refer to the discussion of impacts to serpentine plant communities under the no action alternative. The action alternatives propose 7 motorized trails that pass through serpentine soils. Two of the 7 are NFTS Maintenance Level 1 roads or temporary roads proposed under Alternative 5 only. The other motorized trails are identified as: ARM-2, ARM-3r, YRN-509, YRN-7, and YRN-M2.

Alternatives 2 and 5: Cumulative impacts from implementation of Alternative 2 are not considered significant. Of the action alternatives, implementation of Alternatives 2 and 5 propose the most miles of

additions to the NFTS in these plant communities. Therefore, implementation of Alternatives 2 and 5 have the greatest risk of cumulatively impacting sensitive species dependent on serpentine/copper/heavy metal plant communities of the action alternatives. The risk of cumulative impacts is higher in Alternative 5 than in Alternative 2 because the NFTS Maintenance Level 1 roads and temporary roads proposed as additions to the NFTS as motorized trails under Alternative 5 do not have current surveys. Therefore, the risk of cumulatively impacting *Mielichhoferia elongata* and *Monardella follettii* occurrences (should they occur in the unsurveyed habitat) is less in Alternative 2 than in Alternative 5. Occurrences of *Mielichhoferia elongata* and *Monardella follettii* will be protected under implementation of Alternative 2. Occurrences of *Mielichhoferia elongata* and *Monardella follettii* may go undetected under implementation of Alternative 5 if they occur along unsurveyed motorized trails – it is possible that small inclusions of serpentine/copper/or heavy metal soils could occur along the unsurveyed motorized trails. However, the likelihood of the unsurveyed motorized trails having inclusions of serpentine/copper/or heavy metal soils is considered low given their location, i.e. outside the known serpentine belt on the forest.

Alternatives 6 and 7: Cumulative impacts from implementation of Alternatives 6 and 7 are not considered significant. Alternatives 6 and 7 both propose the addition of about 3 miles of motorized trail within these plant communities and do not propose adding NFTS Maintenance Level 1 roads or temporary roads to the NFTS as motorized trails without current botanical surveys. Alternatives 6 and 7 prohibit use of 31 miles of motorized trails un-authorized for motorized use within these plant communities. Occurrences of *Mielichhoferia elongata* and *Monardella follettii* will be protected under implementation of Alternatives 6 and 7 (should they occur in the unsurveyed habitat).

Alternatives 3 and 4: Cumulative impacts from implementation of Alternatives 3 and 4 are not considered significant. Alternative 4 proposes the addition of 2 miles of motorized trail and prohibits cross country travel in these plant communities. Alternative 4 proposes motorized trail ARM-3r. Alternative 3 does not propose the addition of any motorized trails to the NFTS and would prohibit use of all 35 miles of motorized trails un-authorized for motorized use located within serpentine/copper/heavy metal plant communities.

Older Forest Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres of cross country travel including miles of motorized trails un-authorized for motorized use that pass through older forests. (The miles of motorized trail un-authorized for motorized use that pass through older forests (CWHR 4 and above) is the indicator used to analyze impacts to unsurveyed older forest habitats. Table J-11 displays the number of miles of motorized trail un-authorized for motorized use proposed for addition to the NFTS in older forest plant communities by alternative.)

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact older forest plant communities and the sensitive species dependent on them**.** Alternative 1 does not prohibit

cross country travel on 330,200 acres which includes 627 miles of motorized trails un-authorized for motorized use. Under implementation of Alternative 1 as yet undiscovered sensitive species occurrences dependent on older forest plant communities would be at risk as new motorized trails were created. It is expected that cross country use would damage at least some sensitive species occurrences (if they are present on TNF system lands) and it is reasonable to expect that some occurrences would be lost even though older forest plant communities are not considered open terrain.

There are about 353,631 acres of older forest on TNF system lands, of which 29,900 acres or about 9 percent are currently, impacted by motorized vehicle use. This acreage number was obtained using about 100 feet on either side of motorized trails that pass through vegetation mapped as CWHR 4 and above on NFS lands. The significance of eleven percent disturbance is unknown.

Direct impacts to sensitive species dependent on older forest plant communities from implementation of Alternative 1 could be significant at least at the local, site specific level. Cross country use could kill and/or injure these older forest dependent sensitive species directly, and indirectly kill or injure them through soil changes and the introduction and spread of weeds. Cross country use would also damage other native vegetation in these plant communities increasing the risk of erosion and possibly damaging mycorrhizal networks. The significance of direct impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of sensitive species that occur in a specific location and how many of them are damaged.

Several occurrences of *Cypripedium fasciculatum* are currently impacted by maintenance of NFTS roads. Over the long term, cross country motorized vehicle use could kill significant numbers of these plants and occurrences could be lost. In addition, introduction of weeds could eventually eliminate the occurrences. Non native blackberries have been introduced near the roadside occurrences of this orchid in the Rock Creek area. This aggressive weed could eventually displace the orchids in this area. Implementation of Alternative 1 could significantly impact occurrences of *Cypripedium fasciculatum* over the long term.

Cross country impacts to older forest plant communities containing sensitive species would be considered significant. It is impossible to know when or where cross country motorized vehicle use would occur, so these disturbances are difficult to quantify. Since Alternative 1 does not prohibit cross county travel, the risk of significant impacts to sensitive species that may occur within unsurveyed potential habitats and within known occurrences is higher than the action alternatives. Reducing and/or eliminating impacts to sensitive species are considered effective methods of reducing cumulative impacts to them. However, flag and avoid is not a practical mitigation when cross country travel is not prohibited. Not prohibiting cross country travel on 330,200 acres including 627 miles of motorized trails un-authorized for motorized use greatly increases the risk of negative indirect impacts to sensitive species.

Action alternatives: All of the action alternatives prohibit cross country travel 330,200 acres including 627 miles of motorized trails un-authorized for motorized use. Therefore, direct/indirect impacts to sensitive species dependent on older forest plant communities from cross country travel would not occur. Refer to Table J-11.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trails un-authorized for motorized use proposed to be added to the NFTS within older forest plant communities. The miles of proposed additions of motorized trails to the NFTS that pass through older forests (CWHR 4 and above) is the indicator used to analyze impacts to unsurveyed older forest habitats. Table J-11 displays the number of miles of motorized trails to be added to the NFTS in older forest plant communities by alternative.
- Sensitive species (associated with older forests) located within 100 feet of proposed motorized trail additions to the NFTS. Surveys to date have shown that *Cypripedium fasciculatum* is located within 30 feet of several NFTS roads.
- Weed occurrences located within 100 feet of proposed motorized trail additions to the NFTS. Surveys to date have identified Himalayan blackberry along a NFTS road that is within about 200 feet of an occurrence of *Cypripedium fasciculatum*.

Table J-11. Miles* of motorized use within older forest plant communities by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	1,088	1,088	1,088	1,088	1,088	1,088	1,088
Private/other jurisdiction roads	220	220	220	220	220	220	220
Cross country travel (acres)	330,200	0	0	0	0	0	0
Motorized trails un-authorized for motorized use (miles)	627	0	0	0	0	0	0
Additions to the NFTS	0	36	0	17	141	33	22
Subtotal Motorized	**1934**	**1344**	**1307**	**1325**	**1449**	**1341**	**1330**

*Miles are approximate

No Action: Alternative 1 does not add any motorized trails to the NFTS. Implementation of Alternative 1 could impact sensitive species directly and indirectly by continuing use of motorized trails un-authorized for motorized use within older forest plant communities. Refer to Table J-11 which shows the miles of motorized trails un-authorized for motorized use within these plant communities by alternative. Implementation of Alternative 1 could also directly impact sensitive species through use of about 1,088 miles of NFTS roads and trails located within these plant communities. Direct and indirect impacts could be significant.

Surveys of over 62 miles of motorized trails un-authorized for motorized use have been completed to date. Sensitive species dependent on older forests were not found in those surveys. No new weed occurrences were found in older forest plant communities in these surveys.

Action Alternatives: Implementation of Alternative 5 proposes the most miles of additions to the NFTS in these plant communities – 141 miles. Therefore, implementation of Alternative 5 has the greatest risk of negative impacts to sensitive species dependent on older plant communities of the action alternatives. These are primarily indirect impacts from dust and increases weed introduction and spread. Since Alternative 5 proposes adding NFTS Maintenance Level 1 and temporary roads to the NFTS that do not have current botanical surveys, there is a risk that older forest dependent species will be directly impacted along those motorized trails. Sensitive plant occurrences found in the FY 2008 surveys will be

protected (impacts will be reduced and/or eliminated) from the direct impacts of motorized vehicles. Indirect impacts such as covering them in dust and increased risk of weed introduction and spread would still occur. However, if these plants occur within 30 or 100 feet of the NFTS Maintenance Level 1 or temporary roads proposed for addition as motorized trails under Alternative 5 (refer to the alternative description in Chapter 2 of the DEIS for a listing) they will remain undetected and will continue to be directly and indirectly impacted.

Alternative 2 proposes to add 36 miles of motorized trail un-authorized for motorized use in older forest plant communities. Alternative 6 would add 33 miles, Alternative 7 – 33 miles, and Alternative 4 – 17 miles. All sensitive plant occurrences found in the FY 2008 surveys (as mentioned earlier none were found in the FY 2007 surveys) will have actions implemented to reduce and/or eliminate direct impacts from motorized vehicles. If occurrences are found on or along motorized trails proposed in Alternatives 2, 4, 6, or 7; they will be indirectly impacted through dust and increased risk of weed introduction and spread. Again, refer to the Weed Risk Assessment located in Appendix M of the DEIS for more information about weed introduction and spread.

Alternative 3 does not propose the addition of any motorized trails to the NFTS within older forest plant communities. Implementation of Alternative 3 would not directly or indirectly impact sensitive species.

3. Changes in class of vehicle and season of use

Indicator(s) used to measure effects: No indicators were chosen to measure effects of changing the class of vehicle or season of use. Refer to the following discussion.

No Action: Alternative 1 does not change the class of vehicle or the season of use of motorized trails located within older forest plant communities. It is expected that implementation of Alternative 1 would have the greatest amount of motorized trail damage and associated erosion since it does not prohibit use of the motorized trails un-authorized for motorized use and does not have wet weather restrictions.

Action Alternatives: Changing the class of vehicle that is allowed to use a motorized trail does not differ by action alternative since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007).

Impacts to sensitive species dependent on older forest plant communities from changing the season of use is difficult to quantify. Refer to section 3.02 (Soils and Watershed) of the DEIS. Implementing seasonal restrictions could help to reduce rutting and subsequent channeling of surface water and runoff since it is believed that much of the damage to motorized trails is caused during the wet season. It is reasonable to assume that those motorized trails that have older forest dependent sensitive species within 30 or 100 feet of the motorized trail would benefit from a seasonal closure of the motorized trail because the occurrence would experience fewer effects from erosion of the motorized trail. It is impossible to quantify when and where erosion will occur, and how much erosion will occur. This analysis assumes that motorized trails will be maintained and erosion from them will be reduced and/or eliminated in the short and long term.

Wet weather seasonal restrictions are proposed in Alternatives 4, 5 and 6. Alternative 3 would continue the seasonal restrictions as specified in the TNF LRMP and contained in existing Forest Orders.

Of the action alternatives, Alternatives 2 and 7 have the most native surface motorized trails open year round.

The conditions of NFTS motorized trails and motorized trails un-authorized for motorized use can change rather quickly when climatic conditions and motorized vehicle use combined change the condition of the soil/water/vegetation. It is expected that implementing wet weather restrictions will reduce but not eliminate the amount of rut formation on NFTS motorized trails. Implementation of the mitigations listed in Appendix A (Road Cards) of the DEIS will further reduce erosion from these motorized trails.

4. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact older forest plant communities and the sensitive species dependent on them as well as the benefits from prohibiting the use of motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by implementing frequent evaluation of motorized trails, mitigations implemented to reduce impacts to sensitive species, and detection/treatment of weeds. This motorized trail evaluation combined with rapid mitigation of resource damage avoids significant impacts to older forest plant communities and the sensitive species dependent on them in the short and long term.

Past: Many older forest plant communities in the Sierra Nevada have been directly removed or have had their functions impaired. Late-successional older forests of middle elevations (westside mixed conifer, red fir, white fir, eastside mixed conifer, and eastside pine types) at present constitute 7 to 30 percent of the forest cover, depending on forest type (Sierra Nevada Ecosystem Project 1996). It is reasonable to expect that the native plant (and animal) species dependent on older forest plant communities have also experienced a decline in range and population viability since pre-settlement times. For example, sensitive fungi are dependent on specific vegetation (hosts) and certain amounts of leaf litter/duff. These habitat components for fungi have been historically reduced and/or eliminated through the removal of vegetation and alteration of older forest plant communities. In addition, the underground mycelial network has been broken through the creation of openings such as clearcuts and roads. Past management activities have cumulatively reduced the amount of older forest within TNF watersheds that would be suitable habitat for: *Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa,* and *Phaeocollybia olivacea*. The amount of reduction is unknown. Motorized vehicle use has added to the cumulative impacts to older forest plant communities.

Current: In this analysis, older forest is described as occurring in the red fir/upper montane forest and mixed-conifer forest. Other vegetation types exist that also have older trees, but mixed conifer and red fir are the primary types of older forest analyzed in this document. For more information about old forests, refer to the SNFPA (2001).

As mentioned previously, there are about 353,600 acres of older forest on TNF system lands, of which 29,900 acres or about 9 percent are currently, impacted by motorized vehicle use. This acreage number was obtained using about 100 feet on either side of motorized trails that pass through vegetation mapped as CWHR 4 and above on NFS lands. The significance of this percentage is unknown. Refer to

the wildlife Biological Evaluation located in Appendix L of the DEIS for a discussion of cumulative effects to older forest dependent animal species. Effects (that contribute to cumulative effects primarily from use of NFTS motorized trails) to known occurrences of the older forest dependent sensitive plant species – *Cypripedium fasciculatum* are discussed below.

There are 6 known *Cypripedium fasciculatum* occurrences within the TNF boundary. One of the 6 known occurrences on TNF system lands, one occurrence contains only 3 plants (Lafayette Ridge occurrence). Of the remaining 5 known occurrences on TNF system lands, 4 are being indirectly impacted by dust and have an increased risk of weed infestation due to motorized vehicle use of existing NFTS roads. *Cypripedium fasciculatum* occurrences are known to be located along the 25-28 road (50 plants directly above the road), the Rock Creek road (less than 50 plants some located directly adjacent to the road), the Madrone Springs road (about 20 plants located on the road cut bank), and the largest occurrence (about 350 plants) located at the end of a road near Old Condon Mill. (Note that the 25-28 road is analyzed for decommissioning in the Canyon Project – FY 2008.)

Reasonably foreseeable: Over the long term, with continued disturbance, older forest plant communities will continue to be fragmented through implementation of current and reasonably foreseeable management actions. In general terms, motorized vehicle use of NFTS motorized trails creates linear disturbances. As mentioned previously, there are 1088 miles of NFTS motorized trails on TNF lands. The impacts of linear disturbances within older forest plant communities are not fully studied. The fuel reduction/timber harvest activities identified in Table J-6 impact older forests but must retain some older forest characteristics due to SNFPA direction for maintenance of specific canopies and retention of larger trees. Projects other than fuel reduction/timber harvest also impact older forest plant communities. Special uses projects such as utility corridor construction and maintenance also occur within older forests. They pass through older forest plant communities disturbing the soil and removing vegetation – for example, in patches around cabins or under power lines. Mining projects are also known to impact older forest plant communities by removing all vegetation in some areas. Livestock grazing does not or only minimally impacts older forest plant communities. For example, livestock are known to bed down in older forest plant communities at the edge of meadows.

No action: Implementation of Alternative 1 cumulatively impacts older forest plant communities. When past impacts and the impacts of implementing Alternative 1 are added to the impacts of those actions identified in Table J-6, those impacts could be significant. Alternative 1 does not prohibit cross country travel on 330,200 acres including 627 miles of motorized trails un-authorized for motorized use that are located in older forest plant communities. (Implementation of the temporary order that prohibits cross country travel for up to two years will limit the negative impacts of new motorized trails – at least during the temporary order time frame.) Older forests are not considered sparsely vegetated and the ability to drive across the terrain is somewhat limited. However, surveys to date have shown that motorcycles are not limited in their ability to drive cross country through older forest plant communities. Refer to the project files and the survey records of specific motorized trails.

When the impacts of all past, current and reasonably foreseeable management actions are added together, the possible impacts of cross country travel including use of motorized trails un-authorized for motorized use and NFTS motorized trails within older forests has the potential to significantly impact

older forests and the sensitive species dependent on them over the long term (5 years plus). The majority of the known older forest dependent *Cypripedium fasciculatum* plants are currently being indirectly impacted by dust from use of NFTS motorized trails – estimated at about 90 percent. The significance of this indirect impact (dust) is unknown. In addition, one of the known occurrences of *Cypripedium fasciculatum* is currently at risk of Himalayan blackberry infestation (blackberries within 100 feet of individual plants). One of the biggest impacts of disturbance of any kind is the introduction and spread of weeds. Refer to Appendix M (Weed Risk Assessment) of the DEIS for more discussion of how weeds are introduced and spread within older forest plant communities.

Action alternatives: All action alternatives would reduce the number of miles open for motorized vehicles in older forest plant communities. However, implementation of the action alternatives could cumulatively impact sensitive species dependent on older forest plant communities. Surveys to date (over 62 miles) have not detected any sensitive species along proposed motorized trails that are older forest plant community dependent. However, past management activities have cumulatively reduced the amount of older forest plant communities within TNF watersheds and use of NFTS motorized trails adds to those cumulative impacts. The significance of the addition of impacts to older forest plant communities from use of NFTS motorized trails to cumulative effects is unknown and is not being analyzed in this document other than the acknowledgement that use of NFTS motorized trails contributes to cumulative effects. Some of the unsurveyed motorized trails pass through older forest plant communities and may have sensitive species present. This is unknown until the surveys are complete. None of the reasonably foreseeable actions listed in Table J-6 are expected to significantly impact older forest plant communities on their own because the reasonably foreseeable projects listed are not located within older forest plant communities and/or will retain the largest trees, large down wood, and will not significantly reduce canopy closure.

As mentioned previously, older forest plant communities in the Sierra Nevada have been directly removed or have had their functions impaired. Given the past history of the Sierra Nevada's, it is reasonable to expect that the plant and fungi species dependent on older forest conditions have experienced a significant decline in range and population viability since pre-settlement times (although this assumption is unproven).

Alternative 5: Implementation of Alternative 5 cumulatively impacts older forest plant communities and the sensitive species dependent on them. Implementation of Alternative 5 has the greatest number of miles of motorized vehicle road/trail/area within older forest plant communities (1,449 miles) of all of the action alternatives. Surveys of NFTS and temporary motorized trails proposed in Alternative 5 were done over 5 years ago and are not considered current. About 149 miles of Management Level 1 roads that proposed in Alternative 5 do not have current botanical surveys and may have occurrences of sensitive species and weeds. Occurrences of sensitive species along these motorized trails may be experiencing negative impacts from motorized vehicle use.

Of the action alternatives Alternative 5 also has the most miles of NFTS roads and motorized trails located within older forests. Therefore implementation of Alternative 5 has the greatest risk of negatively impacting older forest plant communities and the sensitive species dependent on them. The significance of possible impacts is dependent on the sensitive species and the amount of impact.

Alternatives 2 and 6: Implementation of Alternatives 2 and 6 could cumulatively impact *Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa,* and/or *Phaeocollybia olivacea* primarily through dust and increased risk of weed introduction and spread. Those impacts are not considered significant even when added to past, current, and reasonably foreseeable future management actions because all motorized trails proposed in these alternatives will be surveyed and impacts to sensitive species will be mitigated. The risk of negative impacts due to implementation of Alternatives 2 and 6 is less than under implementation of Alternative 1 due to the prohibition of cross country travel. As described above, Alternative 2 proposes the addition of 36 miles of motorized trails to the NFTS and Alternative 6 proposes 33 miles. Both alternatives prohibit use on about 94-95 percent of the motorized trails un-authorized for motorized use located within older forest plant communities.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 could cumulatively impact *Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa,* and/or *Phaeocollybia olivacea* primarily through dust and increased risk of weed introduction and spread. Those impacts are not considered significant even when added to past, current, and reasonably foreseeable future management actions because all motorized trails proposed in these alternatives will be surveyed and impacts to sensitive species will be mitigated. The risk of negative impacts due to implementation of Alternatives 4 and 7 is less than under implementation of Alternative 1 due to the prohibition of cross country travel. As described above, Alternative 4 proposes the addition of 17 miles of motorized trails un-authorized for motorized use to the NFTS and Alternative 7 proposes 22 miles. Both alternatives prohibit use on about 97 and 96 percent of the motorized trails un-authorized for motorized use located within older forest plant communities.

Alternative 3: Implementation of Alternative 3 could cumulatively impact *Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa,* and/or *Phaeocollybia olivacea* primarily through dust and increased risk of weed introduction created by use of NFTS motorized trails. However, implementation of Alternative 3 has the least number of miles of motorized trail available for use within older forest plant communities and has the least risk of cumulative impacts to sensitive species that require older forest plant communities of all of the action alternatives. Alternative 3 does not proposed additions to the NFTS of motorized trails un-authorized for motorized use and prohibits cross country travel. Alternative 3 prohibits use on 100 percent of the motorized trails un-authorized for motorized use located within older forest plant communities.

Oak Woodland Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Cross country travel on 13,500 acres which includes 19 miles of motorized trails un-authorized for motorized use that pass through oak woodlands.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact oak woodland plant communities and the sensitive species within them**.** Alternative 1 does not prohibit cross country travel on 13,500 acres of oak woodland plant communities or 19 miles of motorized trail un-

authorized for motorized use. Under implementation of Alternative 1 as yet undiscovered sensitive species occurrences within oak woodland plant communities would be at risk as new motorized trails were created. It is expected that cross country use would damage at least some sensitive species occurrences (if they are present on TNF system lands) and it is reasonable to expect that some occurrences would be lost. Oak woodland plant communities are considered fairly open terrain.

There are about 13,886 acres of oak woodland on TNF system lands, with about 22 miles of NFTS roads and motorized trails. Cross country use by motorized vehicles is currently prohibited on about 386 acres. As noted above, 13,500 acres currently do not have cross country travel prohibited on them. These 13,500 acres have about 19 miles of motorized trails un-authorized for motorized use.

Direct impacts to sensitive species from implementation of Alternative 1 could be significant at least at the local, site specific level. Cross country use could kill and/or injure sensitive species directly, and indirectly kill or injure them through soil changes and the introduction and spread of weeds. Cross country use would also damage other native vegetation in these plant communities by increasing the risk of erosion. The significance of direct impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of sensitive species that occur in a specific location and how many of them are damaged. Currently there are no sensitive species on the TNF list that are oak woodland plant community dependent. However, several of the sensitive species on the TNF list could grow in oak woodlands.

Cross country impacts within oak woodland plant communities containing sensitive species would be considered significant. It is impossible to know when or where cross country motorized vehicle use would occur, so these disturbances are difficult to quantify. Since Alternative 1 allows cross county travel, the risk of significant impacts to sensitive species that may occur within unsurveyed potential habitats is higher than in the action alternatives. Reducing and/or eliminating impacts to sensitive species are considered effective methods of reducing cumulative impacts to them. However, flag and avoid is not a practical mitigation when cross country travel is allowed. Allowing unrestricted motorized vehicle use across the forest greatly increases the risk of negative indirect impacts to sensitive species.

Action alternatives: All of the action alternatives prohibit cross country travel. Therefore, direct impacts to sensitive species within oak woodland plant communities from cross country travel would not occur. Refer to Table J-12. Alternative 5 prohibits use on 17 of the 19 miles (90 percent) of motorized trails un-authorized for motorized use that are located within oak woodland plant communities. All of the other action alternatives (including Alternative 3) prohibit use on about 19 miles of motorized trails un-authorized for motorized use in oak woodlands.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trail proposed to be added to the NFTS within oak woodland plant communities.

No Action: Alternative 1 does not add motorized trails to the NFTS.

Surveys of over 62 miles of motorized trail un-authorized for motorized use have been completed to date. No sensitive species or new weed occurrences were found in oak woodlands during those surveys.

Table J-12. Miles* of road/trail/area within oak woodland plant communities by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	22	22	22	22	22	22	22
Private/other jurisdiction roads	19	19	19	19	19	19	19
Cross country travel (acres)	13,500	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	19	0	0	0	0	0	0
Additions to NFTS	0	<1	0	<1	2	<1	<1
Subtotal Motorized	**60**	**41**	**41**	**41**	**43**	**41**	**41**

*Miles are approximate

Action Alternatives: All action alternatives would reduce the number of miles of motorized vehicles use in oak woodland plant communities. Refer to Table J-12 which shows the miles of proposed additions to the NFTS within these plant communities by alternative. None of the action alternatives add significant numbers of miles of motorized trail un-authorized for motorized use to the NFTS. Alternative 5 proposes one mile of additions to the NFTS in these plant communities. Therefore, of the action alternatives, implementation of Alternative 5 has the greatest risk of negative indirect impacts to sensitive species that may occur within oak woodland plant communities. Possible impacts would be primarily indirect impacts from dust and increased weed introduction and spread. In addition, many of the NFTS Maintenance Level 1 and temporary roads proposed under Alternative 5 do not have current botanical surveys and there is a risk that sensitive species could be impacted if they occur along them. Alternatives 2, 4, 6, and 7 all add less than mile of motorized trail un-authorized for motorized use to the NFTS. This is less than one percent of the motorized trails un-authorized for motorized use located within oak woodlands. Alternative 3 does not propose the addition of any motorized trails within oak woodlands and would not directly impact sensitive species through motorized vehicle use of those motorized trails.

Sensitive plant occurrences found in the FY 2008 surveys will be protected (impacts will be reduced and/or eliminated) from the direct impacts of motorized vehicles. Indirect impacts such as covering them in dust and increased risk of weed introduction and spread would still occur. However, if sensitive species occur within 30 or 100 feet of the motorized trails without current surveys proposed in Alternative 5 (refer to the alternative description in Chapter 2 of the DEIS for a listing) they will remain undetected and will continue to be directly and indirectly impacted.

3. Changes in class of vehicle and season of use

Indicator(s) used to measure effects: No indicators were chosen to measure effects of changing the class of vehicle or season of use. Refer to the following discussion.

No Action: Alternative 1 does not change the class of vehicle or the season of use of motorized trails located within older forest plant communities. It is expected that implementation of Alternative 1 would have the greatest amount of motorized trail damage and associated erosion since it does not prohibit use of the motorized trails un-authorized for motorized use and does not have wet weather restrictions.

Action Alternatives: Changing the class of vehicle that is allowed to use a motorized trail does not differ by action alternative since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007).

Impacts/benefits to sensitive species located within oak woodland plant communities from changing the season of use is difficult to quantify. Refer to section 3.02 (Soils and Watershed) of the DEIS. Implementing seasonal restrictions could help to reduce rutting and subsequent channeling of surface water and runoff since it is believed that much of the damage to motorized trails is caused during the wet season. It is reasonable to assume that those motorized trails that have sensitive species within 30 or 100 feet of the motorized trail would benefit from a seasonal closure of the motorized trail because the occurrence would experience fewer effects from erosion of the motorized trails. It is impossible to quantify when and where erosion will occur, and how much erosion will occur. This analysis assumes that motorized trails will be maintained and erosion from them will be reduced and/or eliminated in the short and long term.

Wet weather seasonal restrictions are proposed in Alternatives 4, 5 and 6. Alternative 3 would continue the seasonal restrictions as specified in the TNF LRMP and contained in existing Forest Orders. Of the action alternatives, Alternatives 2 and 7 have the most native surface motorized trails open year around.

The conditions of NFTS motorized roads and trails and motorized trails un-authorized for motorized use can change rather quickly when climatic conditions and motorized vehicle use combined change the condition of the soil/water/vegetation. It is expected that implementing wet weather restrictions will reduce but not eliminate the amount of rut formation on NFTS motorized trails. Implementation of the mitigations listed in Appendix A (Road Cards) of the DEIS will further reduce erosion from these motorized trails.

4. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact oak woodland plant communities and the sensitive species that may occur within them, as well as the benefits from prohibiting the use of motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by implementing frequent evaluation of motorized trails, mitigations implemented to reduce impacts to sensitive species, and detection/treatment of weeds. This motorized trail evaluation combined with rapid

mitigation of resource damage avoids significant impacts to oak woodlands plant communities and sensitive species in the short and long term.

Past: As identified previously, California's oak woodlands have experienced extensive historic disturbance. No other ecosystem in the Sierra Nevada has experienced more human influence over a longer time period than the oak woodlands (Anderson in SNFPA 2001). The amount and health of oak woodland plant communities has been reduced across the State.

Current: Motorized vehicles impact TNF oak woodlands by: introducing and spreading weeds, damaging native vegetation, increasing soil erosion, and fragmenting habitats. Refer to Table J-12 for the number of miles of proposed addition to the NFTS by alternative. Other on going projects on the forest that impact oak woodlands include: special uses projects such as utility corridor construction and maintenance that pass through and impact many different types of plant communities including oak woodland; minerals operations that remove native vegetation and recontour the landscape; and livestock grazing projects. The TNF does not have any sensitive plants or fungi that are entirely dependent on oak woodlands. However, several sensitive plant species are known to occur in oak woodlands including *Clarkia biloba* ssp. *Brandegeae*.

Reasonably foreseeable: When the past and current impacts are added to the impacts of the reasonably foreseeable future actions identified in Table J-6, risks to oak woodlands increase. Some of the oak woodland plant communities managed by the TNF are located in steep inner gorges. The TNF has some oak tree species that occur within mixed conifer plant communities - but mixed conifer plant communities are not considered oak woodlands. Even though mixed conifer plant communities are not oak woodlands, the oaks that occur within them are considered valuable resources. Therefore, some of the fuel reduction/timber harvest activities identified in Table J-6 retain some oaks within mixed conifer plant communities and remove conifers allowing oaks to receive more light and nutrients – for example the Canyon Forest Health project. However, very few fuel reduction activities and no timber harvest activities occur in oak woodlands on the TNF. The biggest impact of disturbance of any kind within oak woodlands is the risk of introduction and spread of weeds.

No action: Implementation of Alternative 1 allows cross country use within TNF oak woodland plant communities and carries the greatest risk of negative impacts to those plant communities. There are no known occurrences of sensitive species located within oak woodlands on TNF system lands. However, there is a high risk of weed infestation in these lower elevations. Cross country travel would spread weeds. Refer to Appendix M (Weed Risk Assessment) of the DEIS for the effects of weed infestation. In summary, weeds can displace sensitive species if the weeds become established and spread within occurrences. Weed introduction and spread within sensitive species occurrences is considered a significant long term impact. Therefore, when the impacts of all past, current and reasonably foreseeable management actions are added together, the possible impacts of cross country travel and use of motorized trails un-authorized for motorized use located within oak woodlands has the potential to significantly impact sensitive species over the long term (5 years plus). Any sensitive species discovered within oak woodlands in the FY 2008 surveys would have mitigations implemented to reduce and/or eliminate direct impacts. However, indirect impacts from dust and increased risk of weed introduction and/or spread would occur.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles of motorized vehicle use in oak woodlands. However, implementation of the action alternatives could cumulatively impact sensitive species located within oak woodlands even though surveys to date (over 62 miles) have not detected any sensitive species in them. Past management activities have cumulatively reduced the amount of oak woodland within TNF watersheds. Motorized vehicle use adds to the cumulative impacts to oak woodland plant communities, but the significance of those impacts is unknown. Refer to the discussion of impacts to oak woodland plant communities under the no action alternative.

Alternative 5: Compared to Alternative 1, implementation of Alternative 5 has less risk of negative impacts to sensitive plants/fungi within oak woodlands primarily because cross country travel is prohibited. Of the action alternatives, implementation of Alternative 5 carries the highest risk of negative impacts to oak woodland plant communities since it has the largest number of NFTS and motorized trails. Alternative 5 proposes the addition of 7 short NFTS Maintenance Level 1 roads or temporary roads that do not have current botanical surveys for a total of one additional mile added to the NFTS within oak woodland plant communities. Compared to Alternative 1, Alternative 5 reduces cumulative impacts to oak woodland plant communities by prohibiting motorized use on about 90 percent of the motorized trails un-authorized for motorized use in these plant communities.

Alternatives 2, 3, 4, 6, and 7: These action alternatives propose the addition of less than one mile of motorized trail un-authorized for motorized use within oak woodlands and prohibit use on 95 percent of the motorized trails un-authorized for motorized use. This is not considered a significant addition to cumulative impacts to oak woodlands or the sensitive species that may be growing there. The less than one mile of motorized trail un-authorized for motorized use will be surveyed in FY 2008 and if sensitive species are found, they will have mitigations developed and implemented to reduce or eliminate direct impacts. Indirect impacts could still occur from dust and increased risk of weed introduction and spread.

Forest Edges and Openings

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres of forest edge and opening plant communities where cross country travel is prohibited.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact the sensitive species dependent on forest edges and openings. Over the long term (5 years plus) those impacts could be significant. Alternative 1 does not prohibit cross country travel on 498,700 acres with 925 miles of motorized trails un-authorized for motorized trails. Under implementation of Alternative 1 known and as yet undiscovered sensitive species occurrences would be at risk as new motorized trails were created. It is expected that long term cross country use could damage at least some sensitive species occurrences and it is reasonable to expect that some occurrences would be lost.

The about 498,700 acres of forest edges and openings has about 1,708 miles of NFTS roads and motorized trails. (Note: there is overlap between these plant communities and aquatic/riparian, serpentine, older forest, and oak woodland plant communities. Therefore the acres and number of miles of motorized

trails un-authorized for motorized use present in forest edge and openings plant communities contains some of the acres and miles shown in other plant communities and the totals from all plant communities do not add up to 1,400 miles.)

Direct impacts to sensitive species from cross country use could be significant at least at the local, site specific level. The significance of direct and indirect impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of sensitive species that occur in a specific location and how many of them are damaged. Occurrences of *Clarkia biloba* ssp. *Brandegeae*, *Fritillaria eastwoodiae*, *Lewisia kelloggii* ssp. *hutchisonii*, *Lupinus dalesiae*, and *Phacelia stebbinsii* are known to be impacted by use of NFTS motorized trails.

Cross country impacts within forest edges and openings containing sensitive species would be considered significant. It is impossible to know when or where cross country motorized vehicle use would occur, so these disturbances are difficult to quantify. Since Alternative 1 does not prohibit cross county travel, the risk of significant impacts to sensitive species is higher than in the action alternatives. Reducing and/or eliminating impacts to sensitive species through flag and avoid methods is not a practical mitigation when cross country travel is allowed. Not prohibiting cross country travel greatly increases the risk of negative impacts to sensitive species.

Action alternatives: All of the action alternatives prohibit cross country on 498,700 acres of forested edges and openings which includes 925 miles of motorized trails un-authorized for motorized use. Therefore, direct/indirect impacts to sensitive species within forest edges and openings from cross country travel would not occur. Refer to Table J-13.

Table J-13. Miles of motorized use within forested plant communities* by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	1,708	1,708	1,708	1,708	1,708	1,708	1,708
Private/other jurisdiction roads	289	289	289	289	289	289	289
Cross country travel (acres)	498,700	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	925	0	0	0	0	0	0
Additions to the NFTS	0	43	0	16	191	45	26
Total Motorized	**2922**	**2040**	**1997**	**2013**	**2188**	**2042**	**2023**

* Forested plant communities are those that are not considered older forest, oak woodland, aquatic/riparian, high elevation opening/rocky area, and serpentine. Miles represent motorized trails that pass within 100 feet of forested plant communities. Miles are approximate and NFS lands only.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trails to be added to the NFTS within forest edges and openings.

No Action: Alternative 1 does not add motorized trails to the NFTS.

Action Alternatives: Table J-13 shows the miles of motorized trails to be added to the NFTS within these plant communities by alternative. Alternative 5 adds 191 miles of motorized trails to the NFTS or about 20 percent of the motorized trails un-authorized for motorized use in forest edges and openings.

Alternatives 2 and 6 add 43 and 45 respectively or about 5 percent. Alternatives 4 and 7 add 16 and 26 miles respectively- about 2 and 3 percent of the motorized trails un-authorized for motorized use. Alternative 3 does not propose the addition of any motorized trail within forest edges and openings and would not directly or indirectly impact sensitive species through use of motorized trails un-authorized for motorized use.

Sensitive plant occurrences found in the FY 2008 surveys will have direct motorized vehicle impacts reduced and/or eliminated through implementation of mitigations for them. Indirect impacts such as covering them in dust and increased risk of weed introduction and spread would still occur. However, if sensitive species occur within 30 or 100 feet of the NFTS Maintenance Level 1 or temporary roads proposed in Alternative 5 (refer to the alternative description section of this document for a listing) they will remain undetected and will continue to be directly and indirectly impacted. The significance of impacts to sensitive species varies by such factors as sensitive species, amount of disturbance, and location.

3. Changes in class of vehicle and season of use

Indicator(s) used to measure effects: No indicators were chosen to measure effects of changing the class of vehicle or season of use. Refer to the following discussion.

No Action: Alternative 1 does not change the class of vehicle or the season of use of motorized trails un-authorized for motorized use that are located within forest edge and opening plant communities. It is expected that implementation of Alternative 1 would have the greatest amount of motorized trail damage and associated erosion since it does not prohibit use of the motorized trails un-authorized for motorized use and does not have wet weather restrictions.

Action Alternatives: Changing the class of vehicle that is allowed to use a motorized trail un-authorized for motorized use does not differ by action alternative since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007).

Impacts/benefits to sensitive species located within forest edges and openings from changing the season of use is difficult to quantify. Refer to section 3.02 (Soils and Watershed) of the DEIS. Implementing seasonal restrictions could help to reduce rutting and subsequent channeling of surface water and runoff since it is believed that much of the damage to motorized trails is caused during the wet season. It is reasonable to assume that those motorized trails that have sensitive species within 30 or 100 feet of the motorized trail would benefit from a seasonal closure of the trail because the occurrence would experience fewer effects from erosion of the trail. It is impossible to quantify when and where erosion will occur, and how much erosion will occur. This analysis assumes that motorized trails will be maintained and erosion from them will be reduced and/or eliminated in the short and long term.

Wet weather seasonal restrictions are proposed in Alternatives 4, 5 and 6. Alternative 3 would continue the seasonal restrictions as specified in the TNF LRMP and contained in existing Forest Orders. Of the action alternatives, Alternatives 2 and 7 have the most native surface motorized trails open year around.

The conditions of NFTS motorized roads and trails and motorized trails un-authorized for motorized use can change rather quickly when climatic conditions and motorized vehicle use combined change the

condition of the soil/water/vegetation. It is expected that implementing wet weather restrictions will reduce but not eliminate the amount of rut formation on NFTS motorized trails. Implementation of the mitigations listed in Appendix A (Road Cards) of the DEIS will further reduce erosion from these motorized trails.

4. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact forest edges and openings and the sensitive species that may occur within them, as well as the benefits from prohibiting cross county motorized vehicle travel and use of motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by implementing frequent evaluation of motorized trails, mitigations implemented to reduce impacts to sensitive species, and detection/treatment of weeds. This motorized trail evaluation combined with rapid mitigation of resource damage avoids significant impacts to forest edges and openings and sensitive species in the short and long term.

Past: Plants that are dependent on openings and edges within forested plant communities are not considered habitat specific and the habitats are not considered limited. Management activities have occurred on TNF system and privately owned lands for over a century. This long history of disturbance has contributed to the lack of an undisturbed reference for most species. Therefore, it is not possible to quantify how these past management activities have impacted sensitive plants/fungi. In addition, past management has created conditions on the landscape that frequently contribute to cross country travel through the creation of skid trails and temporary roads. For example, temporary roads that were created during timber harvest projects are generally blocked off where they connect to NFTS roads and trails once the project has been implemented. The temporary road may not be decommissioned because future silvicultural projects are planned. In a number of areas motorized vehicle users have removed the barriers blocking the temporary road and/or have gone around the barriers. Continued use of the temporary road creates a motorized trail that has not been designed for motorized use over the long term. Past management activities have cumulatively added to the amount of forest edge and opening habitats but it is unknown if the edge and opening habitats created were suitable for: *Astragalus webberi, Calochortus clavatus* var. *avius, Clarkia biloba* ssp. *brandegeae, Fritillaria eastwoodiae, Lewisia kelloggii* ssp. *hutchisonii, Lewisia kelloggii* ssp. *kelloggii, Lupinus dalesiae, Penstemon personatus*, and *Phacelia stebbinsii*.

Current: Openings and forest edges are constantly being created naturally as trees and other vegetation dies, and lost when shrubs and other vegetation grow into them. Forest edge and opening habitats along motorized trails have frequently become invaded by weeds. Most of the known weed occurrences on the TNF are associated with roads, trails, and landings. Motorized vehicle use is known to increase the risk of weed introduction and spread into new areas, reduce native plant cover, increase erosion, reduce photosynthetic ability of native plants by covering vegetation with dust, change water flow patterns across the landscape, and compact soil. Refer to Appendix M (Weed Risk Assessment) of the EIS. Known impacts to specific sensitive plants are discussed below:

The TNF has limited numbers of *Lewisia kelloggii* var. *hutchisonii* and limited amounts of suitable habitat. Several occurrences are currently being directly and indirectly impacted by cross country motorized vehicle use and use of NFTS motorized trails. The habitat where this plant grows frequently appears barren since this plant completes its life cycle in a period of weeks. Over the long term, continued and increased cross country motorized vehicle use within these occurrences will eventually kill plants through soil compaction, changes in hydrology, and/or direct impacts such as running over them. An example of where these negative impacts are occurring is within the occurrence located along and within road 302-15.

Most of the known occurrences of *Clarkia biloba* ssp. *Brandegeae* on the TNF are growing next to roads. Occurrences are currently being run-over by cross country motorized vehicles. In some areas, invasive exotic weeds have been introduced into these plant communities by motorized vehicles causing a degradation of the habitat for these sensitive plants. For example, the *Clarkia biloba* ssp. *Brandegeae* occurrence located near Mosquito Ridge road is infested with yellow star thistle due in part to people pulling off the road and introducing these weed seeds into new areas. Competition from the yellow star thistle for water and nutrients may eventually kill the *Clarkia biloba* ssp. *Brandegeae* occurrence. Current impacts include reduction of vigor and lack of reproduction of this annual plant, compaction and/or degradation of the soil within the occurrence, and/or changes to water movement where they are growing.

Lupinus dalesiae occurrences are being directly and indirectly impacted by maintenance of NFTS roads in several locations. *Phacelia stebbinsii* plants are being directly and indirectly impacted by motorized vehicle use on NFTS motorized roads and trails and user created motorized trails in the Pierce OHV area. Use of NFTS motorized trails and motorized trails un-authorized for motorized use create dust and increase the risk of weed introduction and spread.

Reasonably foreseeable: Forest edge and opening habitats are cumulatively impacted when past and current impacts are added to the reasonably foreseeable future actions identified in Table J-6. The lower elevation forest edge and opening habitats located along NFTS motorized trails have frequently received weed seed from motorized vehicle use. All of the projects identified on Table J-6 will disturb existing forest edge and openings and/or create new ones. All of the ground disturbing projects identified in Table J-6 will or have already received botanical surveys to identify presence or absence of sensitive species. Where sensitive species are or where found, mitigations are implemented to reduce and/or eliminate impacts to them.

No action: Implementation of Alternative 1 allows cross country use on 498,700 acres containing 925 miles of motorized trails un-authorized for motorized use within NFS forest edge/opening habitats and carries the greatest risk of negative impacts to those habitats. Cross country use could directly and indirectly impact *Astragalus webberi, Calochortus clavatus* var. *avius, Clarkia biloba* ssp. *brandegeae, Fritillaria eastwoodiae, Lewisia kelloggii* ssp. *hutchisonii, Lewisia kelloggii* ssp. *kelloggii, Lupinus dalesiae, Penstemon personatus*, and *Phacelia stebbinsii* (if they occur within the area of cross county use). Predicting where cross country motorized vehicle use would occur is not possible. It is likely that this cross country travel would damage and/or kill sensitive species. In addition, impacts to known occurrences would occur. Impacts could be significant dependent on such factors as the sensitive species being impacted, the number of individuals being impacted, and the severity of the disturbance. For

example, direct impacts to an annual plant (such as *Phacelia stebbinsii*) that has already gone to seed would not be as adverse (as long as significant habitat alteration has not occurred) as direct impacts to an annual plant that has not set seed. If motorized vehicle use impacted a sensitive species to the point that it might not remain viable in an area and the loss of that species in that particular area would substantially influence risks to the entire species, the motorized vehicle use would have significant impacts to that species (Waples et al. 2007). As noted above, it is impossible to know when or where cross country motorized vehicle use would occur but since it would not be prohibited in this alternative, the risk of negative impacts is higher. Since (in general terms) no restrictions would be in place to limit where motorized vehicle use could occur, all sensitive species that can be accessed by motorized vehicles would be at increased risk. Cumulative impacts could be significant. Over the long term, cross country motorized vehicle use could kill significant numbers of sensitive species and the occurrences could be lost. In addition, introduction of weeds could eventually eliminate the occurrences.

Action alternatives: Surveys of over 62 miles of proposed additions to the NFTS thus far have not identified any new occurrences of sensitive species growing in forest edge and opening plant communities. If any sensitive species occurrences are found in the FY 2008 surveys, direct impacts to them (from motorized vehicle use) will be reduced or eliminated. However, indirect impacts from dust and increased risk of weed introduction and spread could still occur. Since these types of plant communities have a high likelihood of having been disturbed in the more recent past, there is a high risk of weeds being present. Many of the proposed additions to the NFTS that pass through these plant communities pass through plantations of various ages. The list of proposed additions to the NFTS that pass through forest edges and openings is located within the project file since it is a long list (9 pages long). However, Table J-13 displays the number of miles of road/trail/area within forested plant communities by alternative.

Alternative 5: Of the action alternatives, implementation of Alternative 5 has the highest risk of indirect and cumulative impacts to forest edge/opening dependent sensitive species since it has the greatest number of NFTS and motorized trail un-authorized for motorized use open for use. However, implementation of Alternative 5 has less risk of indirect/cumulative impacts to sensitive species dependent on forest edges/openings than Alternative 1 because it prohibits cross country travel. Impacts are not considered significant over the short term (5 years or less). Over the long term, the risk of weeds being introduced and spread along the 191 miles of proposed motorized trail additions to the NFTS and 1,708 miles is high. However, it is assumed that routine evaluation of motorized trails will occur by personnel who can identify weed species while the infestation is small in size and easily treated.

Alternatives 2 and 6: Implementation of Alternatives 2 and 6 could indirectly cumulatively impact sensitive species dependent on forest edge and opening habitats but those impacts are not considered significant. Alternatives 2 and 6 prohibit use on about 95 percent of the motorized trails un-authorized for motorized use in forest edge and opening plant communities and do not allow cross country travel by motorized vehicles. If sensitive species occurrences are found along proposed additions to the NFTS, mitigations will be developed to reduce and/or eliminate impacts to them.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 could indirectly and cumulatively impacts forest edge and opening plant communities but those cumulative impacts are not considered

significant. Alternatives 4 and 7 propose fewer additions to the NFTS than Alternatives 1, 2, 5, and 6. Alternatives 4 and 7 add 16 and 26 miles of motorized trails un-authorized for motorized use or about 2 and 3 percent of the motorized trails un-authorized for motorized use to the NFTS within forest edge and opening plant communities. Alternatives 4 and 7 also have a lower risk of introduction and spread of weeds than Alternatives 1, 2, 5, and 6.

Alternative 3: Implementation of Alternative 3 adds to the indirect and cumulative impacts of forest edge and opening plant communities and the sensitive species dependent on them, but those impacts are not considered significant. Alternative 3 does not add any motorized trails to the NFTS. Implementation of Alternative 3 prohibits cross country use. Implementation of Alternative 3 would prohibit use on all 925 miles of motorized trails un-authorized for motorized use but motorized vehicle use would continue on 1,708 miles of NFTS roads and motorized trails. This alternative has the lowest risk of weed introduction and spread which is a benefit for all sensitive species.

High Elevation Openings and Rocky Areas

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres of cross country travel prohibition of the 28,800 acres containing 36 miles of motorized trails un-authorized for motorized use within high elevation openings and rocky areas.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact the sensitive species dependent on high elevation openings and rocky areas. Over the long term (5 years plus) those impacts could be significant. Alternative 1 does not prohibit cross country travel 28,800 acres containing 36 miles of motorized trail un-authorized for motorized use. High elevation openings and rocky areas are generally considered accessible to motorized vehicles. Under implementation of Alternative 1 known and as yet undiscovered sensitive species occurrences would be at risk of impacts from motorized vehicles. Long term cross country use could damage at least some sensitive species occurrences and it is reasonable to expect that some occurrences would be lost.

There are about 43,240 acres of high elevation openings and rocky areas on TNF system lands, with about 79 miles of NFTS roads and motorized trails and 36 miles of motorized trails un-authorized for motorized use located within them.

Direct impacts to sensitive species from cross country use could be significant at least at the local, site specific level. The significance of direct and indirect impacts is dependent on many factors including the amount of disturbance, the sensitive species being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of sensitive species that occur in a specific location and how many of them are damaged. Occurrences of *Erigeron miser* are known to be impacted by use of NFTS motorized trails.

Cross country impacts within high elevation openings and rocky areas containing sensitive species could be significant. These areas are considered highly erosive with harsh growing conditions.

Action alternatives: All of action alternatives prohibit cross country travel on 28,800 acres containing 36 miles and would reduce the number of motorized trails un-authorized for motorized use

miles open for motorized vehicles. Therefore, direct/indirect impacts to sensitive species within high elevation openings and rocky areas from cross country travel would not occur. Refer to Table J-14.

Table J-14. Miles of motorized use within high elevation opening and rocky areas by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	79	79	79	79	79	79	79
Private/other jurisdiction roads	26	26	26	26	26	26	26
Cross country travel (acres)	28,800	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	36	0	0	0	0	0	0
Additions to the NFTS	0	3	0	0	3	3	2
Total Motorized	**141**	**108**	**105**	**105**	**108**	**108**	**107**

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trails proposed to be added to the NFTS within high elevation openings and rocky areas.
- Sensitive species occurrences (associated with high elevation openings and rocky areas) located within 100 feet of proposed additions to the NFTS. (Surveys of over 62 miles of motorized trails un-authorized for motorized use have been completed to date. *Erigeron miser* was found within 100 feet of TKN-J5 and at the end of TKN-J4. The occurrence of *Erigeron miser* located at the end of TKN-J4 is a known occurrence. *Erigeron miser* was also found within 100 feet of one of the YRS-F1 motorized trails. No weeds were found at any of the *Erigeron miser* sites referred to above.)

No Action: Alternative 1 does not add motorized trails to the NFTS.

Action Alternatives: Table J-14 shows the miles of motorized trails added to the NFTS within these plant communities by alternative. Alternatives 2, 5 and 6 add 3 miles of motorized trails to the NFTS or about 8 percent of the motorized trails un-authorized for motorized use in high elevation openings and rocky areas. Alternative 7 adds 2 miles – about 6 percent. Alternatives 3 and 4 do not add miles in high elevation openings and rocky areas and would not directly or indirectly impact sensitive species in those areas.

Erigeron miser occurrences located at the “cement slab” at the end of TKN-J5 and YRS-F1 are both currently being directly and indirectly impacted by use of motorized trails un-authorized for motorized use. Observations (by the author of this evaluation) have shown increased cross country motorized vehicle use within this plant community type on the TNF (compared to ten years ago). TKN-J5 is proposed for addition to the NFTS in Alternatives 2, 5, and 6. YRS-F1 is proposed for addition to the NFTS in Alternatives 2, 5, 6, and 7. Mitigations to reduce impacts to these *Erigeron miser* occurrences are displayed in Appendix A (Road Cards) of the DEIS.

Sensitive plant occurrences found in the FY 2008 surveys will have direct motorized vehicle impacts reduced and/or eliminated through implementation of mitigations for them. Indirect impacts such as covering them in dust and increased risk of weed introduction and spread would still occur. However, if

sensitive species occur within 30 or 100 feet of the NFTS Maintenance Level 1 roads and/or temporary roads proposed for addition to the NFTS in Alternative 5 (refer to the alternative description in Chapter 2 of the DEIS for a listing) they will remain undetected and will continue to be directly and indirectly impacted. The significance of impacts to sensitive species varies by such factors as sensitive species, amount of disturbance, and location.

3. Changes in class of vehicle and season of use

Indicator(s) used to measure effects: No indicators were chosen to measure effects of changing the class of vehicle or season of use. Refer to the following discussion.

No Action: Alternative 1 does not change the class of vehicle or the season of use of motorized trails located within high elevation and rocky opening plant communities. It is expected that implementation of Alternative 1 would have the greatest amount of motorized trail damage and associated erosion since it does not prohibit cross country use or use of motorized trails un-authorized for motorized use, and does not have wet weather restrictions.

Action Alternatives: The effects to sensitive species from changing the class of vehicle that is allowed to use a motorized trail does not differ by action alternative since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007).

Impacts/benefits to sensitive species located within high elevation openings and rocky areas from changing the season of use is difficult to quantify. Refer to section 3.02 (Soils and Watershed) of the DEIS. Implementing seasonal restrictions could help to reduce rutting and subsequent channeling of surface water and runoff and those sensitive species within 30 or 100 feet of the proposed additions to the NFTS could benefit because the occurrence would experience fewer effects from erosion. This analysis assumes that motorized trails will be maintained and erosion from them will be reduced and/or eliminated in the short and long term.

Wet weather seasonal restrictions are proposed in Alternatives 4, 5 and 6. Alternative 3 would continue the seasonal restrictions as specified in the TNF LRMP and contained in existing Forest Orders. Of the action alternatives, Alternatives 2 and 7 have the most native surface motorized trails open year around.

The conditions of NFTS motorized roads and trails and motorized trails un-authorized for motorized use can change rather quickly when climatic conditions and motorized vehicle use combined change the condition of the soil/water/vegetation. It is expected that implementing wet weather restrictions will reduce but not eliminate the amount of rut formation on NFTS motorized roads and trails and/or motorized trails un-authorized for motorized use. Implementation of the mitigations listed in Appendix A (Road Cards) of the DEIS will further reduce erosion from proposed motorized trails.

4. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the Tahoe National Forest.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact high elevation openings and rocky areas and the sensitive species that may occur within them, as well as the benefits from prohibiting cross country travel and use of motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term

cumulative impacts by frequently evaluating motorized trails, implementing mitigations to reduce impacts to sensitive species, and conducting early detection and treatment of weeds. Frequent motorized trail evaluation combined with rapid mitigation of resource damage avoids significant impacts to high elevation opening and rocky area plant communities and sensitive species in the short and long term.

Past: These plant communities are located at 6,000 feet and above and are generally areas with shallow soil. They can be found within forested areas or on ridges above forested areas. Historic management activities have altered high elevation opening and rocky area habitats in a number of ways. These areas were grazed by livestock, timber was removed, roads and trails were built through them, and some of them were impacted by mining activities. Since the plant communities that occur at these sites have adapted to generally highly erosive and shallow soils, with harsh conditions and short growing seasons; those areas heavily disturbed may remain unvegetated. Heavy snow years and unchecked erosion can limit plant establishment and stop the vegetative recovery process or push it back by several decades (Willard et al. 2007). Some of these openings and rocky areas have become infested with weeds such as Klamath weed. Historic management activities have cumulatively reduced the amount and reduced the habitat quality for: *Arabis rigidissima* var. *demota, Erigeron miser, Eriogonum umbellatum* var. *torreyanum, Lewisia longipetala,* and *Tauschia howellii*.

Current: Current management activities in high elevation openings and rocky areas are primarily recreation related. *Erigeron miser* occurrences occur along NFTS motorized roads and trails and motorized trails un-authorized for motorized use. *Erigeron miser* grows only on the TNF. It grows in the crevices between granite rocks - a habitat type that is limited in distribution on the TNF. Known occurrences are being impacted by motorized vehicle use when users drive over granite slabs located within and adjacent to motorized trails.

Other on going projects on the forest that impact high elevation openings and rocky areas include: motorized vehicle use of NFTS motorized trails; special uses projects such as utility corridor construction and maintenance that pass through and impact many different types of plant communities including high elevation openings and rocky areas; minerals operations that remove native vegetation and recontour the landscape; and livestock grazing projects. None of these ongoing projects impacts these plant communities significantly in the short term (5 years or less). However, they do increase the risk of weed introduction and spread especially over the long term.

Reasonably foreseeable: High elevation openings and rocky areas are cumulatively impacted when past and current impacts are added to the reasonably foreseeable future impacts identified in Table J-6. None of the actions identified in Table J-6 are implemented in high elevation openings or rocky areas.

No action: Implementation of Alternative 1 adds to the cumulative impacts to sensitive species dependent on high elevation openings and rocky areas through cross country travel on 28,800 acres containing 36 miles of motorized trails un-authorized for motorized use in these plant communities. Over the long term, continued and increased cross country motorized vehicle use within sensitive species occurrences will eventually kill significant numbers of plants. Implementation of Alternative 1 may impact *Arabis rigidissima* var. *demota* and *Erigeron miser* significantly over the long term (5 years plus) if motorized vehicle use eliminates entire occurrences through cross country travel. It is believed that

impacts could occur to these plants from cross country travel and that those impacts could be significant because:

- *Arabis rigidissima* var. *demota* has not been found on the TNF. However, it is known to occur near the forest boundary. If it exists on the TNF and is impacted by motorized vehicle use, those impacts could be significant.
- There are 14 known occurrences of *Erigeron miser* on the TNF. Of the 14 known occurrences, 10 have hiking, rock climbing and/or OHV use listed as disturbances on the occurrence records. Only 3 occurrence records indicate no disturbances. *Erigeron miser* grows in a very specific habitat (crevices in granite boulders) and is only known to occur on the TNF. OHV use, hiking, and rock climbing are recreational activities that are expected to increase on NFS lands. Observations by the author of this analysis have shown a definite increase in the number of vehicles traveling across granite boulder habitats in the last 10 years. As motorized vehicles continue to be modified to access more habitats, it is expected that even more motorized vehicle travel will occur across granite boulder habitats. In addition, mountain bike activity is also increasing in these habitats. Alternative 1 has the highest risk of weed introduction and spread. Refer to Appendix M (Weed Risk Assessment) of the DEIS for more information about weed introduction and spread. All of these factors put *Erigeron miser* viability at risk over the long term. However, the number of plants currently known to occur does not indicate a viability problem in the short term (5 years or less).

Implementation of Alternative 1 may also impact *Eriogonum umbellatum* var. *torreyanum*, *Lewisia longipetala*, and *Tauschia howellii*, but those impacts are not considered significant over the short term because:

- The terrain where *Eriogonum umbellatum* var. *torreyanum* grows makes it extremely difficult for motorized vehicles traveling cross country to access those occurrences. Most of the known occurrences do not have motorized vehicle impacts and are not located in areas where it is believed motorized vehicle use will occur.
- The known occurrences of *Lewisia longipetala* are near hiking trails not motorized trails. They are not located in areas where it is believed motorized vehicle use will occur due to the steepness and remoteness of the habitat.
- There is only one occurrence of *Tauschia howellii* known to occur on the TNF. It is believed that motorized vehicle use will not occur in the steep, highly erosive habitat where this plant occurs. Current indirect impacts to this occurrence include dust, changed hydrology, and increased risk of weed introduction primarily from the staging/parking area that is located directly above this occurrence. These impacts are not considered significant at this time. If cross country motorized vehicle use increases significantly over the long term (as projected), it is possible that this occurrence could be significantly impacted. The long term risk can not be quantified however. Implementation of Alternative 1 increases the risk of disturbance within these habitats.

Action alternatives: Implementation of the action alternatives could cumulatively impact sensitive species dependent on high elevation openings and rocky areas. Those impacts are not considered

significant. In the past, motorized vehicle use was not expected to occur in these habitats because they are generally steep and highly erosive, rock outcrops, and/or very high elevation rocky openings. However, current technology has increased the ability of motorized vehicles to travel in these kinds of habitats. When motorized vehicle use occurs near or within the habitat itself, damage to the habitat can be severe. The plants dependent on these habitats do not appear to compete well with other vegetation. Therefore, weed introduction and/or spread could kill them over the long term. These plant communities are already subject to natural erosion and have a short growing period. Any disturbance increases erosion and causes significant impacts to the soil and water components of the habitat. There are 15 motorized trails un-authorized motorized use located (all or parts of the motorized trail) in high elevation (6,000 feet plus) openings/rocky areas on NFS lands. These 15 motorized trails include H652-5-5, TKN-J4, TKN-J5, TKS-11, YRN-11, YRS-003b, YRS-F1, YRS-F1b, YRS-F1c, YRS-G3, and YRS-G3w. TKN-J5 has an occurrence of *Erigeron miser* within 100 feet of the motorized trail. Barriers will be placed at the end of TKN-J5 to keep motorized vehicles from traveling on the granite boulders where the *Erigeron miser* is growing. Refer to Appendix A (Road Cards) of the DEIS). Mitigations will also be developed for any sensitive species occurrences found in the FY 2008 surveys.

Alternatives 2, 5, and 6: Cumulative impacts from implementation of Alternatives 2, 5, or 6 are not considered significant. All of these alternatives prohibit cross country travel. All of these alternatives propose the addition of about 3 miles additions to the NFTS. Conversely, Alternatives 2, 5, and 6 prohibit use on 33 miles of the 36 miles of motorized trail un-authorized for motorized use in these plant communities or about 91 percent of them. There is less risk to sensitive species dependent on high elevation opening/rocky area plant communities than in Alternative 1. However, of the action alternatives, implementation of Alternatives 2, 5, and 6 have the highest risk of negative indirect impacts to sensitive species dependent on high elevation openings and rocky areas since they have the largest number of motorized trails open for use. Indirect impacts include impacts from dust and increased weed risk. Of the action alternatives, implementation of Alternatives 2, 5, and 6 have the highest risk of introducing and spreading weeds into high elevation openings and rocky areas. Of the action alternatives, implementation of Alternatives 2, 5, and 6 also add the greatest amount to the cumulative impacts to these species, but those impacts are not considered significant in the short and long term. Alternatives 2, 5, and 6 continue the indirect impacts to *Erigeron miser* occurrences located along motorized trails TKN-J5 and one of the YRS-F1 motorized trails, through motorized vehicle use of those motorized trails.

Alternative 7: Cumulative impacts from implementation of Alternatives 7 are not considered significant. This alternative does not allow cross country travel, therefore there is less risk to sensitive species dependent on high elevation opening/rocky area plant communities than in Alternative 1. This alternative proposes the addition of about 2 miles of motorized trail un-authorized for motorized use to the NFTS. Conversely, it prohibits use of 34 of the 36 miles of motorized trail un-authorized for motorized use in these plant communities or about 91 percent of them. There is less risk of indirect impacts to sensitive species dependent on high elevation opening/rocky area plant communities than in Alternatives 2, 5, and 6 because there are fewer miles of motorized trail proposed and therefore less dust and weed risk. Alternative 7 continues the indirect impacts to *Erigeron miser* occurrences located along

motorized trails TKN-J5 and one of the YRS-F1 motorized trails, through motorized vehicle use of those motorized trails.

Alternatives 3 and 4: Implementation of Alternatives 3 or 4 adds to the cumulative impacts of high elevation openings and rocky areas the least. Alternatives 3 and 4 prohibit cross country use. Alternatives 3 and 4 do not propose the addition of any motorized trails un-authorized for motorized use to the NFTS. Alternatives 3 and 4 prohibit use on all 36 miles of motorized trail un-authorized for motorized use within these plant communities. Alternatives 3 and 4 do not indirectly impact *Erigeron miser* occurrences located along motorized trails TKN-J5 and one of the YRS-F1 motorized trails.

Noxious Weeds and Sensitive Species

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres of cross country travel including motorized trails un-authorized for motorized use with weed occurrences within 100 feet of the motorized trail.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact sensitive species in the short and long term by increasing the risk of weed introduction and spread on TNF system lands. Implementation of Alternative 1 carries the highest risk of introduction and spread of aggressive, non-native plants (weeds) since it allows motorized vehicle use on the most miles of motorized trails un-authorized for motorized use by not prohibiting cross country travel on most of the forest (except for prohibiting use of certain areas, such as those on the American River Ranger District). Motorized vehicles could access more NFS lands and potentially spread weeds to all accessible sensitive plant occurrences. Under implementation of Alternative 1, the number of motorized trails un-authorized for motorized use would increase through cross country use.

Those motorized trails that are known to have weed infestations have a high risk of weeds spreading along that motorized trail. Surveys to date have identified several motorized trails that are infested with weeds. Table J-4 shows that the motorized trails with known occurrences of weeds include: ARM-5, SV-P14, TKN-J9, TKN-J13, TKN-M1, TKN-M2, TKS-M9, YRM-M3, YRM-M4, YRN-008, YRN-509, YRN-M3b, YRS-SF6, and 35-4-P (Cal Ida).

The motorized trails displayed in Table J-4 have the highest short and long term risk of weed spread. However, different weeds have different ecological impacts. Table J-4 also provides an indication of the ecological impact of the type of weed that infests the motorized trail. Under implementation of Alternative 1, all of the motorized trails un-authorized for motorized use identified in Table J-4 would continue to be used and that use would spread weeds. Possible effects are discussed by weed species below:

Cheatgrass: Cheatgrass exists and will continue to spread on both sides of the forest. It will remain patchy in occurrence on the westside of the forest and will not cover large areas unless all vegetation is removed from infested areas, such as in a large wildfire. On the eastside of the forest, vehicles will continue to spread seed of this non-native grass. Cheatgrass eventually takes over plant communities such as sagebrush/bitterbrush if those plant communities experience continued disturbance. This is especially

true after wildfire events. Motorized vehicle use across the landscape increases the risk of cheatgrass seed dispersal. Cheatgrass infestation also increases the risk of wildfire ignition. Increased wildfires in sagebrush/bitterbrush plant communities could lead to habitat conversion. Sensitive species located in areas where there is cheatgrass could be lost over the long term (5 years plus). Motorized trails known to have cheatgrass infestations within 100 feet of the motorized trails include: ARM-5, SV-P14, TKN-J9, TKN-M1, TKN-M2, YRS-SF6, YRM-M4, YRN-509, and 35-4-P. An *Ivesia sericoleuca* occurrence located along TKN-M2 has patches of cheatgrass within 100 feet of this sensitive plant. Therefore, the *Ivesia sericoleuca* along TKN-M2 has a high risk in the short and long term of being infested with cheatgrass. Individual plants of *Ivesia sericoleuca* could be lost in the short term. The entire occurrence could be lost over the long term if the cheatgrass infestation becomes large.

Musk thistle: Musk thistle will continue to spread along motorized trails and across landscapes located on the eastside of the forest. The areas most likely to experience musk thistle infestation include those where bare ground is formed, native vegetation is reduced, and a seed source is near. Motorized vehicles spread thistle seeds in the soil and mud attached to tires and vehicles. The bare soil areas created adjacent to motorized trails provide areas where thistle seeds can readily germinate and grow. Motorized trails un-authorized for motorized use known to have musk thistle infestations within 100 feet of the motorized trail include: SV-P14 and TKN-J13. There is an aspen clone located along motorized trails SV-P14. Motorized vehicle use of these motorized trails would spread musk thistle into the aspen clone and to other areas. Over the long term motorized vehicle use could spread musk thistle to areas with sensitive species. A manual treatment for the eradication of musk thistle on the eastside of the forest is ongoing.

Bull thistle: Bull thistle will continue to spread on both sides of the forest. The areas most likely to experience bull thistle infestation include those where bare ground is formed, native vegetation is reduced, and a seed source is near. Vehicles create bare soil and eliminate native vegetation within and adjacent to wheel tracks. Cross country use and use of motorized trails un-authorized for motorized use will spread this weed to new areas. Over the long term, bull thistle may be spread to sensitive species occurrences. Bull thistle is known to occur along TKS-M9 and YRS-SF6. There are no known occurrences of sensitive species along these motorized trails. However, there is a long term risk of spreading bull thistle from TKS-M9 and YRS-SF6 to areas of sensitive species.

Klamath weed: Klamath weed will continue to spread on both sides of the forest. Occurrences will remain patchy and will be located primarily along the sides of motorized trails. Klamath weed seedlings are not strong competitors so reducing other vegetation benefits them. Therefore, it is expected that they will remain in disturbed areas. However, it is also expected that existing biological control agents will control this weed so it does not become widespread. Klamath weed is known to occur along YRN-M3b. There are no known sensitive species occurrences along YRN-M3b. However, there is a long term risk of spreading Klamath weed from YRN-M3b to areas of sensitive species.

Scotch and Spanish broom: Scotch and Spanish brooms will continue to spread on the westside of the forest. Occurrences will be located primarily along roads, trails and other disturbed areas. However, these brooms will invade adjacent forest also. Scotch and/or Spanish broom will continue to spread through vehicle use of the motorized trails un-authorized for motorized use where they occur: YRM-M3, YRM-M4, YRN-008, YRN-509, and within the Cal Ida network. There are no known sensitive plants

along theses motorized trails, but there is a long term risk of spreading these brooms to sensitive plant occurrences. The brooms at these sites will be treated manually until the seed bank is exhausted.

Wooly mullein: Wooly mullein will continue to spread via seeds. Vehicles will spread seeds by moving them from place-to-place in soil or mud on tires. Vehicles will create bare soil areas that will help this weed become established. Continued disturbance will create new areas for it to move into. Wooly mullein is known to occur within 100 feet of TKN-J9. There are no known sensitive species occurrences along TKN-J9. However, there is a long term risk of spreading wooly mullein from TKN-J9 to areas of sensitive species.

Action alternatives: All of the action alternatives prohibit cross country travel which reduces the risk of introduction and spread of weeds by reducing the amount of NFS lands available for motorized travel. Therefore, the risk of direct/indirect impacts to sensitive/watchlist species from weed introduction and spread is less under the action alternatives in the short and long term compared to the no action alternative. Weeds will continue to spread on the forest, but it is believed the rate of spread will be slower than under the no action alternative primarily due to the prohibition of cross country travel.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trails un-authorized for motorized use proposed to be added to the NFTS with weed occurrences with 100 feet of the motorized trail.
- Sensitive species occurrences located within 100 feet of proposed additions to the NFTS that have weed occurrences within 100 feet of the motorized trail.

No Action: Alternative 1 does not add motorized trails to the NFTS.

Action Alternatives: Surveys to date have located weed occurrences within 100 feet of the following proposed additions to the NFTS: ARM-5, SV-P14, TKN-J9, TKN-J13, TKN-M1, TKN-M2, TKS-M9, YRM-M3, YRM-M4, YRN-008, YRN-509, YRN-M3b, YRS-SF6, and 35-4-P (Cal Ida). Those action alternatives that propose these motorized trails un-authorized for motorized use have a high risk of introducing weeds into sensitive species occurrences over the long term. TKN-M2 also has a sensitive species occurrence of *Ivesia sericoleuca* that has cheatgrass within 100 feet of it. Motorized vehicle use of TKN-M2 increases the risk of weed introduction and spread into this sensitive species occurrence in the short term (5 years or less).

Alternatives 2, 5, and 6 propose the addition (to the NFTS) of all of the motorized trails un-authorized for motorized use known to have weed occurrences except for 35-4-P that is not proposed in Alternative 2. Alternatives 2, 5, and 6 propose the addition of TKN-M2 to the NFTS. Therefore, implementation of Alternatives 2, 5, and 6 have a high risk of introducing cheatgrass into the *Ivesia sericoleuca* occurrence located along TKN-M2 in the short and long term. Alternatives 2, 5, and 6 have a high risk of introducing weeds into sensitive plant occurrences in other areas over the long term.

Alternative 7 proposes the addition of 9 of the 14 motorized trails un-authorized for motorized use known to have weed occurrences. Alternative 7 does not propose the addition of TKN-M2 to the NFTS. In addition, Alternative 7 does not propose YRM-M3, YRN-008, YRN-509, or 35-4-P. However,

implementation of Alternative 7 has a high risk of introducing weeds into sensitive plant occurrences over the long term.

Alternative 4 proposes the addition of 7 of the 14 motorized trails un-authorized for motorized use known to have weed occurrences. Alternative 4 does not propose the addition of TKN-M2 to the NFTS. Implementation of Alternative 4 has a high risk of introducing weeds into sensitive plant occurrences over the long term.

Alternative 3 does not propose the addition of any of the motorized trails un-authorized for motorized use known to have weed occurrences. Implementation of Alternative 3 could still spread weeds to sensitive species occurrences over the long term. However, since Alternative 3 prohibits cross country travel and does not propose any additions to the NFTS, it is believed that the rate of weed spread would be slower. This is unproven.

3. Changes in class of vehicle and season of use

Indicator(s) used to measure effects: No indicators were chosen to measure effects of changing the class of vehicle or season of use. Refer to the following discussion.

No Action: Implementation of Alternative 1 does not change the motorized trail class of vehicle or its season of use. It is expected that implementation of Alternative 1 would have the greatest amount of motorized trail damage and associated erosion since it does not prohibit use of the motorized trails un-authorized for motorized use and does not have wet weather restrictions. Bare soil areas created through erosion create conditions more favorable for weed infestation.

Action Alternatives: Changing the class of vehicle that is allowed to use a motorized trail does not differ by action alternative since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007).

Impacts/benefits to sensitive species from changing the season of use is difficult to quantify. Refer to section 3.02 (Soil and Watershed) of the DEIS. Wet weather seasonal restrictions are proposed in Alternatives 4, 5 and 6. Alternative 3 would continue the seasonal restrictions as specified in the TNF LRMP and contained in existing Forest Orders. Of the action alternatives, Alternatives 2 and 7 have the most native surface motorized trails open year around.

Implementing seasonal restrictions could help to reduce rutting and subsequent channeling of surface water and runoff and those sensitive species within 30 or 100 feet of the motorized trail could benefit because the occurrence would experience fewer effects from erosion of the motorized trail. This analysis assumes that motorized vehicle trails will be maintained and erosion from them will be reduced and/or eliminated in the short and long term. Therefore the risk of weed introduction and spread into sensitive plant areas from changing the season of use is not expected to vary significantly by action alternative.

4. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact TNF system lands and the sensitive species that may occur within them, as well as the benefits of prohibiting use of motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by frequently evaluating

motorized trails, implementing mitigations to reduce impacts to sensitive species, and conducting early detection and treatment of weeds. Frequent motorized trail evaluation to detect weeds combined with rapid treatment of those weeds avoids significant impacts to TNF system lands and sensitive species in the short and long term.

Past: Most of the TNF is considered relatively weed free. This relatively weed free state may indicate that a source of weed seed was not available when TNF native plant communities were disturbed in the last century. This is unknown but appears to be a reasonable assumption based on literature that documents the progression of various weed species across California and the nation. It is also possible that weeds have persisted at low levels in some areas for decades before spreading rapidly when favorable conditions developed (Shepperd et al 2006). Many of the weeds found in California forests today were introduced intentionally or unintentionally by European settlers beginning in the 18th century (Bossard et al 2000). The lack of weed infestation in previously disturbed areas may also indicate less access onto the TNF by motorized vehicles. It is widely recognized that motorized vehicle use has increased over the last decade. It is also widely recognized that motorized use helps to spread weeds from place to place both by creating habitat along motorized trails and by carrying seed/weed plant parts on vehicles. However weeds were introduced, it is known that they are spreading across California. Jepson (1925) listed 292 non-native (weed) plant species in California. By the end of the 20th century the estimate for non-native plant species in California has risen to 1,045 (Randall and others 1998 in Shepperd et al 2006).

Current: In general terms, most A/B/C rated-weed occurrences (refer to the glossary in Appendix C of the EIS) on the TNF are located along State/County/Federal/NFTS roads. Weed infestations degrade NFS lands (including habitats for sensitive species) by directly competing with native plants and causing their displacement. The number and types of weed infestations known on the TNF are displayed in Appendix M (Weed Risk Assessment) of the DEIS in the weed risk assessment for this project. Weeds are known to occur along NFTS motorized roads/trails and motorized trails un-authorized for motorized use. Ongoing management actions such as utility corridors maintenance, mining operation, and livestock grazing continue to spread weeds from place to place across the forest. As noted in other sections of this document, there are weed infestations competing with sensitive species for soil, water and nutrients in several locations. Sensitive species occurrences with known weed infestations (and/or weed occurrences within 100 feet) include occurrences of *Clarkia biloba* ssp. *Brandegeae* (yellow star thistle), *Cypripedium fasciculatum* (Himalayan blackberry), *Erigeron miser* (Klamath weed) and *Ivesia sericoleuca* (cheatgrass). Weeds do not occur within all occurrences of these sensitive plants, but where they do the sensitive plant occurrence is at risk of being lost over the long term. Efforts have been made to reduce/eliminate the yellow star thistle in known *Clarkia biloba* ssp. *Brandegeae* occurrences along Mosquito Ridge road.

Motorized vehicle use of NFTS motorized trails is also an ongoing activity that is known to negatively impact sensitive plants/fungi through the introduction of weeds. Motorized vehicle use of NFTS motorized trails removes native vegetation, creating bare soil conditions. Dust from use of native surface NFTS motorized trails decreases native vegetation cover by reducing rates of photosynthesis, leaf conductance, transpiration, and water-use efficiency. Dust from motorized vehicle use has also been shown to increase temperatures of leaves and stems and decrease leaf surface areas (Munger et al 2003)

negatively impacting plant vigor. Reduced native plant vigor increases the chance that weeds can become established.

Reasonably foreseeable: Implementation of those projects identified in Table J-6 may introduce weed seed and/or weed plant parts into new areas even though most management actions on the TNF require the washing of equipment that operates off roads if it is coming from a weed infested area, and the use of certified weed free plant materials for erosion control (when needed). However, all of the projects listed in Table J-6 involve travel on NFTS motorized roads and could introduce weed seed into new areas from their vehicles. Ground disturbance favors weed spread if the weeds are already on or near the area being disturbed. It is reasonably foreseeable that weeds will continue to spread on the TNF and will be introduced into sensitive species occurrences over the long term.

No action: Implementation of Alternative 1 adds to the cumulative risk of weeds being introduced and spreading into sensitive species occurrences. As identified in the weed risk assessment for this project (Appendix M of the DEIS) implementation of Alternative 1 has a high risk of introducing weeds into new areas and spreading weeds from areas that are already infested with weeds. Implementation of Alternative 1 allows cross country use and does not prohibit use of motorized trails un-authorized for motorized use. Therefore, it has the greatest risk of negative impacts to TNF native plant communities and the sensitive species dependent on them, of any of the alternatives. Implementation of Alternative 1 carries the highest risk of weed introduction into sensitive species occurrences since it allows motorized vehicle use on the greatest amount of NFS land.

Action alternatives: Motorized vehicle use provides a continuous source of weed seed introduction and also provides disturbed areas within and adjacent to the motorized vehicle trails. Refer to the weed risk assessment located in Appendix M of the DEIS and the discussion under the no action alternative for more information. None of the action alternatives allow cross country use. Therefore, all of the action alternatives have less risk of introducing weeds into sensitive species occurrences than Alternative 1.

Alternative 5: Of the action alternatives, implementation of Alternative 5 has the greatest risk of weed introduction and spread and therefore the greatest risk of negative impacts to sensitive species since it proposes the addition of the most motorized trails un-authorized for motorized use. Alternative 5 adds about 283 of the 1,400 miles of motorized trail un-authorized for motorized use – or about 22 percent. Refer to Table J-3 for a summary of the miles of motorized trail un-authorized for motorized use proposed for addition to the NFTS by alternative. In addition, the surveys of many of the motorized trails un-authorized for motorized use proposed in Alternative 5 are not considered current. Therefore, those motorized trails may have weed occurrences that would go undetected and would spread and grow in size. It is unknown whether these motorized trails have occurrences of sensitive species or weeds. Implementation of Alternative 5 therefore has a high risk of impacting sensitive species over the long term through the spread of weeds. Since implementation of Alternative 5 prohibits cross country travel, it has less risk of spreading weeds into sensitive species occurrences over the long term than implementation of Alternative 1.

Alternatives 2 and 6: Alternatives 2 and 6 have a greater risk of spreading weeds into sensitive species occurrences over the long term than Alternatives 3, 4, and 7, but not as great a risk as Alternatives 1 and 5. Alternative 2 proposes the addition of about 73 of the 1,400 motorized trail un-authorized for

motorized use or about 6 percent. Alternative 6 proposes the addition of about 70 miles or about 5 percent. In addition, Alternative 2 adds shoreline access on dry soils in the Prosser, Boca and Stampede Reservoir areas. Reservoir shoreline areas are known to have weed occurrences when the water level is low. For example, Canada thistle is known to occur along the low water line of French Meadows reservoir and musk thistle and other weeds are known to occur along the Boca reservoir low water line. When these weed occurrences are covered with water, many of the weed seeds are killed. However, some of the weed seed floats to new areas. Any motorized vehicle use in the areas where the weeds are located will spread the weeds to new areas. Alternative 2 also proposes the addition of Eureka Diggings and Greenhorn areas. These are generally unvegetated areas where vehicles are not restricted to motorized trails. These unvegetated areas provide sites where weeds can readily become established without competition from native vegetation. Established weed sites can spread weed seed to new areas as vehicles go from infested sites to other areas. Therefore, the risk of spreading weeds into sensitive species occurrences is higher in Alternative 2 than in Alternative 6, primarily because Alternative 2 has more area open for motorized vehicle use.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 have a lower risk of spreading weeds into sensitive species occurrences than implementation of Alternatives 1, 2, 5, and 6. Alternative 4 proposes the addition of about 31 miles of motorized trail un-authorized for motorized use to the NFTS or about 2 percent of the 1,400 miles. Alternative 7 proposes the addition of about 45 miles or about 3 percent. The long term risk of negative impacts to sensitive species from weed introduction and spread is lower because these alternatives propose the addition of fewer miles of motorized trail to the NFTS and prohibit cross country use.

Alternative 3: Alternative 3 has the least long term risk of weed introduction and spread into sensitive species occurrences because it does not propose the addition of motorized trails to the NFTS, it prohibits use of 1,400 miles of motorized trail un-authorized for motorized use, and prohibits cross country travel by motorized vehicles.

Plant Biodiversity and Plant Community Fragmentation

1. Prohibition of cross country travel

Indicator used to measure effects:

- Acres where cross country travel is prohibited within inventoried roadless areas. (Inventoried roadless areas are considered some of the largest unroaded native plant communities on the TNF (except for Granite Chief Wilderness). Refer to section 3.09 (Roadless and Special Areas) of the DEIS for more information about inventoried roadless areas on the TNF.)

No action: Alternative 1 does not prohibit use of motorized trails un-authorized for motorized use located within inventoried roadless areas, and does not prohibit cross country travel. Under implementation of Alternative 1, fifty four miles of motorized trail un-authorized for motorized use within inventoried roadless areas would continue to be available for motorized vehicle use. Accessible areas within inventoried roadless areas would be available for cross country travel. As discussed above, this increases the risk of weed introduction and spread within these areas - increasing the risk to native plant

biodiversity and fragmentation of the native plant communities. Impacts could be significant over the long term.

Inventoried roadless areas are considered some of the largest unroaded native plant communities on the TNF (except for Granite Chief Wilderness). The effects of native plant community fragmentation by weeds that could be introduced by motorized vehicle use have not been completely studied. Since inventoried roadless areas have not been surveyed, impacts to native plant biodiversity and fragmentation of native plant communities are assessed versus impacts to sensitive species occurrences. Sensitive species occurrences add to native plant diversity and are considered important components of the native plant communities where they are located.

Action alternatives: None of the action alternatives allow cross country travel within inventoried roadless areas. Therefore there is less long term risk to native plant diversity and less risk of fragmentation impacts to native plant communities located within inventoried roadless areas under implementation of the action alternatives (compared to the no action alternative). In addition, of the action alternatives, Alternative 5 prohibits use of the fewest miles of motorized trail un-authorized for motorized use within these areas and has the highest long term risk to native plant diversity and greatest risk of fragmentation impacts to native plant communities located within inventoried roadless. Alternative 5 would prohibit use of 38 miles of motorized trail un-authorized for motorized use within these areas or about 70 percent of the 54 miles. Alternative 2 would prohibit use of about 45 miles of motorized trail un-authorized for motorized use or about 83 percent; Alternative 6 would prohibit use of 46 miles or about 85 percent, Alternative 7 would prohibit use of about 47 miles or about 87 percent, and Alternatives 3 and 4 prohibit use of all 54 miles of motorized trail un-authorized for motorized use located within inventoried roadless areas. Alternatives 3 and 4 have the lowest risk to native plant diversity and least risk of fragmentation impacts to native plant communities located within inventoried roadless areas.

2. Additions to the National Forest Transportation System (NFTS)

Indicator used to measure effects:

- Miles of motorized trail un-authorized for motorized use proposed for addition to the NFTS that are located within inventoried roadless areas.

No action: Alternative 1 does not propose the addition of any motorized trails to the NFTS. However, Alternative one does not prohibit use of the 54 miles of motorized trail un-authorized for motorized use located within inventoried roadless areas. Alternative 1 also allows cross country travel. Alternative one has the highest long term risk to native plant diversity and greatest risk of fragmentation impacts to native plant communities located within inventoried roadless of all the alternatives.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles of motorized trails un-authorized for motorized use in inventoried roadless areas. Of the action alternatives, Alternative 5 proposes the addition of the greatest number of motorized trails un-authorized for motorized use located in inventoried roadless areas – about 16 miles. Sixteen miles of motorized trail is about 30 percent of the existing miles of motorized trail un-authorized for motorized use within these areas. However, of the action alternatives, Alternative 5 has the highest long term risk to native plant diversity and greatest risk of fragmentation impacts to native plant communities located within

inventoried roadless areas. Refer to Table J-15 which displays the number of miles of motorized trail un-authorized for motorized use proposed by alternative in inventoried roadless areas. Alternative 2 adds 9 miles, Alternative 6 adds 8 miles, and Alternative 7 adds seven miles, which is 17 to 13 percent of the miles of motorized trail un-authorized for motorized use within these areas. Alternatives 3 and 4 do not add miles of motorized trail to the NFTS within inventoried roadless areas. Alternatives 3 and 4 have the lowest risk to native plant diversity and least risk of fragmentation impacts to native plant communities located within inventoried roadless areas.

Large blocks of land such as inventoried roadless areas are especially important areas for maintaining native plant and plant community diversity (Loomis et al. 2000). Inventoried roadless areas provide a natural benchmark or control to judge the effects of human development on natural systems and to understand relatively undisturbed ecological processes. In addition, naturally functioning ecosystems (plant communities) such as those often found in inventoried roadless areas provide many valuable services including watershed protection, carbon storage, nutrient cycling, pest control, pollination, and fish and wildlife habitat (ibid).

Table J-15. Total miles of motorized and non-motorized use within Inventoried Roadless Areas by alternative

Alternative	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Cross country travel	Continues	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited
Roads open to highway legal vehicles only	1	0	1	1	0	0	1
Roads open to all vehicles	33	34	33	32	34	32	33
Trails open to all vehicles	51	57	51	51	64	57	56
Trails open to ATVs and motorcycles only	0	0	0	0	0	0	0
Trails open to motorcycles only	44	48	44	44	47	47	47
Private/other jurisdiction roads	23	23	23	23	23	23	23
Motorized trails un-authorized for motorized use remaining open	54	0	0	0	0	0	0
Subtotal Motorized	**206**	**161**	**152**	**152**	**168**	**160**	**159**
NFS nonmotorized trails	88	88	88	88	88	88	88
NFS nonmotorized & nonmechanical trails	62	62	62	62	62	62	62
Motorized trails un-authorized for motorized used to use	5	50	59	59	44	51	52

Sensitive species located along motorized trails are more likely to be exposed to disruption by human activities and to experience problems with weeds. Adding motorized trails to the NFTS within inventoried roadless areas increases the risk that sensitive species will be lost and/or have the plant community where they are located fragmented by motorized vehicle use and weed infestation. Once these motorized trail additions are shown on maps, they could receive increased use. Additional use could increase the amount of weed seed being introduced into the inventoried roadless area. Early detection of new weed introductions would be difficult since these areas are remote and generally accessible only by specialized 4 wheel drive/motorcycle equipment. TNF personnel trained in weed identification rarely travel them. This means that weeds could be introduced and go undetected for long periods of time. Infestations of

weeds into these relatively weed free areas could negatively impact sensitive species occurrences. Over the long term, sensitive species occurrences could be displaced by weeds.

3. Changes in class of vehicle and season of use

Indicator(s) used to measure effects: No indicators were chosen to measure effects of changing the class of vehicle or season of use on motorized trail located within inventoried roadless areas. Refer to the following discussion.

No Action: Alternative 1 does not change the motorized trail class of vehicle, or the season of use. It is expected that implementation of Alternative 1 would have the greatest amount of motorized trail damage and associated erosion since it does not prohibit use of the motorized trails with un-authorized public use and does not have wet weather restrictions. Bare soil areas created through erosion create conditions more favorable for weed infestation.

Action Alternatives: Changing the class of vehicle that is allowed to use a motorized trail does not differ by action alternative since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007).

Impacts/benefits to sensitive species from changing the season of use is difficult to quantify. Refer to section 3.02 (Soils and Watershed) of the DEIS. Wet weather seasonal restrictions are proposed in Alternatives 4, 5 and 6. Alternative 3 would continue the seasonal restrictions as specified in the TNF LRMP and contained in existing Forest Orders. Of the action alternatives, Alternatives 2 and 7 have the most native surface motorized trails open year around.

4. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the Tahoe National Forest.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact inventoried roadless areas and the sensitive species that may occur within them, as well as the benefits from prohibiting use of motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by frequently evaluating motorized trails, implementing mitigations to reduce impacts to sensitive species, and conducting early detection and treatment of weeds. Frequent motorized trail evaluation to detect weeds combined with rapid treatment of those weeds avoids significant impacts to TNF system lands and sensitive species in the short and long term.

Past: Past actions that have impacted the inventoried roadless areas on the TNF include all of the past actions identified under the different plant communities in this report. Inventoried roadless areas were not identified until the late 1970s during the Roadless Area Review and Evaluation (RARE I and RARE II). The character and amount of roads, private land, and motorized trails varies greatly by roadless area. Refer to section 3.09 (Roadless and Special Areas) for more information.

Current: Current management activities that occur within TNF inventoried roadless areas include use of NFTS roads and trails, activities on private land, livestock grazing and minerals operations. The amount of use of NFTS roads and trails, the types of private land activities, the amount and location of livestock grazing, and the minerals operations also vary by inventoried roadless area. For example, the following motorized trails un-authorized for motorized use are proposed in the West Yuba inventoried

roadless area: YRN-M3b, YRN-M3a, YRN-7, and YRN-M2. All of these motorized trails except YRN-7 were pioneered by miners to access mining claims. The East Yuba roadless area also has active mining operations. YRN-001, YRN-M1, YRN-11, YRN 5a and 5c, YRN-9, YRN-007, and YRN-4 are all motorized trails un-authorized for motorized use proposed within the East Yuba roadless area. Of these motorized trails, YRN-M1, YRN-007, and YRN-4 were pioneered by miners. YRN-11, YRN 5a and 5c, YRN-9 and probably YRN-001 were pioneered by users. Motorized trails used by miners to access their mining claims will remain available for their use regardless of the alternative selected.

Reasonably foreseeable: Implementation of those projects identified in Table J-6 would not impact inventoried roadless areas. None of those projects are located within inventoried roadless areas.

No action: Implementing Alternative 1 has a greater risk of negative impacts to native plant diversity and a greater risk of negative impacts to native plant communities (and therefore the sensitive species dependent on them) located within inventoried roadless areas than the action alternatives. Alternative 1 has a higher risk of these negative impacts to plant diversity and connectivity primarily due to allowing cross country travel and allowing motorized use on all 54 miles of motorized trail un-authorized for motorized use within roadless areas.

Motorized vehicle disturbance within inventoried roadless areas can reduce native plant biodiversity. Loss of native plant biodiversity is dependent on the intensity of motorized vehicle use, but even a single vehicle pass can destroy or disrupt many types of plant communities. Plants with shallow root systems may be especially vulnerable (Wilshire 1983, Lacey et al. 1997). This loss of native vegetation increases the risk of soil loss due to wind and water erosion. Soil loss increases the decomposition of organic matter, weakens soil aggregate stability and can result in the formation of inorganic surface crusts. Inorganic surface crusts increase water runoff, inhibit germination and emergence of seedlings, and reduce water penetration into the soil. Natural soil stabilizers such as organic (lichen, fungal and algal) soil crusts are highly vulnerable to cross country motorized vehicle use. All of these impacts contribute to native plant community degradation and fragmentation.

Motorized vehicle use can fragment native plant communities. Plant community fragmentation is an issue for at least some sensitive species. Those sensitive plants with specific pollination and habitat requirements are the most vulnerable to habitat fragmentation impacts. For example, *Cypripedium fasciculatum* requires mycorrhizal connections under ground and specific pollinators and is associated with older forests. Motorized trails are frequently identified as the cause of habitat fragmentation. Cross country motorized vehicle use has been shown to have the same fragmentation effects as motorized trails. Cross country motorized vehicle use has been shown to reduce perennial and annual plant cover, reduce plant density, and overall above-ground vegetative biomass (Hall 1989). In general terms, the degree of plant loss depends on the intensity of motorized vehicle use.

The density of NFTS motorized trails in the various roadless areas is described in section 3.09 (Roadless and Special Areas). Cross country use in roadless areas could create high road and trail density over the long term with negative cumulative impacts to native plant communities. Several areas on the TNF have a high density of motorized trails – however none of the watersheds within inventoried roadless areas are considered high risk watersheds. Refer to the DEIS existing condition road/trail/area maps – also Appendix D of the DEIS which outlines the watershed risk assessment.

The inventoried roadless areas on the TNF are considered relatively free of motorized trails and are assumed to provide quality habitat for native plants/fungi. Since complete botanical surveys of inventoried roadless areas and other areas of the forest are not available, these assumptions are unproven. However, it is reasonable to expect relatively undisturbed large geographic areas to provide quality habitat for native plants/fungi.

Large blocks of unfragmented land (such as roadless areas) play an important role in providing habitat for threatened, endangered, proposed (TEP), and sensitive plant species (USDA FS 2000). Nationally, roadless areas provide large, relatively undisturbed blocks of important habitat including more than 1,400 sensitive and almost 100 TEP plant species (ibid). The inventoried roadless areas on the TNF have not been completely surveyed. It is expected that inventoried roadless areas on the TNF provide important biological strongholds for native plant species and communities just as they do across the nation. Sensitive and other native plants in TNF inventoried roadless areas are less likely to be exposed to disruption by human activities such as collection, trampling, and other surface disturbance. This lower level of disruption may make roadless areas important references for understanding the natural composition and dynamics of native plant communities.

TNF inventoried roadless areas are less likely to experience problems with nonnative invasive species (weeds) and are more likely to be able to maintain intact native plant communities. Roadless areas provide or affect habitat for almost 60 percent of the TEP species found on or affected by NFS lands (USDA FS 2000). This is over 10 percent of all plant species listed under the Endangered Species Act within the United States, and almost 70 percent of Forest Service designated sensitive species (ibid). TEPS species benefit within inventoried roadless areas by having reduced risk of future habitat degradation and disturbance, and conservation of existing biological strongholds. Implementation of the no action alternative would not provide these benefits to sensitive species.

TEPS species are at increased risk of adverse cumulative effects from increased population growth and associated land uses, land conversions, and nonnative species (weed) invasions. Therefore, the value of relatively unfragmented blocks of land such as inventoried roadless areas to TEPS species is likely to increase as habitat loss and habitat degradation increase in scope and magnitude. Implementation of the no action alternative increases the risk of habitat loss and habitat degradation. Habitat loss and degradation, and adverse effects to TEPS and other native plant species viability from the invasion and/or encroachment of non-native plant and animal species are increasing.

Action alternatives: All of the action alternatives reduce impacts to native plants and plant communities by reducing the number of un-authorized motorized trail available for motorized use within inventoried roadless areas and prohibiting cross country travel. The action alternatives that propose the addition of the most miles of motorized trail un-authorized for motorized use to the NFTS within inventoried roadless areas have the greatest risk of negatively impacting native plant biodiversity and fragmenting native plant communities (and the sensitive species within them). The risk to native plants is closely tied to the high risk of introducing weeds into large blocks of land that are currently considered weed free.

Alternative 5: Of the action alternatives, implementation of Alternative 5 has the greatest risk of negative impacts to native plant diversity and has a greater risk of negative impacts to native plant

communities through fragmentation. Of the action alternatives, Alternative 5 proposes the addition of the greatest number of motorized trails un-authorized for motorized use located in inventoried roadless areas – about 16 miles. Sixteen miles of motorized trail is about 30 percent of the existing miles of un-authorized motorized trail within these areas. Conversely, Alternative 5 prohibits use of the fewest miles of motorized trail un-authorized for motorized use within these areas. Alternative 5 would prohibit use of 38 miles of motorized trail un-authorized for motorized use within these areas or about 70 percent of the 54 miles. Implementation of Alternative 5 has more miles of motorized trail and more risk of weed introduction and spread within large geographic areas. The significance of these impacts is hard to quantify. However, the risk is believed to be a long term risk (over five years) since use of motorized trails un-authorized for motorized use is currently considered low.

Alternatives 2, 6 and 7: Implementation of Alternatives 2, 6 and 7 have more risk of negative impacts to native plant diversity and native plant community fragmentation caused by weed introduction and spread than Alternatives 3 and 4, but not as much as Alternatives 1 and 5. Alternative 2 adds 9 miles, Alternative 6 adds 8 miles, and Alternative 7 adds seven miles, which is 17 to 13 percent of the miles of motorized trail un-authorized for motorized use within these areas. Conversely, Alternative 2 would prohibit use of about 45 miles of un-authorized motorized trail or about 83 percent; Alternative 6 would prohibit use of 46 miles or about 85 percent, Alternative 7 would prohibit use of about 47 miles or about 87 percent.

Alternatives 3 and 4: Implementation of Alternatives 3 and 4 have the least risk of negative impacts to native plant biodiversity and fragmentation of native plant communities within roadless areas through introduction and spread of weeds. Alternative 3 and 4 do not propose additions to the NFTS within inventoried roadless areas. Alternatives 3 and 4 do not allow use of motorized trails un-authorized for motorized use located within roadless areas. Implementation of Alternatives 3 and 4 will benefit sensitive species (if they occur there)/native plant diversity/native plant community connectivity by reducing the risk of weed introduction and spread by motorized vehicles.

The value of large blocks of land such as inventoried roadless areas in conserving sensitive species is likely to increase as native plant communities are lost and/or degraded throughout the Sierra Nevada region through development, climatic change, weed and non-native animal infestation, etc.

Determinations

No action: Implementation of the no action alternative over the long term may impact *Arabis rigidissima* var. *demota, Astragalus webberi, Botrychium ascendens, Botrychium crenulatum, Botrychium lunaria, Botrychium minganense, Botrychium montanum, Bruchia bolanderi, Calochortus clavatus* var. *avius, Clarkia biloba* ssp. *Brandegeae, Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa, Epilobium howellii, Erigeron miser, Eriogonum umbellatum* var. *torreyanum, Fissidens aphelotaxifolius, Fritillaria eastwoodiae, Helodium blandowii, Hydrothyria venosa, Ivesia aperta* var. *aperta, Ivesia aperta* var. *canina, Ivesia sericoleuca, Ivesia webberi, Lewisia cantelovii, Lewisia kelloggii* ssp. *hutchisonii, Lewisia kelloggii* ssp. *kelloggii, Lewisia longipetala, Lewisia serrata, Lupinus dalesiae, Meesia triquetra, Meesia uliginosa, Mielichhoferia elongata, Monardella follettii, Penstemon personatus, Phacelia stebbinsii, Phaeocollybia olivacea, Pyrrocoma lucida,* and/or *Tauschia*

howellii; and contribute to a trend toward federal listing or loss of viability for these species within the planning area of the TNF. Over the long term the risk to these species increases as the motorized vehicle use increases – especially cross country use.

Action alternatives: Implementation of any of the action alternatives may impact *Arabis rigidissima* var. *demota, Astragalus webberi, Botrychium ascendens, Botrychium crenulatum, Botrychium lunaria, Botrychium minganense, Botrychium montanum, Bruchia bolanderi, Calochortus clavatus* var. *avius, Clarkia biloba* ssp. *Brandegeae, Cudonia monticola, Cypripedium fasciculatum, Cypripedium montanum, Dendrocollybia racemosa, Epilobium howellii, Erigeron miser, Eriogonum umbellatum* var. *torreyanum, Fissidens aphelotaxifolius, Fritillaria eastwoodiae, Helodium blandowii, Hydrothyria venosa, Ivesia aperta* var. *aperta, Ivesia aperta* var. *canina, Ivesia sericoleuca, Ivesia webberi, Lewisia cantelovii, Lewisia kelloggii* ssp. *hutchisonii, Lewisia kelloggii* ssp. *kelloggii, Lewisia longipetala, Lewisia serrata, Lupinus dalesiae, Meesia triquetra, Meesia uliginosa, Mielichhoferia elongata, Monardella follettii, Penstemon personatus, Phacelia stebbinsii, Phaeocollybia olivacea, Pyrrocoma lucida*, and/or *Tauschia howellii*; but is not expected to contribute to a trend toward federal listing or loss of viability for these species within the planning area of the TNF in the short or long term.

Recommendations

The following recommendations are made to reduce impacts to sensitive species and native plant communities that support them:

- Use only certified weed-free products for erosion control to avoid possible adverse impacts to sensitive plant and fungus habitat.
- Ensure that all equipment used is weed free.
- Follow the TNF seeding guidelines
- Survey all motorized trails before they are open for use
- Routinely (annually) survey motorized trails for weed occurrence and treat weeds rapidly
- Ensure routine maintenance of motorized trails to reduce erosion and possible degradation of native plant communities

Project File

The following documents/maps were used during analysis of effects to sensitive plant and fungi species. They are located in the project files and Supervisor's Office files and are included within this Biological Evaluation by reference.

- Best management practices (BMPs) for road and trail maintenance and reconstruction
- Soil, vegetation, sensitive species occurrence, and project maps
- References
- TNF survey records including photos
- TNF weed occurrence records
- GIS outputs (background data for tables)

Appendix K: Management Indicator Species Report

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July 2008

Introduction

The purpose of this report is to evaluate and disclose the impacts of the Tahoe NF Motorized Travel Management Project on the habitat of the thirteen (13) Management Indicator Species (MIS) identified in the Forest (NF) Land and Resource Management Plan (LRMP) (USDA 1990) as amended by the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (USDA Forest Service 2007a). This report documents the effects of the proposed action and alternatives on the habitat of selected project-level MIS. Detailed descriptions of the Tahoe NF Motorized Travel Management Project alternatives are found in the Draft Environmental Impact Statement (DEIS) USDA Forest Service 2008).

MIS are animal species identified in the SNF MIS Amendment Record of Decision (ROD) signed December 14, 2007, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). The current rule applicable to project decisions is the 2004 Interpretive Rule, which states "Projects implementing land management plans…must be developed considering the best available science in accordance with §219.36(a)…and must be consistent with the provisions of the governing plan." (Appendix B to §219.35). Guidance regarding MIS set forth in the Tahoe NF LRMP as amended by the 2007 SNF MIS Amendment ROD directs Forest Service resource managers to (1) at project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and (2) at the bioregional scale, monitor populations and/or habitat trends of MIS, as identified in the Tahoe NF LRMP as amended.

Direction Regarding the Analysis of Project-Level Effects on MIS Habitat

Project-level effects on MIS habitat are analyzed and disclosed as part of environmental analysis under the National Environmental Policy Act (NEPA). This involves examining the impacts of the proposed project alternatives on **MIS habitat** by discussing how direct, indirect, and cumulative effects will change the habitat in the analysis area.

These project-level impacts to habitat are then related to broader scale (bioregional) population and/or habitat trends. The appropriate approach for relating project-level impacts to broader scale trends depends on the type of monitoring identified for MIS in the LRMP as amended by the SNF MIS Amendment ROD. Hence, where the Tahoe NF LRMP as amended by the SNF MIS Amendment ROD identifies distribution population monitoring for an MIS, the project-level habitat effects analysis for that MIS is informed by available distribution population monitoring data, which are gathered at the bioregional scale. The bioregional scale monitoring identified in the Tahoe NF LRMP, as amended, for MIS analyzed for the Tahoe NF Motorized Travel Management Project is summarized in Section 3 of this report.

Adequately analyzing project effects to MIS generally involves the following steps:

- Identifying which habitat and associated MIS would be either directly or indirectly affected by the project alternatives; these MIS are potentially affected by the project.
- Summarizing the bioregional-level monitoring identified in the LRMP, as amended, for this subset of MIS.
- Analyzing project-level effects on MIS habitat for this subset of MIS.
- Discussing bioregional scale habitat and/or population trends for this subset of MIS.
- Relating project-level impacts on MIS habitat to habitat and/or population trends at the bioregional scale for this subset of MIS.

These steps are described in detail in the Pacific Southwest Region's draft document "MIS Analysis and Documentation in Project-Level NEPA, R5 Environmental Coordination" (May 25, 2006). This Management Indicator Species (MIS) Report documents application of the above steps to select project-level MIS and analyze project effects on MIS habitat for the Tahoe NF Motorized Travel Management Project.

Direction Regarding Monitoring of MIS Population and Habitat Trends at the Bioregional Scale

The bioregional scale monitoring strategy for the Tahoe NF's MIS is found in the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (ROD) of 2007. Bioregional scale habitat monitoring is identified for all twelve of the terrestrial MIS. In addition, bioregional scale population monitoring, in the form of distribution population monitoring, is identified for all of the terrestrial MIS except for the greater sage-grouse. For aquatic macroinvertebrates, the bioregional scale monitoring identified is Index of Biological Integrity and Habitat. The current bioregional status and trend of populations and/or habitat for each of the MIS is discussed in the Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA Forest Service 2008).

MIS Habitat Status and Trend

All habitat monitoring data are collected and/or compiled at the bioregional scale, consistent with the LRMP as amended by the 2007 SNF MIS Amendment ROD (USDA Forest Service 2007a).

Habitats are the vegetation types (for example, early seral coniferous forest) or ecosystem components (for example, snags in green forest) required by an MIS for breeding, cover, and/or feeding. MIS for the Sierra Nevada National Forests represent 10 major habitats and 2 ecosystem components (USDA Forest Service 2007a), as listed in Table K-1. These habitats are defined using the California Wildlife Habitat Relationship (CWHR) System (CDFG 2005). The CWHR System provides the most widely used habitat relationship models for California's terrestrial vertebrate species (ibid). It is described in detail in the SNF Bioregional MIS Report (USDA Forest Service 2008).

Habitat status is the current amount of habitat on the Sierra Nevada Forests. Habitat trend is the direction of change in the amount or quality of habitat over time. The methodology for assessing habitat status and trend is described in detail in the SNF Bioregional MIS Report (USDA Forest Service 2008).

MIS Population Status and Trend

All population monitoring data are collected and/or compiled at the bioregional scale, consistent with the LRMP as amended by the 2007 SNF MIS Amendment ROD (USDA Forest Service 2007a). The information is presented in detail in the 2008 SNF Bioregional MIS Report (USDA Forest Service 2008).

Population monitoring strategies for MIS of the Tahoe NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment ROD (USDA Forest Service 2007a). Population status is the current condition of the MIS related to the population monitoring data required in the 2007 SNF MIS Amendment ROD for that MIS. Population trend is the direction of change in that population measure over time.

There are a myriad of approaches for monitoring populations of MIS, from simply detecting presence to detailed tracking of population structure (USDA Forest Service 2001, Appendix E, page E-19). A distribution population monitoring approach is identified for all of the terrestrial MIS in the 2007 SNF MIS Amendment, except for the greater sage-grouse (USDA Forest Service 2007a). Distribution population monitoring consists of collecting presence data for the MIS across a number of sample locations over time. Presence data are collected using a number of direct and indirect methods, such as surveys (population surveys), bird point counts, tracking number of hunter kills, counts of species sign (such as deer pellets), and so forth. The specifics regarding how these presence data are assessed to track changes in distribution over time vary by species and the type of presence data collected, as described in the SNF Bioregional MIS Report (USDA Forest Service 2008).

Aquatic Macroinvertebrate Status and Trend

For aquatic macroinvertebrates, condition and trend is determined by analyzing macroinvertebrate data using the predictive, multivariate River Invertebrate Prediction and Classification System (RIVPACS) (Hawkins 2003) to determine whether the macroinvertebrate community has been impaired relative to reference condition within perennial water bodies. This monitoring consists of collecting aquatic macroinvertebrates and measuring stream habitat features according to the Stream Condition Inventory (SCI) manual (Frasier et al. 2005). Evaluation of the condition of the biological community is based upon the “observed to expected” (O/E) ratio, which is a reflection of the number of species observed at a site versus the number expected to occur there in the absence of impairment. Sites with a low O/E scores have lost many species predicted to occur there, which is an indication that the site has a lower than expected richness of sensitive species and is therefore impaired.

Selection of Project level MIS

Management Indicator Species (MIS) for the Tahoe NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007a). The habitats and ecosystem components and associated MIS analyzed for the project were selected from this list of MIS, as indicated in Table K-1. In addition to identifying the habitat or ecosystem components (1st column), the CWHR type(s) defining each habitat/ecosystem component (2nd column), and the associated MIS (3rd column), Table K-1 discloses whether or not the habitat of the MIS is potentially affected by the Tahoe NF Motorized Travel Management Project (4th column).

Table K-1. Selection of MIS for Project-Level Habitat Analysis for the Tahoe NF Motorized Travel Management Project

Habitat or Ecosystem Component	CWHR Type(s) defining the habitat or ecosystem component[1]	Sierra Nevada Forests Management Indicator Species *Scientific Name*	Category for Project Analysis[2]
Riverine & Lacustrine	lacustrine (LAC) and riverine (RIV)	aquatic macroinvertebrates	3
Shrubland (west-slope chaparral types)	montane chaparral (MCP), mixed chaparral (MCH), chamise-redshank chaparral (CRC)	fox sparrow *Passerella iliaca*	3
Sagebrush		Greater sage grouse	1
Oak-associated Hardwood & Hardwood/conifer	montane hardwood (MHW), montane hardwood-conifer (MHC)	mule deer *Odocoileus hemionus*	3
Riparian	montane riparian (MRI), valley foothill riparian (VRI)	yellow warbler *Dendroica petechia*	3
Wet Meadow	Wet meadow (WTM), freshwater emergent wetland (FEW)	Pacific tree frog *Pseudacris regilla*	3
Early Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree sizes 1, 2, and 3, all canopy closures	Mountain quail *Oreortyx pictus*	3
Mid Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 4, all canopy closures	Mountain quail *Oreortyx pictus*	3
Late Seral Open Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P	Sooty (blue) grouse *Dendragapus obscurus*	3
Late Seral Closed Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6.	California spotted owl *Strix occidentalis occidentalis*	3
		American marten *Martes americana*	
		northern flying squirrel *Glaucomys sabrinus*	
Snags in Green Forest	Medium and large snags in green forest	hairy woodpecker *Picoides villosus*	3
Snags in Burned Forest	Medium and large snags in burned forest (stand-replacing fire)	black-backed woodpecker *Picoides arcticus*	2

[1] All CWHR size classes and canopy closures are included unless otherwise specified; **dbh** = diameter at breast height; **Canopy Closure classifications:** S=Sparse Cover (10-24% canopy closure); P= Open cover (25-39% canopy closure); M= Moderate cover (40-59% canopy closure); D= Dense cover (60-100% canopy closure); **Tree size classes:** 1 (Seedling)(<1" dbh); 2 (Sapling)(1"-5.9" dbh); 3 (Pole)(6"-10.9" dbh); 4 (Small tree)(11"-23.9" dbh); 5 (Medium/Large tree)(≥24" dbh); 6 (Multi-layered Tree) [In PPN and SMC] (Mayer and Laudenslayer 1988).

[2] **Category 1:** MIS whose habitat is not in or adjacent to the project area and would not be affected by the project.
Category 2: MIS whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project.
Category 3: MIS whose habitat would be either directly or indirectly affected by the project.

The sage grouse (Category 1) and the black-backed woodpecker (Category 2) will not be discussed further in this analysis. The sage grouse is a Category 1 species and does not occur on the Tahoe NF. Although habitat for the black-backed woodpecker occurs on the Tahoe NF, it is only affected by fire salvage and fire restoration projects.

The MIS whose habitat would be either directly or indirectly affected by the Tahoe NF Motorized Travel Management Project, identified as Category 3 in Table K-1, are carried forward in this analysis, which will evaluate the direct, indirect, and cumulative effects of the proposed action and alternatives on the habitat of these MIS. The MIS selected for project-level MIS analysis for the Tahoe NF Motorized Travel Management are: aquatic macroinvertebrates, fox sparrow, mule deer, yellow warbler, Pacific tree frog, mountain quail, sooty grouse (sooty grouse), California spotted owl, American marten, northern flying squirrel, and hairy woodpecker.

Bioregional Monitoring Requirements for MIS Selected for Project-Level Analysis

MIS Monitoring Requirements

The Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007a) identifies bioregional scale habitat and/or population monitoring for the Management Indicator Species for ten National Forests, including the Tahoe NF (USDA Forest Service 2007a). The habitat and/or population monitoring requirements for Tahoe NF's MIS are described in the Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA Forest Service 2008) and are summarized below for the MIS being analyzed for the Tahoe NF Motorized Travel Management Project. The applicable habitat and/or population monitoring results are described in the SNF Bioregional MIS Report (USDA Forest Service 2008) and are summarized in Section 5 below for the MIS being analyzed for the Tahoe NF Motorized Travel Management Project.

Habitat monitoring at the bioregional scale is identified for all the habitats and ecosystem components, including the following analyzed for the Tahoe NF Motorized Travel Management Project: shrubland; oak-associated hardwood & hardwood/conifer; riparian; wet meadow; early seral coniferous forest; mid seral coniferous forest; late seral open canopy coniferous forest; late seral closed canopy coniferous forest; snags in green forest.

Bioregional Monitoring for aquatic macroinvertebrates: Index of Biological Integrity (IBI) and habitat condition and trend are measured by collecting aquatic macroinvertebrates, and analyzing the resulting data using the River Invertebrate Prediction and Classification System (RIVPACS) (Hawkins 2003) to determine whether the macroinvertebrate community has been impaired relative to reference condition within perennial water bodies. In addition, stream habitat features are measured according to the Stream Condition Inventory (SCI) manual (Frasier et al. 2005).

Population monitoring at the bioregional scale for fox sparrow, mule deer, yellow warbler, Pacific tree frog, mountain quail, sooty grouse, California spotted owl, American marten, northern flying squirrel, and hairy woodpecker: Distribution population monitoring. Distribution population monitoring consists of

collecting presence data for the MIS across a number of sample locations over time (also see USDA Forest Service 2001, Appendix E).

How MIS Monitoring Requirements are Being Met

Habitat and/or distribution population monitoring for all MIS is conducted at the Sierra Nevada scale. Refer to the SNF Bioregional MIS Report (USDA Forest Service 2008) for details by habitat and MIS.

Description of Proposed Project

The Tahoe NF Motorized Travel Management Project proposes to 1) prohibit motorized vehicle travel off of designated NFS roads, NFS trails and areas by the public, except as allowed by permit or other authorization (excluding snowmobile use); 2) add between 0 (Alt 3 - adds none) and 283 miles (Alt 5 – adds the most) of motorized routes to the current National Forest Transportation System (NFTS); add 87 acres of open areas for OHV use (Alt 2 only); allow dry soil access to shoreline reservoir areas (Alt 2 only); seasonally restrict motorized use on native surface roads and trails; and change the class of vehicles.

Table K-2. Summary of Alternatives for the Tahoe NF Motorized Travel Management Project

Alternatives	Number of Acres Cross Country Travel	Miles of Route Additions	Areas Added to OHV Use	Reservoir Areas Added Open to Shoreline Access on Dry Soils	Seasonal Restrictions
Alternative 1	Prohibited 86,500 Continues 717,900	0	None	None	▪ Forest Plan ▪ Existing Forest Orders
Alternative 2	Prohibited 801,700 Designated Open 2,700	72.5	Eureka Diggins - 27 ac Greenhorn Area – 60 ac	Prosser, Boca, Stampede	▪ Forest Plan with amendment to Management Area 84 ▪ Existing Forest Orders
Alternative 3	Prohibited 804,400 Designated Open <100	0	None	None	▪ Forest Plan ▪ Existing Forest Orders
Alternative 4	Prohibited 804,400 Designated Open <100	31.2	None	None	▪ Forest Plan ▪ Existing Forest Orders ▪ Wet Weather
Alternative 5	Prohibited 804,400 Designated Open <100	282.8	None	None	▪ Forest Plan with amendment to Management Area 84 ▪ Existing Forest Orders ▪ Wet Weather
Alternative 6	Prohibited 804,400 Designated Open <100	70.3	None	None	▪ Forest Plan with amendment to Management Area 84 ▪ Existing Forest Orders ▪ Wet Weather
Alternative 7	Prohibited 804,400 Designated Open <100	45.1	None	None	▪ Forest Plan ▪ Existing Forest Orders

Effects of Proposed Project on the Habitat for the Selected Project-Level MIS

The following section documents the analysis for the following 'Category 3' species: aquatic macroinvertebrates, fox sparrow, mule deer, yellow warbler, Pacific tree frog, mountain quail, sooty grouse, California spotted owl, American marten, northern flying squirrel, and hairy woodpecker. The analysis of the effects of the Tahoe NF Motorized Travel Management Project on the MIS habitat for the selected project-level MIS is conducted at the **project** scale. The analysis used the following habitat data: Tahoe NF GIS 2000_veg. Detailed information on the MIS is documented in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Cumulative effects at the bioregional scale are tracked via the SNF MIS Bioregional monitoring, and detailed in the SNF Bioregional MIS Report (USDA Forest Service 2008).

Lacustrine/Riverine Habitat (Aquatic Macroinvertebrates)

Habitat/Species Relationship

Aquatic or Benthic Macroinvertebrates (BMI) were selected as the MIS for riverine and lacustrine habitat in the Sierra Nevada. They have been demonstrated to be very useful as indicators of water quality and aquatic habitat condition (Resh and Price 1984; Karr et al. 1986; Hughes and Larsen 1987; Resh and Rosenberg 1989). They are sensitive to changes in water chemistry, temperature, and physical habitat; aquatic factors of particular importance are: flow, sedimentation, and water surface shade.

Project-level Effects Analysis – Lacustrine/Riverine Habitat

Habitat Factor(s) for the Analysis: Flow; Sedimentation; and Water surface shade.

Flow. This habitat factor will be evaluated by assessing changes in the miles of perennial stream flow and intermittent stream flow, and changes in acres of lakes and ponds.

Sedimentation. This habitat factor will be evaluated by assessing miles of stream and acres of lake affected by sediment discharge as a result of native surfaced route crossings on streams and proximity of routes to streams, lakes and ponds. Sedimentation will be measured by route density within RCAs and Stream crossing density within RCAs.

Water surface shade. This habitat factor will be evaluated by assessing changes in water surface shade as a result of route locations that cross streams or are adjacent to streams, lakes and ponds. This change will serve to indicate changes in water surface shade to perennial and intermittent streams, and lakes and ponds.

Current Condition of the Habitat Factor(s) in the Project Area

Flow. There are currently 1,398 miles of perennial stream, 941 miles of intermittent stream, and approximately 11,599 acres of lakes, ponds, and reservoirs on Tahoe NF including on National Forest System lands. These miles of perennial and intermittent streams, and acres of lakes, ponds, and reservoirs comprise the habitat for aquatic macroinvertebrates across the Forest.

Sedimentation. Native surfaced, motorized stream crossings and motorized routes within close proximity to riverine and lacustrine habitats can be a considerable source of sediment delivery to aquatic habitats important to macroinvertebrates (See Chapter 3.02 Water Resources). There are currently 2,099

native surfaced, stream crossings, and 1719 miles of roads and trails within RCAs on the Tahoe NF. There are 3 water bodies on the Tahoe NF that are listed as impaired for sediment on the EPA's 303(d) List. These are Truckee River, Humbug Creek, and Squaw Creek.

Water surface shade. Water surface shade varies tremendously on the Tahoe NF depending on the type and amount of vegetation, topographic features, floodplain type, etc. that the watercourse falls within.

Direct and Indirect Effects to Habitat

Wet Weather Seasonal Closures

Proposed wet weather seasonal restrictions on native surfaced roads and trails were analyzed for the project alternatives in terms of all aquatic species and their habitats. Motorized travel on native surfaced routes during the wet weather season has the potential to cause erosion and deliver sediment to aquatic species habitats.

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where fish and other aquatic species would be benefited through the reduction of erosion and sedimentation that could occur from wet season wheeled motorized use on routes, especially motorized roads and trails that are within close proximity to or cross streams or other riparian aquatic habitats. Alternatives 1, 2, 3, and 7 do not impose wet weather seasonal restrictions on native surfaced motorized routes and therefore, aquatic riparian dependent species would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of motorized stream crossings and highest RCA route densities that could potentially delivery sediment to aquatic and riparian habitats from wheeled motorized use on native surfaced routes during the wet weather season.

Change in Class of Vehicle

The change in class of vehicle may change the impacts to soil and water resources due to the potential change from smoothed surfaced route to native (rough) surfaced route (See Chapter 3.02 Watershed Resources). If the route changes from smoothed surfaced to native surfaced, the change in class of vehicle may result in increased sediment and erosion risk. The analysis of the change in class of vehicles indicates Alternatives 2, 5, and 6 will result in an increase in high risk routes (native surfaced) by a change of 0.2 miles per square mile of RCA and by 0.3 crossings per square mile across the entire Tahoe NF, where increases in sedimentation to riverine and lacustrine habitats may occur over time. No change in class of vehicles would occur in Alternatives 1 and 3, only minor changes (3.4 miles) would occur in Alternatives 4 and 7.

Prohibition of Cross Country Travel

Under Alternative 1, no action, motorized cross country travel will not be prohibited on approximately 149,277 acres within Riparian Conservation Areas (RCAs), where the potential for adversely affecting aquatic macroinvertebrate habitat factors by increasing sedimentation and altering water surface shade. Under the action alternatives, prohibitions on cross country travel on 149,277 acres within RCA's will

likely reduce the potential for sedimentation and alteration of water surface shade, and therefore benefit aquatic riverine and lacustrine habitat quality.

Proposed Route Additions to NFTS

Measures or indicators of changes in sedimentation and water surface shade are assessed by analyzing the number of stream crossings additions associated with motorized trail additions to the NFTS, and the miles motorized trail additions within Riparian Conservation Areas (RCAs) for perennial and intermittent streams, and lakes, ponds, and reservoirs.

Number of Native Surfaced, Stream Crossings

The number of native surfaced, stream crossings is assessed for the alternatives, and provides a way to compare changes in sediment into riverine and lacustrine habitats for aquatic macroinvertebrates (Table K-3). Alternative 1 poses the greatest risk of increased sedimentation where 785 stream crossings are affected by the continuance of cross country travel on motorized trails unauthorized to motorized public use. Of the action alternatives, Alternative 5 results in the greatest number of native surfaced, stream crossings (563 crossings) associated with proposed motorized trail additions to National Forest Transportation System (NFTS), followed by Alternatives 2, 6, 7, and 4, in descending order (Table K-3). Alternative 3 does not add motorized trails to the NFTS, and therefore macroinvertebrate habitat factors of sedimentation or water surface shade would not be affected.

Table K-3. Number of Native Surfaced, Stream Crossings Associated with Motorized Route Additions

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Stream crossings associated with proposed motorized route additions (negative impact)	0	459	0	19	563	266	20
Stream Crossings that would remain with the continuance of cross country travel on existing routes unauthorized to motorized public use (negative impact)	785	0	0	0	0	0	0
Crossings that would be unauthorized to motorized public use with the prohibition of cross country travel (positive impact)	0	326	785	766	222	519	765

Miles of Proposed Route Additions within RCAs

The miles of proposed motorized trail additions to the National Forest Transportation System (NFTS) within RCAs were assessed for the alternatives, and provide additional information to assess the potential for off-site sediment delivery into riverine and lacustrine habitats for aquatic macroinvertebrates (Table K-4). Alternative 1 poses the greatest risk to increased sedimentation potential from 201 miles of motorized trails un-authorized for motorized use within RCAs that would remain due to not prohibiting cross country travel. Similar to stream crossing numbers, Alternative 5 also results in the greatest number of motorized route trails within RCAs that would be added to the NFTS, followed by Alternatives 2, 6, 7, and 4, in descending order (Table K-4). As stated above, Alternative 3 does not add motorized trails to the NFTS, and therefore changes to macroinvertebrate habitat factors of sedimentation or water surface shade would not occur.

Table K-4. Miles of Proposed Route Additions within Riparian Conservation Areas (RCAs)

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of proposed motorized trail additions within RCAs (negative impact)	0	79	0	6	111	49	8
Miles of existing motorized routes unauthorized to motorized public use within RCAs that would remain due to not prohibiting cross country travel (negative impact)	201	0	0	0	0	0	0
Miles of motorized routes within RCAs that would be prohibited to motorized public use with the prohibition of cross country travel (positive impact)	0	123	201	195	90	152	193

Summary of Direct and Indirect Effects to Macroinvertebrate Habitat Factors

Table K-5 summarizes the direct and indirect effects of macroinvertebrate habitat factors for the alternatives from proposed motorized trail additions to the National Forest Transportation System and cross country travel, including motorized trails un-authorized for motorized use. None of the action alternatives are expected to measurably change the amount of habitat within intermittent, perennial streams, lakes, ponds, and reservoirs. Flows within intermittent and perennial streams are expected to remain in existing conditions. Habitat quality will be affected from changes to sedimentation and to water surface shade. The following actions are assessed for their potential to affect sedimentation, and to a lesser degree to water surface shade. Native surface road and motorized trail crossings and within close proximity to watercourses have the potential to alter riparian habitat and therefore change the amount of water surface shade. These factors are measured by assessing the density of native surface road and motorized trails within the Riparian Conservation Areas (RCAs) and the density of stream crossings within RCAs. RCAs are defined as the area within 100 feet on each side of intermittent streams and 300 feet of perennial streams. Lakes, ponds, and reservoirs are considered perennial and have a 300 foot RCA. Water surface shade will be reduced by a very limited amount where shade has been removed by the proposed route crossings. Water surface shade alteration will depend upon the width of the crossing and the type of vegetation present at the crossing. Within some watercourses, water surface shade will either not be altered or only minimally reduced, such as, crossings within forested habitats. Crossings through riparian vegetation (herbaceous meadow plants and woody riparian shrubs) have resulted in a reduction of some water surface shade. The amount of water surface shade will depend on the width of the crossings and the number of crossings (crossing density).

Table K-5. Summary of Effects of Motorized Route Additions to Aquatic Macroinvertebrate Habitat Factors for the Alternatives

Alternatives	Changes in habitat quality in miles of Stream and Acres of Lakes/ Ponds/Reservoirs	Changes in Sediment Levels	Changes in Water Surface Shade
Alternative 1	Low	Increases the greatest (201 RCA route miles, 785 crossings)	Decreases the most
Alternative 2	Low	Increase (79 RCA route miles, 459 crossings)	Decrease
Alternative 3	Low	No Change	No Change
Alternative 4	Low	Increases the least (6 RCA miles, 19 crossings)	Decreases the least

Alternatives	Changes in habitat quality in miles of Stream and Acres of Lakes/ Ponds/Reservoirs	Changes in Sediment Levels	Changes in Water Surface Shade
Alternative 5	Low	Increase (111 RCA miles, 563 crossings)	Decrease
Alternative 6	Low	Increase (49 RCA miles, 266 crossings)	Decrease
Alternative 7	Low	Increase (8 miles, 20 crossings)	Decrease

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to aquatic macroinvertebrates include all perennial, intermittent streams, lakes, ponds, and reservoirs located within the boundary of the Tahoe NF.
Past and current cumulative effects to aquatic macroinvertebrate habitat that have affected the habitat factors of flow, sedimentation, and surface shade include current and historic grazing along watercourses; loss of habitat (shade) and increased sedimentation through catastrophic wildfires; timber and fuels management where sedimentation has increased and cover has been reduced or removed; mining and dredging, urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 31 active livestock grazing allotments including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the aquatic macroinvertebrates within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to aquatic macroinvertebrate habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Many recent, current, and future vegetation and fuels reduction projects are designed to minimize affects to stream and riparian habitats by following “riparian conservation objectives” as prescribed in the Sierra Nevada Forest Plan Amendment. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which may have resulted in changes in flow, increased sedimentation, and loss in surface cover.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including

camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increased impact to aquatic macroinvertebrate habitats because humans are attracted to streams, lakes, ponds, and reservoirs. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased impacts to aquatic macroinvertebrate habitat would be expected, particularly during the summer months.

Cumulative Effects Conclusion

For the action alternatives, generally, changes in flow and water surface shade will be too small to be measured. When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from grazing, vegetation/fuels projects, wildfires, mining, and recreation, Alternative 1 poses the greatest risk to the riverine and lacustrine habitats on the Tahoe NF, where cross country travel will continue on 149,277 acres within Riparian Conservation Areas where the highest potential to reduce habitat quality by increasing sediment delivery and alter water surface shade to aquatic macroinvertebrate habitats.

Changes in class of vehicles on native surfaced routes may potentially increase sedimentation to macroinvertebrate habitats under Alternatives 2, 5, and 6 by 0.2 miles per square mile of RCA and by 0.3 crossings per mile across the Tahoe NF. Changes in class of vehicles on native surfaced routes will not measurably increase sedimentation to macroinvertebrate habitats under Alternatives 4 and 7.

Wet weather seasonal restrictions under Alternatives 4, 5, and 6 on all native surfaced roads and trails would benefit macroinvertebrate habitat through the reduction of erosion and sedimentation that could result from wet season wheeled motorized use on routes, especially wheeled motorized routes that are within close proximity to macroinvertebrate habitats.

Sedimentation of macroinvertebrate habitats the greatest under Alternative 1, where 785 stream crossings and 201 RCA miles of motorized trails would continue to have un-authorized motorized use since cross country is not prohibited. For the action alternatives, Alternative 5 results in the greatest number of native surfaced, stream crossings, followed by Alternatives 2, 6, 7, and 4, in descending order from the addition of motorized trails to the National Forest Transportation System (NFTS). Alternative 3 does not add any stream crossings because no route additions are proposed to the NFTS.

Summary of Aquatic Macroinvertebrate Status and Trend at the Bioregional Scale

The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale Index of Biological Integrity and Habitat monitoring for aquatic macroinvertebrates; hence, the lacustrine and riverine effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by these monitoring data. The sections below summarize the Biological Integrity and Habitat status and trend data for aquatic macroinvertebrates. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat and Index of Biological Integrity Status and Trend. Aquatic habitat has been assessed using Stream Condition Inventory (SCI) data collected since 1994 (Frasier et al. 2005) and habitat status information from the Sierra Nevada Ecosystem Project (SNEP) (Moyle and Randall 1996). Index of Biological Integrity is assessed using the River Invertebrate Prediction and Classification System

(RIVPACS) and macroinvertebrate data collected since 2000 (see USDA Forest Service 2008, Table BMI-1). These data indicate that the status and trend in the RIVPACS scores is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Aquatic Macroinvertebrates Habitat Trend

The Tahoe NF Motorized Travel Management Project will affect the greatest amount of macroinvertebrate habitat under Alternative 1, through increased sedimentation and decreased surface shade, where 201 miles of motorized trails unauthorized to motorized public use would continue to occur under the continuance of cross country travel within RCAs. These motorized trails would effectively result in 785 native surfaced, stream crossings that could adversely affect the quality of macroinvertebrate habitats through increased sediment delivery and decreased surface water shade.

The analysis of the addition of motorized trails to the National Forest Transportation System (NFTS) for the action alternatives indicates Alternative 5 results in the greatest amount impact to macroinvertebrate habitat, though the potential increase in sedimentation and decrease in surface water shade from motorized stream crossings and RCA route miles (111 RCA miles, 563 crossings), followed by Alternatives 2, 6, 7, and 4, in descending order (Tables K-3, K-4 and K-5). Alternative 3 does not add any stream crossings or motorized trails within RCAs because no motorized trail additions to the NFTS are proposed under this alternative.

The action alternatives will not alter the existing trend in macroinvertebrate habitat, nor will it lead to a change in the distribution of macroinvertebrates across the Sierra Nevada bioregion. This is based on the relatively low amount of lacustrine and riverine habitat affected, the prohibition of cross country travel within 149,277 RCA acres, the probation of cross country travel on between 222 and 785 motorized RCA miles, and the prohibition of cross country travel on between 90 and 201 stream crossings.

Shrubland (West-Slope Chaparral) Habitat (Fox Sparrow)

Habitat/Species Relationship

The fox sparrow was selected as the MIS for shrubland (chaparral) habitat on the west-slope of the Sierra Nevada, comprised of montane chaparral (MCP), mixed chaparral (MCH), and chamise-redshank chaparral (CRC) as defined by the California Wildlife Habitat Relationships System (CWHR) (CDFG 2005). Recent empirical data from the Sierra Nevada indicate that, in the Sierra Nevada, the fox sparrow is dependent on open shrub-dominated habitats for breeding (Burnett and Humple 2003, Burnett et al. 2005, Sierra Nevada Research Center 2007).

Project-level Effects Analysis - Shrubland (West-Slope Chaparral) Habitat

Habitat Factor(s) for the Analysis: For the proposed alternatives, the habitat factor used in this analysis was the amount of shrubland habitat (west-slope chaparral) that fell within a 200 meter zone of influence of proposed routes to be added to the National Forest Transportation System (NFTS). The no action alternative (Alternative 1) was analyzed by determining the amount of shrubland habitat that fell within a 200 meter zone of influence of existing routes unauthorized to motorized public use.

Current Condition of the Habitat Factor(s) in the Project Area

The project area, comprised of the Tahoe NF boundary, currently has 62,928 acres of shrubland habitat. Shrubland habitat is comprised of various age classes that range from young shrubs, intermediate age classes, and mature to decadent shrub classes.

Direct and Indirect Effects to Habitat

Change in Class of Vehicles

Although responses to motorized vehicle use varies by species and depends upon the type of vehicle, in addition to the intensity, timing, speeds, and amount motorized vehicle use, the specific species responses are not well understood. For this analysis, it is assumed that all vehicle types result in the same disturbance to fox sparrow. Therefore, changes in the class of vehicles would not vary in their effects to fox sparrow for all of the proposed alternatives.

Seasonal Restrictions

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where fox sparrow habitat effectiveness would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced roads and motorized trails that are seasonally restricted during the wet weather season. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized roads and trails therefore the fox sparrow habitat effectiveness would not be enhanced due to wet weather seasonal restrictions. Cross country travel on motorized trails un-authorized for motorized use would have the greatest amount of disturbance to fox sparrow habitat, where the highest number of fox sparrow habitat would not receive the benefit of reduced disturbance associated with motorized use during the wet weather season.

Prohibition of Cross Country Travel

Under Alternative 1, cross country travel would not be prohibited, potentially affecting 39,639 acres of shrubland (west slope chaparral) habitat, potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the fox sparrow. For the action alternatives, cross country travel would be prohibited on 39,639 acres, where disturbance, avoidance, abandonment would be reduced or eliminated. Existing LRMP motorized prohibitions would remain in effect.

Proposed Route Additions to the NFTS

The direct and indirect effects to fox sparrow shrubland habitat from motorized trail additions to the National Forest Transportation System (NFTS) results in a decrease in habitat quality from disturbance, displacement and/or avoidance of habitat as a result of activities associated with motorized vehicle use. Based on the analysis conducted for fox sparrow shrubland habitat, Alternative 1 would affect the greatest amount of habitat within a 200-meter zone of influence (Table K-6). Approximately 5,754 acres or 0.6% of Sierra Nevada-wide habitat would be affected by continued cross country travel on motorized trails un-authorized for motorized use. Alternative 5 has the next highest direct and indirect effects to fox sparrow habitat, where 1,534 shrubland acres or 0.2% of Sierra Nevada-wide habitat would be affected by

proposed motorized trail additions to the NFTS. Alternatives 2, 6, and 7 are similar in their affects to shrubland habitat, where 383 acres or 0.04% of Sierra-wide habitat would be affected. Alternatives 3 and 4 do not result in any direct or indirect effects to fox sparrow habitat.

Table K-6. Acres Cross Country Travel Prohibitions and Proportion of Fox Sparrow MIS habitat within a 200-meter "Zone of Influence" of Proposed Routes

Fox Sparrow MIS Habitat		**Alt 1[1]**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Acres Cross Country Travel within Shrubland habitat								
Acres shrubland habitat where cross country travel would be prohibited	45,766 TNF habitat acres	0	39,639	39,639	39,639	39,639	39,639	39,639
Acres shrubland habitat where cross country travel would not be prohibited		39,639	0	0	0	0	0	0
Proportion of Fox Sparrow MIS habitat within a 200-meter "Zone of Influence" of Proposed Route Additions								
Acres shrubland (west-slope chaparral types)	Habitat Acres	9,590	767	0	0	2,302	767	767
Proportion of Habitat in Sierra Nevada	922,000	1%	0.1%	0%	0%	0.2%	0.1%	0.1%
Habitat Security Risk in Sierra Nevada bioregion		Low	Low	Low	Low	Low	Low	Low
Proportion of Habitat in Tahoe NF boundary[2]	62,928	15.2%	1.2%	0%	0%	3.7%	1.2%	1.2%
Habitat Security Risk in Sierra Nevada bioregion		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

[1]Alternative 1 includes existing routes unauthorized to motorized public use that would continue with continued cross country travel.

[2]The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to fox sparrow includes all suitable fox sparrow shrubland on the west slope of the Tahoe NF on the Yuba River Ranger District and the American River Ranger District. Past and current cumulative effects to fox sparrow include current and historic grazing of fox sparrow habitat; loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 22 active livestock grazing allotments on the American River and Yuba River Ranger Districts, including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix Q provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Since 1990, more than 130,000

acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to fox sparrow habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Thinning, mastications, and underburning treatments may result in some removal of shrubland habitat in the short-term, but may increase fox sparrow shrubland habitat in the long-term. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which have removed fox sparrow habitat, but over time, a large percentage of the burned areas quickly become revegetated by shrubland habitats, especially on highly productive sites on the west slope of the Tahoe NF.

Cumulative Effects Conclusion

Alternative 1 poses the greatest cumulative effects to fox sparrow MIS shrubland habitat on the Tahoe NF, where 9,590 acres out of 62,928 acres of fox sparrow habitat would be affected within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. This will add to existing cumulative effects by approximately 15.2%. Alternative 1 could contribute to a downward trend in fox sparrow habitat effectiveness within shrubland habitat (westslope chaparral on the Tahoe NF. Alternative 5 will affect 2,302 acres out of 62,928 acres fox sparrow shrubland habitat or 3.7% of the Tahoe NF fox sparrow shrubland habitat. Alternative 5 will only result in a small downward trend in habitat effectiveness on the Tahoe NF. Alternatives 2, 6, and 7 affect 767 out of 62,928 acres fox sparrow shrubland habitat or 1.2% of the fox sparrow habitat on the Tahoe NF, and will not alter overall fox sparrow shrubland habitat. Alternatives 3 and 4 do not directly or indirectly affect fox sparrow MIS habitat, therefore, no cumulative effects will occur from implementation of alternatives 3 and 4.

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where fox sparrow habitat effectiveness would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced roads and motorized trails that are seasonally restricted during the wet weather season. The change in the class of vehicles would not affect fox sparrow habitat for all of the proposed alternatives. Finally, all the action alternatives would prohibit motorized cross country travel on 39,639 acres of fox sparrow habitat, where habitat effectiveness would be enhanced through reduced disturbance and avoidance.

Summary of Fox Sparrow Status and Trend at the Bioregional Scale

The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the fox sparrow; hence, the shrubland effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the fox sparrow. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 922,000 acres of west-slope chaparral shrubland habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend is stable.

Population Status and Trend. The fox sparrow has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including: 1997 to present – Lassen National Forest (Burnett and Humple 2003, Burnett et al. 2005); 2002 to present - Plumas and Lassen National Forests (Sierra Nevada Research Center 2007); on-going monitoring through California Partners in Flight Monitoring Sites (CPIF 2002); 1992 to 2005 – Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations (Siegel and Kaschube 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that fox sparrows continue to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that, although there may be localized declines in the population trend, the distribution of fox sparrow populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Fox Sparrow Trend

The Tahoe NF Travel Management Project will directly, indirectly, and cumulatively affect between 5,754 acres (highest) of fox sparrow shrubland habitat under Alternative 1 and 0 acres (lowest) under Alternatives 3 and 4. Based on the acres affected, which range from 0% to 0.6% of the total Sierra Nevada-wide, the Tahoe NF Motorized Travel Management Project will not change the existing trend in the habitat, nor will it lead to a change in the distribution fox sparrows across the Sierra Nevada bioregion.

Oak-Associated Hardwoods and Hardwood/Conifer Habitat (Mule deer)

Habitat/Species Relationship

The mule deer was selected as the MIS for oak-associated hardwood and hardwood/conifer in the Sierra Nevada, comprised of montane hardwood (MHW) and montane hardwood-conifer (MHC) as defined by the California Wildlife Habitat Relationships System (CWHR) (CDFG 2005). Mule deer range and habitat includes coniferous forest, foothill woodland, shrubland, grassland, agricultural fields, and suburban environments (CDFG 2005). Many mule deer migrate seasonally between higher elevation summer range and low elevation winter range (Ibid). On the west slope of the Sierra Nevada, oak-associated hardwood and hardwood/conifer areas are an important winter habitat (CDFG 1998).

Project-level Effects Analysis - Oak-Associated Hardwoods and Hardwood/Conifer Habitat

Habitat Factor(s) for the Analysis: For the proposed alternatives, the habitat factor used in this analysis was the amount of oak-associated hardwood and hardwood/conifer habitat that fell within a 200 meter zone of influence of proposed routes to be added to the National Forest Transportation System (NFTS). The no action alternative (Alternative 1) was analyzed by determining the amount of oak-associated hardwood and hardwood/conifer habitat that fell within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use.

Current Condition of the Habitat Factor(s) in the Project Area

The Tahoe NF currently has 99,238 acres of oak-associated hardwood and hardwood/conifer habitat. Habitat is comprised of various age classes that range from sapling size with sparse canopy cover (CWHR size class 2S) to multi-layered stands with dense canopy cover (CWHR size class 6D).

Direct and Indirect Effects to Habitat

Change in Class of Vehicles

The change is the class of vehicles will have no effect to mule deer habitat, since the change in class of vehicles on existing motorized routes will generally not affect mule deer habitat condition. In general, some smoothed surfaced roads may become rough (native) surfaced roads through reduced road maintenance. In addition, some existing motorized National Forest Transportation System (NFTS) roads may receive lower maintenance resulting in higher vegetation density at the road margins which would provide additional cover and/or foraging habitat. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives.

Wet Weather Seasonal Restrictions

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where mule deer habitat effectiveness would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced roads and motorized trails that are seasonally restricted during the wet weather season. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized roads and motorized trails and therefore, the mule deer habitat effectiveness would not be enhanced when native surfaced motorized roads and trails are under wet weather seasonal restrictions. Under Alternative 1, not prohibiting cross country travel, including existing motorized trails un-authorized for motorized use, would result in the greatest amount of disturbance to mule deer within oak-associated hardwood and hardwood/conifer habitats.

Prohibition of Cross Country Travel

Under Alternative 1, cross country travel would not be prohibited, potentially affecting 65,239 acres of oak-associated hardwood and hardwood/conifer habitat, resulting in reduced habitat effectiveness through disturbance, avoidance, and abandonment for the mule deer. For the action alternatives, cross country travel would be prohibited on 65,239 acres, where disturbance, avoidance, and abandonment by mule deer would be reduced or eliminated.

Proposed Route Additions to the NFTS

Mule deer were found to respond to disturbance associated with secondary motorized roads and trails within a 200 meter distance. Although, because deer may respond differently, depending on the type of route and the type of surrounding vegetation, analyzing for these variables can be complex. The amount of disturbance to deer depends upon the type of route, the intensity of use, and the degree to which motorized activities overlap with deer use. The project alternatives only consider the addition of motorized trails to the National Forest Travel System (NFTS) that are native surfaced, which have less

volume of traffic and receive lower rates of speed. Therefore, a Zone of Influence within 200 meters of motorized routes was used by to compare differences in the direct and indirect impacts between alternatives for oak associated hardwood and hardwood/conifer habitat used by deer as represented by CWHR types MHW and MHC. Oak associated hardwood and hardwood/conifer affected within a 200-meter zone of influence was then compared to the amount of oak associated hardwood and hardwood/conifer habitat available Sierra Nevada-wide.

Areas that are less influenced by motorized roads and trails are considered "security habitat," whereas, areas influenced by routes are considered "zones of influence" where deer are less secure. For Alternative comparison purposes, a simple ranking system, such as the one developed by Gaines et al. (2003), is used. For this purpose, less than 25 percent of key habitat affected was ranked as a low level of road or trail influence, 25 to 50 percent of key habitat affected was ranked as a moderate level of influence, and greater than 50 percent of key habitat affected was ranked as a high level of influence. Using this ranking system, all the alternatives result in a low "security" risk to mule deer habitat. The habitat effectiveness of oak-associated hardwood and hardwood/conifer habitat would be minimally affected by the influence of motorized routes.

Alternative 1 poses the greatest risk to oak-associated hardwood and hardwood/conifer habitats by affecting 13,595 acres or 1.7% of Sierra Nevada-wide habitat (Table K-7). These 13,595 acres will result in reduced habitat effectiveness from potential disturbance or avoidance behavior as a result of factors associated with motorized roads and trails. Alternative 5 directly and indirectly affects 1,699 acres or 0.1% of Sierra Nevada-wide oak associated hardwood and hardwood/conifer habitats. The remaining action alternatives do not affect oak associated hardwood and hardwood/conifer habitats, and therefore, do not directly or indirectly affect mule deer habitat within oak associated hardwood and hardwood/conifer habitats.

Table K-7 Acres of Cross Country Travel Prohibitions and Proportion of Mule Deer MIS habitat within a 200-meter "Zone of Influence" of Proposed Routes

		Alt 1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres of Cross Country Travel Prohibitions Within Oak-Associated Hardwood and Hardwood/Conifer Habitats								
Acres oak-associated and hardwood conifer habitat where cross country travel would be prohibited	73,107 TNF habitat acres	0	65,239	65,239	65,239	65,239	65,239	65,239
Acres oak-associated and hardwood conifer habitat where cross country travel would not be prohibited		65,239	0	0	0	0	0	0
Proportion of Mule Deer MIS habitat within a 200-meter "Zone of Influence" of Proposed Routes								
Acres Oak-associated hardwood and hardwood/conifer habitats		13,595	0	0	0	1,699	0	0
Proportion of Sierra Nevada Habitat	809,000	1.7%	0%	0%	0%	0.1%	0%	0.0%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat[2]	99,238	13.6%	0%	0%	0%	1.7%	0%	0%
Habitat Security Risk in Sierra Nevada		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

[1]Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel.

[2]The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to mule deer includes all suitable mule habitats within the boundary of the Tahoe NF. Past and current cumulative effects to mule deer include current and historic grazing of mule deer habitat; loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 31 active livestock grazing allotments including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the mule deer within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to mule deer habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally do not increase forage condition for deer because they do not usually result in reducing the canopy cover below 40%, except for group selection harvest treatments on the Sierraville

RD. Group selection harvests are expected to increase forage condition and increase forest structural diversity. These thinning treatments may result in the short-term reduction in cover for deer, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Many recent, current, and future vegetation and fuels reduction projects are emphasizing habitat improvement for deer by removing competing conifers within oak habitats and aspen habitats which are designed to enhance mule deer foraging condition. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which have removed mule deer habitat.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increase in negative interactions between humans and mule deer. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased disturbance to mule deer would be expected, particularly during the summer months. Table K-8 lists the reasonably foreseeable recreation projects that are expected to occur. Two non-motorized trails are being proposed for development in the near future. The development and use of these trails may slightly increase disturbance to mule deer since deer have been shown to demonstrate increased responses to humans when humans are in close proximity to deer, especially when humans are on foot.

Additionally, Table K-8 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit re-issuances, and describes potential cumulative impacts to mule deer.

Table K-8. Direct, Indirect and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Mule Deer Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities, changes in cover, foraging habitat enhancement in aspen and oak habitats.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve riparian and meadow habitat quality used for forage and fawning.	Beneficial cumulative impact by improving long-term forage and fawning habitat quality.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance.	Slight increase in cumulative impact.
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

When considering all the cumulative effects of past, present, and reasonably foreseeable future impacts from grazing, vegetation/fuels projects, wildfires, and recreation, Alternative 1 poses the greatest risk to the 4 major deer herds on the Tahoe NF, where between 12% and 27% of key winter ranges are influenced by motorized trails un-authorized for motorized use, and between 7% and 41% of key summer ranges are affected, depending on the deer herd. Alternative 5 slightly increases the amount of cumulative effects on key deer habitats over the other action alternatives, where site specific localized effects may occur. The remaining action alternatives are similar and only slightly increase overall cumulative impacts to the 4 major deer herds on the Tahoe NF. Alternative 3 does not add any motorized trails un-authorized for motorized use to the National Forest Transportation System (NFTS), so does not add to existing cumulative impacts. All the action alternatives will result in a beneficial impact to all deer ranges across the Tahoe NF from the prohibition of cross-country travel, including motorized travel on approximately 1,123 to 1,294 miles of existing motorized trails un-authorized for motorized use depending on the alternative. It is expected that non-motorized use may occur on these motorized trails un-authorized for motorized use which would likely result in less disturbance to mule deer. However, some studies indicate that certain non-motorized activities (hiking, mountain bicycling, equestrian, etc.) could actually result in greater disturbance to mule deer. At any rate, the amount of disturbance caused by non-motorized use will depend on the type, intensity and duration of the use. The prohibition of cross country travel, including motorized trails un-authorized for motorized use, become revegetated and recover over time, either through active or passive restoration efforts, overall mule deer disturbance from human activity is

expected to diminish in the future. In addition, Alternatives 4, 5, & 6 would benefit deer on winter ranges through the implementation of wet weather closures on native surfaced roads and motorized trails.

Cumulative Effects Conclusion

Alternative 1 poses the greatest cumulative effects to mule deer MIS oak-associated hardwood and hardwood/conifer habitat on the Tahoe NF where 13,595 acres out of 99,238 acres of mule deer habitat would be affected within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. This will add to existing cumulative effects by approximately 13.6%. Alternative 1 could contribute to a downward trend in mule deer habitat effectiveness within oak-associated and hardwood/conifer habitats on the Tahoe NF. Alternative 5 will affect 1,699 acres out of 99,238 acres mule deer habitat or 1.7% of the Tahoe NF oak-associated hardwood and hardwood/conifer habitat. Alternative 5 will not alter existing trend in oak-associated hardwood and hardwood/conifer habitat on the Tahoe NF. The remaining action alternatives do not directly or indirectly affect oak-associated hardwood and hardwood/conifer habitat, therefore, no cumulative effects will occur from implementation of alternatives 2, 3, 4, 6, or 7.

The change is the class of vehicles will have no effect to mule deer habitat, since the change in class of vehicles on existing National Forest Transportation System (NFTS) roads will generally not affect mule deer habitat condition. Wet weather seasonal restrictions under Alternatives 4, 5, and 6 on all native surfaced roads and trails would benefit mule deer habitat effectiveness through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted. Finally cross country travel would be prohibited on 65,239 acres with the implementation of the action alternatives where disturbance, avoidance, and abandonment by mule deer would be reduced or eliminated. Alternative 1 would have the greatest risk to mule deer habitats, where cross country travel would not be prohibited, affecting 65,239 acres of oak-associated hardwood and hardwood/conifer habitat.

Summary of Mule Deer Status and Trend at the Bioregional Scale

The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the mule deer; hence, the oak-associated hardwood and hardwood/conifer effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the mule deer. This information is drawn from the detailed information on habitat and population trends in the Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 809,000 acres of oak-associated hardwood and hardwood/mixed conifer habitat on National Forest System lands in the Sierra Nevada. The trend is slightly increasing (within the last decade, changing from 5% to 7% of the acres on National Forest System lands).

Population Status and Trend. The mule deer has been monitored in the Sierra Nevada at various sample locations by herd monitoring (spring and fall) and hunter survey and associated modeling (CDFG 2007). California Department of Fish and Game (CDFG) conducts surveys of deer herds in early spring to determine the proportion of fawns that have survived the winter, and conducts fall counts to determine

herd composition (CDFG 2007). This information, along with prior year harvest information, is used to estimate overall herd size, sex and age rations, and the predicted number of bucks available to hunt (ibid). These data indicate that mule deer continue to be present across the Sierra Nevada, and current data at the rangewide, California, and Sierra Nevada scales indicate that, although there may be localized declines in some herds or Deer Assessment Units, the distribution of mule deer populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mule Deer Trend

Alternative 1 results the greatest amount of oak-associated hardwood and hardwood/conifer habitat 13,595 acres (1.7% of Sierra Nevada-wide habitat) affected by cross country travel, including use on existing motorized trails un-authorized for motorized use. Alternative 5 results in 1,699 acres or 0.1% of Sierra Nevada-wide habitat affected, where mule deer habitat within oak-associated hardwood and hardwood/conifer habitat types would be reduced. The remaining action alternatives (Alt 2, Alt 3, Alt 4, Alt 6, Alt 7) do not affect oak-associated hardwood and hardwood/conifer habitat. Based on the small percentage of habitat affected, the Tahoe NF Motorized Travel Management Project will not alter the existing habitat trend, nor will it lead to a change in the distribution of mule deer across the Sierra Nevada bioregion.

Riparian Habitat (Yellow warbler)

Habitat/Species Relationship

The yellow warbler was selected as the MIS for riparian habitat in the Sierra Nevada. This species is usually found in riparian deciduous habitats in summer (cottonwoods, willows, alders, and other small trees and shrubs typical of low, open-canopy riparian woodland) (CDFG 2005). Yellow warbler is dependent on both meadow and non-meadow riparian habitat in the Sierra Nevada (Siegel and DeSante 1999). On the Tahoe NF, CWHR montane riparian habitat (MRI) provides suitable habitat for the yellow warbler.

Project-level Effects Analysis – Montane Riparian Habitat

Habitat Factor(s) for the Analysis: Two habitat factors were used to assess the effects of the proposed motorized trail additions to the National Forest Transportation System (NFTS) for the alternatives on yellow warbler habitat. For Alternative 1, the habitat factors were used to assess the effects on existing motorized trails un-authorized for motorized use. The habitat factors used to assess direct and indirect effects of motorized routes for the yellow warbler were riparian habitat acres affected and the proportion of montane riparian habitat within a 200-meter “zone of influence” of motorized routes.

Habitat Acres: Acres of montane riparian habitat provides a measure of the direct effect to montane riparian habitat from proposed route additions. Habitat acres were determined by the length of the road/trail multiplied by the width of the Road/trail. Road/trail width is assumed to be a maximum of 8 feet. In some cases, route width may be less; therefore, impacts may be somewhat over-emphasized.

Zone of Influence within 200 meters: For the action alternatives, the habitat factor used to assess the effects of yellow warbler habitat effectiveness consisted of determining the amount of montane riparian habitat that fell within a 200-meter zone of influence of proposed motorized trail additions.

Current Condition of the Habitat Factor(s) in the Project Area

The Tahoe NF has approximately 5,131 acres CWHR montane riparian habitat (MRI).

Direct and Indirect Effects to Habitat

Change in Class of Vehicles

The change in class of vehicle on some existing National Forest Transportation System (NFTS) roads may result in some smoothed surfaced roads becoming rough surfaced roads through changed road maintenance. In addition, some existing motorized NFTS roads may receive lower maintenance resulting in increased vegetation density at the road margins which would provide additional cover and/or foraging habitat. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives. For the yellow warbler, existing habitat conditions will dictate whether or not the change in class of vehicle will result in reduced habitat quality. The analysis of the change in class of vehicles indicates Alternatives 2, 5, and 6 will result in an increase in high risk routes (native surfaced) by a change of 0.2 miles per square mile of RCAs and by 0.3 stream crossings per square mile across the entire Tahoe NF (see Chapter 3.02 Watershed Resources). In general, it is not expected that the change in class of vehicle would result in a significant change to yellow warbler habitat conditions, unless changes in road maintenance results in increased montane riparian habitat degradation. No change in class of vehicles would occur in Alternatives 1, 3, 4, and 7.

Wet Weather Seasonal Restrictions

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where montane riparian habitats for the yellow warbler would be benefited through the reduction of erosion and sedimentation that could occur from wet season wheeled motorized use on routes, especially motorized roads and trails that are within close proximity to yellow warbler habitat. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized roads and trails and therefore, yellow warbler habitat would not benefit from wet weather seasonal restrictions. Alternative 1 has the greatest number of stream crossings and highest RCA route densities that could potentially delivery sediment to montane riparian habitats from wheeled motorized use on native surfaced routes during the wet weather season.

Prohibition of Cross Country Travel

Under Alternative 1, cross country travel would not be prohibited, affecting 3,525 acres of montane riparian habitat, potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the yellow warbler. For the action alternatives, cross country travel would be prohibited on 3,525 acres, where disturbance, avoidance, abandonment would be reduced or eliminated.

Proposed Route Additions to the NFTS

Table K-9 displays the acres of montane riparian habitat directly and indirectly affected by the alternatives. Alternative 1 affects the greatest amount of montane riparian habitat, suitable for yellow warbler, where continued use of motorized trails un-authorized for motorized use results in a loss or reduction in montane riparian habitat within 10 out of 5,131 acres or 0.2% of Tahoe NF montane riparian habitat. Alternatives 2, 5, & 6 are similar in their effects to montane riparian habitat, where proposed additions of motorized trails to the National Forest Transportation System (NFTS) results in between 0.4 and 0.6 acres out of 5,131 acres or 0.01% of Tahoe NF yellow warbler habitat. Alternatives 3, 4, and 7 have either minimal or no habitat affected by the proposed motorized trail additions.

Table K-9. Proportion of Yellow Warbler MIS habitat affected by of Proposed Route Additions

Yellow Warbler MIS Habitat	Yellow Warbler Habitat Acres	Alt1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres Montane Riparian Habitat		10	0.4	0	0.04	0.6	0.4	0.1
Proportion of Sierra Nevada Habitat	29,000	.03%	0%	0%	0%	0%	0%	0%
Habitat Security Risk in Sierra Nevada		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**
Proportion of Tahoe NF Habitat	5,131	0.2%	0.01%	0%	0%	0.01%	0.01%	0%
Habitat Security Risk in Tahoe NF		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

*Alternative 1 includes existing routes un-authorized to motorized public use that would continue with the continuance of cross country travel.

Cumulative Effects to Habitat in the Analysis Area

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities have or will contribute to impacts to the montane riparian habitat for the yellow warbler within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Generally, vegetation/fuels management projects have not affected habitat within montane riparian habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Many recent, current, and future vegetation and fuels reduction projects are designed to minimize affects to montane riparian habitats by following “riparian conservation objectives” as prescribed in the Sierra Nevada Forest Plan Amendment Record of Decision (2004). Between 1994 and 2008, approximately 94,000 acres burned on the Tahoe NF, some of which have resulted in substantial changes in montane riparian habitat. In many cases, montane riparian habitat that was severely burned during a stand-replacing wildfire resulted in changes to or loss of riparian vegetation, loss of shade, cover, and structural diversity. In some cases, some riparian areas recovered post-fire and were significantly enhanced (i.e. aspen habitats in the Cottonwood Fire of 1994).

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing,

cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increased impact to montane riparian habitats because humans are attracted to these areas for their beauty and scenic quality. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased impacts to montane riparian habitat would be expected, particularly during the summer months. Table K-10 lists the reasonably foreseeable future projects and the associated direct, indirect, and cumulative impacts that are planned to occur on the Tahoe NF.

Table K-10. Direct, Indirect and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Yellow Warbler Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities, changes in cover, foraging habitat enhancement in aspen and oak habitats.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact to montane riparian habitat.
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve montane habitat quality and quantity used for foraging and nesting.	Beneficial cumulative impact by improving long-term habitat quality.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance where trail is in close proximity to yellow warbler habitat.	No cumulative impact to montane riparian habitat..
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

Cumulative Effects Conclusion

Alternative 1, no action, affects the greatest amount of yellow warbler habitat (10 acres out of 5,131 acres) on the Tahoe NF. Alternatives 2, 3, and 7 do not affect yellow warbler habitat (or affects only a nominal amount) from proposed route additions. Alternatives 2, 5, and 6 alter less than 0.02% of yellow warbler habitat (0.4 acres to 0.6 acres out of 5,131 acres Tahoe NF habitat). In general, it is not expected that the change in class of vehicle would result in a significant change to yellow warbler habitat conditions, unless changed road maintenance results in increased montane riparian habitat degradation. Wet weather seasonal restrictions on all native surfaced roads and motorized trails under Alternatives 4, 5,

and 6 would benefit montane riparian habitat for the yellow warbler through the reduction of erosion and sedimentation. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized roads and trails and therefore, montane riparian habitat for the yellow warbler would not benefit from wet weather seasonal restrictions. Finally, Alternative 1 would pose the greatest risk on 3,525 acres of yellow warbler habitat, where cross country travel would not be prohibited causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the yellow warbler. For the action alternatives, cross country travel would be prohibited on 3,525 acres, where disturbance, avoidance, abandonment would be reduced or eliminated. Overall, none of the alternatives will alter the existing trend in yellow warbler habitat. However, Alternative 1, which does not prohibit cross country motorized travel to continue, could alter yellow warbler trend.

Summary of Yellow Warbler Status and Trend at the Bioregional Scale

The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the yellow warbler; hence, the riparian habitat effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the yellow warbler. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 29,000 acres of riparian habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend is stable.

Population Status and Trend. The yellow warbler has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including Lassen NF (Burnett and Humple 2003, Burnett et al. 2005) and Inyo NF (Heath and Ballard 2003) point counts; on-going California Partners in Flight monitoring and studies (CPIF 2004); 1992 to 2005 – Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations (Siegel and Kaschube 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that yellow warblers continue to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of yellow warbler populations in the Sierra Nevada is stable.

Relationship of Project-level Habitat Impacts to Bioregional-Scale Yellow Warbler Trend

Alternative 1 results the greatest amount of montane riparian habitat 10 acres of 29,000 acres (0.03% of Sierra Nevada-wide habitat) affected by cross country travel, including use on existing motorized trails not authorized for motorized use. The action alternatives result in none to very few (0 acres to less than 1 acre out of 29,000 acres) acres of yellow warbler habitat compared to Sierra Nevada-wide habitat available. Based on the small percentage of habitat affected, the Tahoe NF Motorized Travel Management Project will not alter the existing habitat trend, nor will it lead to a change in the distribution of yellow warbler across the Sierra Nevada bioregion.

Wet Meadow Habitat (Pacific tree frog)

Habitat/Species Relationship

The Pacific tree frog was selected as an MIS for wet meadow habitat in the Sierra Nevada. This broadly distributed species requires standing water for breeding; tadpoles require standing water for periods long enough to complete aquatic development, which can be as long as 3 or more months at high elevations in the Sierra Nevada (CDFG 2005). During the day during the breeding season, adults take cover under clumps of vegetation and surface objects near water; during the remainder of the year, they leave their breeding sites and seek cover in moist niches in buildings, wells, rotting logs or burrows (ibid).

Project-level Effects Analysis – Wet Meadow Habitat

Habitat Factor(s) for the Analysis: For this analysis the acres of wet meadow (WTM) habitat altered by the proposed alternatives is assessed. The amount of wet meadow altered or removed is calculated by determining the length of proposed routes that intersect wet meadows and multiplying by 8 feet (assumption: width of roads/trails equals 8 feet), and then converting to acres. Herbaceous cover, herbaceous plant height and meadow hydrology have the potential to be indirectly affected by motorized roads and trails. In general, degradation in meadow hydrologic condition caused by motorized roads and trails can lead to reduced herbaceous cover and height, as well as changes in meadow plant species composition.

Current Condition of the Habitat Factor(s) in the Project Area

The Tahoe NF currently has 7,976 acres of wet meadow habitat. Wet meadow habitat condition varies across the Forest from early, mid to late seral ecological status condition. In general, wet meadows on the Tahoe NF predominately fall in the mid ecological status category. Wet meadow herbaceous ground cover ranges from sparse to dense depending upon the ecological status and management activities. Herbaceous height classes range from short to tall (<12” to >12”), with the majority averaging over 12” in height. Hydrological condition of wet meadows generally correlates with meadow ecological status.

Direct and Indirect Effects to Habitat

Change in Class of Vehicles

The change in class of vehicle on some existing National Forest Transportation System (NFTS) motorized routes may result in some smoothed surfaced roads becoming rough surfaced roads through changed road maintenance, and would likely result in slower travel speeds. In addition, some existing motorized NFTS roads may receive different maintenance potentially resulting in increased vegetation density at the road margins which would provide additional cover and/or foraging habitat. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives. For the Pacific tree frog, it is expected that the change in class of vehicle could result in habitat degradation within wet meadow habitat, but that would depend on the existing condition of the road and the condition of road where it intersects the wet meadow habitat depending upon current conditions, soil type and soil moisture conditions. The analysis of the change in class of vehicles indicates Alternatives 2, 5, and 6 will result in an increase in high risk routes (native surfaced) by a change of 0.2 miles per square mile of RCA and by 0.3 crossings per square mile across the entire Tahoe NF (see

Chapter 3.02 Watershed Resources), where vegetation and soil degradation could occur from erosion within some wet meadow habitats. No or only limited change in class of vehicles would occur in Alternatives 1, 3, 4, and 7.

Wet Weather Seasonal Restrictions

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where wet meadow habitat for the Pacific tree frog would be benefited through the reduction of erosion and sedimentation that could occur from wet season wheeled motorized use on routes, especially National Forest Transportation System roads and motorized trails that are within close proximity to wet meadow habitats. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized roads and trails and therefore, wet meadow habitats would not benefit from wet weather seasonal restrictions.

Prohibition of Cross Country Travel

Under Alternative 1, cross country travel would not be prohibited, affecting 9,167 acres of wet meadow habitat, potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the Pacific tree frog. For the action alternatives, cross country travel would be prohibited on 9,167 wet meadow acres, where disturbance, avoidance, and abandonment to the Pacific tree frog would be reduced or eliminated.

Proposed Route Additions to NFTS

Table K-11 displays the acres of wet meadow habitat directly and indirectly affected by the alternatives. Alternative 1 affects the greatest amount of wet meadow habitat, suitable for the Pacific tree frog, where motorized trails un-authorized for motorized use result in a loss or reduction in wet meadow habitat within 13 out of 66,000 acres or 0.2% of Sierra Nevada wet meadow habitat. Alternative 3 does not affect wet meadow habitat, since no motorized trails are proposed to be added to the National Forest Transportation System (NFTS). The remaining action alternatives affects between 0.3 acres and 1 acre (Alt 7 – least, Alt 5 – most) wet meadow habitat, where proposed motorized trail additions to the National Forest Transportation System results in a nominal amount of Sierra Nevada wet meadow habitat.

Table K-11. Proportion of Pacific Tree Frog MIS Wet Meadow habitat affected by of Proposed Motorized Trail Additions to the National Forest Transportation System

Pacific tree frog MIS Habitat	Wet Meadow Habitat Acres	Alt1[1]	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Acres Wet Meadow Habitat[2]		13	0.5	0	0.04	1.1	0.5	0.3
Proportion of Sierra Nevada Habitat	66,000	0.02%	0.001 %	0%	0%	0.002 %	0.001 %	0%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat	10,246	0.13%	.005%	0%	0%	0.01%	.005%	.003%
Habitat Security Risk in Tahoe NF		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

[1]Alternative 1 includes existing routes unauthorized to motorized public use under the continuance of cross country travel.

[2] The acres of wet meadow habitat affected by proposed route additions is calculated by multiplying the length of the route by the width of the route, and then converting to acres. The route width is assumed to be 8 feet. In some cases, route width will be less, and therefore, acres affected will be overestimated.

Cumulative Effects to Habitat in the Analysis Area

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities have or will contribute to impacts to wet meadow habitat for the Pacific tree frog within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Generally, vegetation/fuels management projects have not affected habitat within wet meadow habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. Many recent, current, and future vegetation and fuels reduction projects are designed to minimize affects to wet meadow habitats by following "riparian conservation objectives" as prescribed in the Sierra Nevada Forest Plan Amendment Record of Decision (2004). Between 1994 and 2008, approximately 94,000 acres burned on the Tahoe NF, some of which may have altered in wet meadow habitat.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to increase impacts to wet meadow habitat because humans are attracted to these areas for their beauty and scenic quality. In addition, off road travel within wet meadow habitat can have a long-lasting, detrimental impact from wheel tracks, and the subsequent loss of vegetation and drying of wet meadow habitats. Damage to wet meadow habitats has resulted from off road use in several localized areas on the Tahoe NF, particularly in the spring months following snowmelt. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased impacts to Pacific tree frog wet meadow habitat would be expected from increased motorized use. Table K-12 lists the reasonably foreseeable future projects on the Tahoe NF, and the associated direct, indirect, and cumulative impacts.

Table K-12. Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Pacific Tree Frog Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/ fuels reduction – thinning, group select, and aspen enhancement	13	No change in wet meadow habitat expected.	No cumulative impact
Hazard tree removal	2	No change in wet meadow habitat expected	No cumulative impact.
Fish passage construction project	1	No change in wet meadow habitat expected.	No cumulative impact
Watershed Restoration (Carman II and Perazzo)	2	Short-term habitat impacts during implementation. Improve wet meadow vegetation and hydrologic condition used for foraging and reproduction.	Beneficial cumulative impact by improving long-term wet meadow habitat quality and quantity, including enhancement of meadow vegetation composition and hydrologic condition.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance where trail is in close proximity to Pacific tree frog habitat.	No cumulative impact to wet meadow habitat..
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

Cumulative Effects Conclusion

Alternative 1, no action, affects the greatest amount of Pacific tree frog wet meadow habitat (13 acres out of 10,246 acres or 0.13%) on the Tahoe NF. The action alternatives, all affect less than 0.01% (between 0 acres and 1.1 acre out of 10,246 acres of Tahoe NF wet meadow habitat acres) (Alt 3 – least, Alt 5 – most). In general, it is not expected that the change in class of vehicle would result in a significant change to Pacific tree frog habitat conditions, unless changed road maintenance results in increased montane riparian habitat degradation. Wet weather seasonal restrictions on all native surfaced roads and motorized trails under Alternatives 4, 5, and 6 would benefit wet meadow habitat for the Pacific tree frog through the reduction of erosion and sedimentation. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized roads and trails and therefore, wet meadow habitat for the Pacific tree frog would not benefit from wet weather seasonal restrictions. Finally, Alternative 1 would pose the greatest risk on 9,167 acres of Pacific tree frog habitat, where cross country travel would not be prohibited causing reduced habitat effectiveness through disturbance, avoidance, and abandonment of the species. For the action alternatives, cross country travel would be prohibited on 9,167 acres, where disturbance, avoidance, abandonment would be reduced or eliminated. Overall, none of the alternatives will alter the existing trend in wet meadow habitat. However, Alternative 1, which does not prohibit cross country travel, could alter wet meadow habitat trend.

Summary of Pacific Tree Frog Status and Trend at the Bioregional Scale

The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the Pacific tree frog; hence, the wet meadow effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the Pacific tree frog. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 66,000 acres of wet meadow habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend is stable.

Population Status and Trend. Since 2002, the Pacific tree frog has been monitored on the Sierra Nevada forests as part of the Sierra Nevada Forest Plan Amendment (SNFPA) monitoring plan (USDA Forest Service 2006, 2007b; Brown 2008). These data indicate that Pacific tree frog continues to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of Pacific tree frog populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Pacific Tree Frog Trend

Alternative 1 results the greatest amount of wet meadow habitat 13 acres of 66,000 acres (0.02% of Sierra Nevada-wide habitat) affected by not prohibiting cross country travel, including use on existing motorized trails not authorized for motorized use. The action alternatives result in affecting none to very few (0 acres to 1 acre out of 66,000 acres) acres of wet meadow habitat compared to Sierra Nevada-wide habitat available. Based on the small percentage of habitat affected, the Tahoe NF Motorized Travel Management Project will not alter the existing habitat trend, nor will it lead to a change in the distribution of Pacific tree frog across the Sierra Nevada bioregion.

Early and Mid Seral Coniferous Forest Habitat (Mountain quail)

Habitat/Species Relationship

The mountain quail was selected as the MIS for early and mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat in the Sierra Nevada. Early seral coniferous forest habitat is comprised primarily of seedlings (<1” dbh), saplings (1”-5.9” dbh), and pole-sized trees (6”-10.9” dbh). Mid seral coniferous forest habitat is comprised primarily of small-sized trees (11”-23.9” dbh). The mountain quail is found particularly on steep slopes, in open, brushy stands of conifer and deciduous forest and woodland, and chaparral; it may gather at water sources in the summer, and broods are seldom found more that 0.8 km (0.5 mi) from water (CDFG 2005).

Project-level Effects Analysis – Early and Mid Seral Coniferous Forest Habitat

Habitat Factor(s) for the Analysis: The habitat factor used in this analysis for the action alternatives was the amount of early and mid seral coniferous forest habitat that fell within the 200-meter zone of influence of proposed motorized trail additions to the National Forest Transportation System (NFTS). For alternative 1, no action, the amount of early and mid seral coniferous forest habitat that fell within the

200-meter zone of influence of existing motorized trails un-authorized for motorized use was determined. Each alternative was compared to determine the proportion of habitat directly and indirectly affected in relation to the amount of early and mid seral coniferous forest habitat available at the Sierra Nevada-wide scale.

Current Condition of the Habitat Factor(s) in the Project Area

The Tahoe NF Motorized Travel Management project area boundary currently has 89,863 acres of early seral coniferous forest habitat and 402,539 acres of mid-seral coniferous forest habitat. Habitat is comprised of various age classes ranging from sparse seeding coniferous forest (1S) to pole size trees with dense canopy cover (3D) within the early seral habitat, and from small tree sizes with sparse cover (4S) to small tree sizes with dense cover (4D) in the mid-seral habitat type.

Direct and Indirect Effects to Habitat

Change in Class of Vehicles

Overall, the change is the class of vehicles would not likely have an effect to mountain quail habitat, since the change in class of vehicles on existing National Forest Transportation System (NFTS) roads will generally not affect or alter mountain quail habitat condition. In general, some smoothed surfaced roads may become rough surfaced roads through changed road maintenance. In addition, some existing motorized NFTS roads may receive changed maintenance resulting in higher vegetation density at the road margins which would provide additional cover and/or foraging habitat. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives.

Wet Weather Seasonal Restrictions

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and trails, where mountain quail habitat effectiveness would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced roads and motorized trails that are seasonally restricted during the wet weather season. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized roads and trails and therefore, the mountain quail habitat effectiveness would not be enhanced when native surfaced motorized roads and motorized trails are under wet weather seasonal restrictions. Under Alternative 1, not prohibiting cross country travel, including use on existing motorized trails un-authorized for motorized use, would result in the greatest amount of disturbance to mountain quail within early and mid seral coniferous forest habitats.

Prohibition of Cross Country Travel

Under Alternative 1, cross country travel would not be prohibited, affecting 344,961 acres of early seral and mid seral coniferous forest habitats combined, potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment for the mountain quail. For the action alternatives, cross country travel would be prohibited on 344,961 early and mid seral coniferous forest acres, where disturbance, avoidance, abandonment would be reduced or eliminated.

Proposed Route Additions to NFTS

Tables K-13 and K-14 display the proportion of early and mid seral coniferous forest affected by the alternatives within a 200-meter zone of influence of motorized roads and trails. Based on the amount of early and mid seral coniferous forest habitat affected within a 200-meter zone of influence of motorized roads and trails, Alternative 1, no action, results in the greatest amount of both early seral (23,775 acres or 4.4% of Sierra Nevada-wide habitat) and mid seral (69,224 acres or 2.5% of Sierra Nevada-wide habitat) coniferous habitat affected. For the action alternatives, Alternative 5 results in the next greatest amount of both early and mid seral habitat affected by motorized trails added to the National Forest Transportation System (NFTS), which affects 6,293 acres (1.2% of Sierra Nevada-wide habitat) and 13,312 acres (0.5% of Sierra Nevada-wide habitat), respectively. The remaining action alternatives affect between 0 acres (Alt 3 – lowest) to 1,399 acres (Alt 2 & Alt 6 - highest) of early seral habitat; and between 0 acres to 2,663 acres of mid seral conifer habitat. For all the alternatives, the proportion of Sierra Nevada-wide early and mid seral habitat affected by motorized roads and trails results in a low risk to habitat security for mountain quail.

Table K-13. Proportion of Mountain Quail Early Seral Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Proposed Motorized Roads and Trails

Fox Sparrow MIS Habitat	**Total Habitat Acres[2]**	**Alt 1[1]**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Acres Early Seral Coniferous Forest		23,775	1,399	0	699	6,293	1,399	699
Proportion of Sierra Nevada Habitat	546,000	4.4%	0.3%	0%	0.1%	1.2%	0.3%	0.1%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat[2]	89,863	26%	1%	0%	0%	7%	1%	1%
Habitat Security Risk in Tahoe NF		**Moderate**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

[1]Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel.

[2]The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

Table K-14. Proportion of Mountain Quail Mid Seral Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Proposed Routes

Fox Sparrow MIS Habitat	**Total Habitat Acres[2]**	**Alt 1[1]**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Acres Shrubland (west-slope chaparral types)		69,224	2,663	0	2,663	13,312	5,325	2,663
Proportion of Sierra Nevada Habitat	2,766,000	2.5%	0.1%	0%	0.1%	0.5%	0.2%	0.1%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat	402,539	17%	1%	0%	1%	3%	1%	1%
Habitat Security Risk in Tahoe NF		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

[1] Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel.

[2] The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to mountain quail includes mid and early seral coniferous forest habitat within the boundary of the Tahoe NF. Past and current cumulative effects to mountain quail include current and historic grazing of mountain quail habitat; loss of mid and early conifer forest habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 31 active livestock grazing allotments including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the mountain quail habitat within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to mountain quail habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally do not increase forage condition for deer because they do not usually result in reducing the canopy cover below 40%, except for group selection harvest treatments on the Sierraville RD. Group selection harvests are expected to increase forage condition and increase forest structural diversity. These thinning treatments may result in the short-term reduction in cover for mountain quail, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which have removed mountain quail habitat.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Generally, the increase in recreational use on the Tahoe NF has the potential to cause an increase in negative interactions between humans and mountain quail. Future increase in recreational use on the Tahoe NF is expected, and therefore, increased disturbance to mountain quail would be expected, particularly during the summer months. Table K-15 summarizes a list of the reasonably foreseeable future projects and their potential direct, indirect, and cumulative impacts.

Table K-15. Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/ fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities, changes in cover, foraging habitat enhancement in aspen and oak habitats.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve foraging habitat adjacent to early and mid seral coniferous forest habitat.	Beneficial cumulative impact by improving long-term forage quality.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance.	Slight increase in cumulative impact.
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

Cumulative Effects Conclusion

Alternative 1 adds the greatest amount to existing cumulative impacts by affecting 26% early seral coniferous forest habitat (23,775 acres out of 89,863 TNF habitat acres) and 17% mid seral coniferous forest habitat (69,224 out of 402,539 TNF habitat acres), totaling 43% of early and mid coniferous forest habitat on the Tahoe NF. Alternative 5 follows, by affecting 7% early seral and 3% mid seral coniferous forest habitats, from proposed route additions within a 200 meter zone of influence. The remaining action alternatives affect between 0 and 2% early and mid seral coniferous forest habitat combined. Based on the small percentage of habitat affected by the action alternatives, the Tahoe NF Motorized Travel Management Project will not alter the existing trend in early and mid seral coniferous forest habitat important for the mountain quail. Alternative 1 may cause a downward trend mountain quail and may affect the distribution of the species on the Tahoe NF.

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and trails, where mountain quail habitat effectiveness would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced routes that are seasonally restricted during the wet weather season. The change in the class of vehicles would not affect mountain quail habitat for all of the proposed alternatives. Finally, all the action alternatives would prohibit motorized cross country travel on 34,961 acres of early and mid seral coniferous forest habitat, where mountain quail habitat effectiveness would be enhanced through reduced disturbance and avoidance.

Summary of Mountain Quail Status and Trend at the Bioregional Scale

The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the mountain quail; hence, the early and mid seral coniferous forest effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the mountain quail. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 546,000 acres of early seral and 2,766,000 acres of mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands in the Sierra Nevada. Within the last decade, the trend for early seral is slightly decreasing (from 9% to 5% of the acres on National Forest System lands) and the trend for mid seral is slightly increasing (from 21% to 25% of the acres on National Forest System lands).

Population Status and Trend. The mountain quail has been monitored in the Sierra Nevada at various sample locations by hunter survey, modeling, and breeding bird survey protocols, including California Department of Fish and Game hunter survey, modeling, and hunting regulations assessment (CDFG 2004a, CDFG 2004b) and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that mountain quail continue to be present across the Sierra Nevada, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of mountain quail populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mountain Quail Trend

The Tahoe NF Motorized Travel Management Project will affect 23,775 acres (3.5% of Sierra Nevada wide habitat) of early seral coniferous forest and 69,775 acres (2.5% of Sierra Nevada-wide habitat) of mid seral coniferous forest habitat important to mountain quail under Alternative 1. The action alternatives will affect between 0 acres and 4,895 acres (Alt 3 & 4 - lowest to Alt 5 - highest) of early seral coniferous habitat, and between 0 acres and 7,987 acres of mid seral coniferous forest habitat. All the action alternatives result in a low percentage of total early and mid seral habitat (0% to 1.3% of Sierra Nevada-wide mid and early seral habitat) affected by motorized routes. Alternative 1 does not prohibit cross country travel to continue, including use on motorized trails un-authorized for motorized use, where approximately 5% early and mid seral coniferous forest combined would be affected at the Sierra Nevada-wide scale. Based upon the low amount of habitat affected, the Tahoe NF Motorized Travel Management Project will not alter the existing trend in early seral and mid seral coniferous habitats, nor will it lead to a change in the distribution of mountain quail across the Sierra Nevada bioregion.

Late Seral Open Canopy Coniferous Forest Habitat [Sooty (blue) grouse]

Habitat/Species Relationship

The sooty grouse was selected as the MIS for late seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat in the Sierra Nevada. This habitat is

comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures less than 40%. Sooty grouse occurs in open, medium to mature-aged stands of fir, Douglas-fir, and other conifer habitats, interspersed with medium to large openings, and available water, and occupies a mixture of mature habitat types, shrubs, forbs, grasses, and conifer stands (CDFG 2005). Empirical data from the Sierra Nevada indicate that sooty Grouse hooting sites are located in open, mature, fir-dominated forest, where particularly large trees are present (Bland 2006).

Project-level Effects Analysis - Late Seral Open Canopy Coniferous Forest Habitat

Habitat Factor(s) for the Analysis: The habitat factor used in this analysis for the action alternatives was the amount of late seral open canopy coniferous forest habitat that fell within the 200-meter zone of influence of proposed motorized trail additions to the National Forest Transportation System (NFTS). For alternative 1, no action, the amount of late seral open canopy coniferous forest habitat that fell within the 200-meter zone of influence of existing motorized trails un-authorized for motorized use was determined. Each alternative was compared to determine the proportion of habitat directly and indirectly affected in relation to the amount of late seral coniferous open canopy forest habitat available at the Sierra Nevada-wide scale.

Current Condition of the Habitat Factor(s) in the Project Area

The project area (Tahoe NF boundary NFS and non NFS lands) currently has 35,389 acres of late seral open canopy coniferous forest habitat. This habitat is comprised of size classes 5S (medium/large tress with sparse canopy cover and 5 (medium/large trees with open canopy cover).

Direct and Indirect Effects to Habitat

Change in Class of Vehicles

Overall, the change is the class of vehicles would not likely have an effect or alter the condition of late seral open coniferous forest habitat for the sooty grouse. In general, some smoothed surfaced roads may become rough surfaced roads through changed road maintenance, but this will not likely result in a measurable change in the condition or amount of sooty grouse habitat at the forest-wide scale. In addition, some existing motorized NFTS roads may receive different maintenance resulting in higher vegetation density at the road margins which would provide additional cover and/or foraging habitat in localized areas. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives.

Wet Weather Seasonal Restrictions

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where sooty grouse habitat effectiveness would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced roads and motorized trails that are seasonally restricted during the wet weather season. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized roads and trails and therefore, the sooty grouse habitat effectiveness would not be enhanced when native surfaced motorized routes are under wet weather seasonal restrictions. Under Alternative 1, continued cross country travel, including on existing routes

unauthorized to motorized public travel, would result in the greatest amount of disturbance to mountain within early and mid seral coniferous forest habitats.

Prohibition of Cross Country Travel

Under Alternative 1, cross country travel would continue, potentially affecting 17,178 acres of sooty grouse habitat within late seral open canopy coniferous forest, potentially causing disturbance and reducing sooty grouse habitat effectiveness. For the action alternatives, cross country travel would be prohibited on 17,178 acres, where disturbance, avoidance, and disruption would be reduced or eliminated.

Route Additions to the NFTS

Based on the analysis conducted, Alternative 1 affects the most amounts of late seral open canopy coniferous forest with a 200-meter zone of influence of existing motorized trails un-authorized for motorized use, which would continue under cross country travel. Alternative 1 affects 13,302 (17.7% of Sierra Nevada-wide habitat) (Table K-16). Alternative 5 results in 2,046 acres (2.7%) of late seral open canopy coniferous forest affected by proposed motorized trail additions to the NFTS. Alternatives 2, 4, and 6, similarly affected 1,023 acres of sooty grouse habitat or 1.4% of Sierra Nevada-wide habitat. Alternatives 3 and 7 do not affect late seral open canopy coniferous forest habitat within a 200-meter zone of influence.

Table K-16. Prohibition of Cross Country Travel and Proportion of Sooty (Blue) Grouse Late Seral Open Canopy Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Proposed Route Additions

Sooty Grouse MIS Habitat		**Alt 1[1]**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Prohibition of Cross Country Travel within Late Seral Open Canopy Coniferous Forest Sooty Grouse Habitat								
Acres of sooty grouse habitat where cross country travel is prohibited	21,216 acres Tahoe NF habitat acres	0	17,178	17,178	17,178	17,178	17,178	17,178
Acres sooty grouse habitat where cross country travel would not be prohibited		17,178	0	0	0	0	0	0
Proportion of Sooty (Blue) Grouse Late Seral Open Canopy Coniferous Forest MIS habitat within 200-meter "Zone of Influence" of Proposed Route Additions								
Acres Sooty Grouse Habitat - Late Seral Open Coniferous Forest		3,943	197	0	197	789	197	197
Proportion of Sierra Nevada Habitat	75,000	5.3%	0.3%	0%	0.3%	1.1%	0.3%	0.3%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat[2]	35,389	11%	0.6%	0%	0.6%	2.2%	0.6%	0.6%
Habitat Security Risk in Sierra Nevada		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

[1] Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel.

[2] The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to sooty grouse includes all late seral open canopy coniferous forest habitats within the boundary of the Tahoe NF. Past and current cumulative effects to

sooty grouse include current and historic grazing of sooty grouse habitat; loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

The Tahoe NF currently has 31 active livestock grazing allotments including both cattle and sheep. Tahoe LRMP standards and guidelines, as amended by the Sierra Nevada Forest Plan Amendment (USFS 2004), for grazing are generally reducing the amount of grazing impacts on rangelands.

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the sooty grouse within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to sooty grouse habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments may not affect habitat for sooty grouse because they generally retain at least 40% canopy cover, except for group selection harvest treatments for HFQLG projects on the Sierraville RD. Group selection harvests are expected to increase forage condition and increase forest structural diversity. Some thinning treatments may result in the short-term reduction in cover for sooty grouse, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Many recent, current, and future vegetation and fuels reduction projects are improving sooty grouse habitat within aspen habitats which are designed to enhance wildlife habitat diversity and foraging condition. Aspen habitats are important for sooty grouse. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which have removed sooty grouse habitat.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Future increases in recreational use on the Tahoe NF are expected, and therefore, increased disturbance, displacement, avoidance, or illegal poaching to sooty grouse could be expected, particularly during the summer months. Table K-17 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, range allotment plans, non-motorized trail development, and special use permit re-issuances, and summarizes cumulative impacts to sooty grouse.

Table K-17. Direct, Indirect and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Direct and Indirect Impact to Sooty Grouse	Overall Cumulative Impact
Vegetation management/ fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities, changes in cover, foraging and reproductive habitat enhancement in aspen and oak habitats.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2	Minimal impact. Short-term disturbance during harvest.	None to minimal cumulative impact
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve riparian and meadow habitat quality used for forage and reproduction.	Beneficial cumulative impact by improving long-term forage quality.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance.	Slight increase in cumulative impact.
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

Cumulative Effects Conclusion

Alternative 1 poses the greatest cumulative effects to sooty grouse MIS late seral open canopy coniferous habitat on the Tahoe NF where 11% (3,943 acres out of 35,389 Tahoe NF habitat acres) sooty grouse habitat would be affected within a 200-meter zone of influence of existing motorized trails un-authorized for motorized use. Alternative 5 will cumulatively add 789 acres out of 35,389 acres sooty grouse habitat or approximately 2% of the Tahoe NF late seral open canopy coniferous habitat. Alternatives 2, 4, 6, and 7 will add approximately less than 1% (197 acres out of 35, 389 acres Tahoe NF habitat) to existing cumulative impacts. Alternative 3 does not directly or indirectly affect sooty grouse habitat, and therefore no cumulative impacts will be added under this alternative. The alternatives will not alter existing trend in late seral open canopy coniferous forest habitat.

The change is the class of vehicles will have no effect to sooty grouse habitat, since the change in class of vehicles on existing motorized routes will generally not alter sooty grouse habitat condition. Wet weather seasonal restrictions under Alternatives 4, 5, and 6 on all native surfaced roads and motorized trails would benefit sooty grouse habitat effectiveness through the reduced disturbance and avoidance when motorized use on native surfaced roads and motorized trails are seasonally restricted. Finally cross country travel would be prohibited on 17,178 acres of sooty grouse habitat with the implementation of the action alternatives where disturbance, avoidance, and abandonment by sooty grouse would be reduced or eliminated. Alternative 1 would have the greatest cumulative impact to sooty grouse habitats, where cross country travel would not be prohibited, affecting 17,178 acres of late seral open canopy coniferous forest habitat.

Summary of Sooty Grouse Status and Trend at the Bioregional Scale

The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the sooty grouse; hence, the late seral open canopy coniferous forest effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the sooty grouse. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There is currently 75,000 acres of late seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat on National Forest System lands in the Sierra Nevada. The trend is slightly decreasing (from 3% to 1% within the last decade on National Forest System lands).

Population Status and Trend. The sooty grouse has been monitored in the Sierra Nevada at various sample locations by hunter survey, modeling, point counts, and breeding bird survey protocols, including California Department of Fish and Game Blue (Sooty) Grouse Surveys (Bland 1993, 1997, 2002, 2006); California Department of Fish and Game hunter survey, modeling, and hunting regulations assessment (CDFG 2004a, CDFG 2004b); Multi-species inventory and monitoring on the Lake Tahoe Basin Management Unit (LTBMU 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that sooty grouse continue to be present across the Sierra Nevada, except in the area south of the Kern Gap, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of sooty grouse populations in the Sierra Nevada north of the Kern Gap is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Sooty Grouse Trend

Under Alternative 1, 13,302 acres (17.7% of Sierra Nevada habitat) of late seral open canopy coniferous forest will be directly or indirectly affected, which could substantially disturb, displace, or cause avoidance to sooty grouse from cross country motorized travel, including on existing motorized trails un-authorized for motorized use. Alternative 1 could result in a downward habitat trend for the sooty grouse.

The action alternatives all result in a low risk to sooty grouse security habitat, where between 0 acres and 2,046 acres (or 0 and 2.7% of Sierra Nevada-wide habitat) are influenced by proposed motorized trail additions to the National Forest Transportation System (NFTS). The Tahoe NF Motorized Travel Management Project action alternatives will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of sooty grouse across the Sierra Nevada bioregion.

Late Seral Closed Canopy Coniferous Forest Habitat (California spotted owl, American marten, and northern flying squirrel)

Habitat/Species Relationship

California spotted owl. The California spotted owl was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches

dbh) with canopy closures above 40% within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. The California spotted owl is strongly associated with forests that have a complex multi-layered structure, large-diameter trees, and high canopy closure (CDFG 2005, USFWS 2006). It uses dense, multi-layered canopy cover for roost seclusion; roost selection appears to be related closely to thermoregulatory needs, and the species appears to be intolerant of high temperatures (CDFG 2005). Mature, multi-layered forest stands are required for breeding (Ibid). The mixed-conifer forest type is the predominant type used by spotted owls in the Sierra Nevada: about 80 percent of known sites are found in mixed-conifer forest, with 10 percent in red fir forest (USDA Forest Service 2001).

American Marten. The American marten was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures above 40% within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. Martens prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure, and an interspersion of riparian areas and meadows. Important habitat attributes are: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1987). Key components for westside and eastside marten habitat can be found in the Sierra Nevada Forest Plan Amendment FEIS (USDA Forest Service 2001), Volume 3, Chapter 3, part 4.4, pages 20-21.

Northern flying squirrel. The northern flying squirrel was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures above 40% within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. The northern flying squirrel occurs primarily in mature, dense conifer habitats intermixed with various riparian habitats, using cavities in mature trees, snags, or logs for cover (CDFG 2005).

Project-level Effects Analysis – Late Seral Closed Canopy Coniferous Forest Habitat

Habitat Factor(s) for the Analysis: To assess the effects on late seral closed canopy coniferous forest habitat (California spotted owl, American marten, and northern flying squirrel) from action alternatives, the proportion of late seral closed canopy coniferous forest habitat that fell habitat within a 200-meter zone of influence of proposed motorized trail additions to the National Forest Transportation System (NFTS) was assessed. For Alternative 1, the proportion of late seral closed canopy coniferous forest that fell within a 200-meter influence of existing motorized trails un-authorized for motorized trails was determined.

Current Condition of the Habitat Factor(s) in the Project Area

Within the Tahoe NF Travel Management Project area, there are currently 128,310 acres of late seral closed canopy coniferous forest habitat [CWHR ponderosa pine (PPN), Sierran mixed conifer (SMC),

white fir (WFR), red fir (RFR)], within tree size 5 (canopy closures M and D) and tree size 6 (multilayered).

Direct and Indirect Effects to Habitat

Change in Class of Vehicles

Overall, the change is the class of vehicles would not likely have an effect or alter the condition of late seral closed canopy coniferous forest habitat for the American marten, California spotted owl, or the northern flying squirrel. In general, some smoothed surfaced roads may become rough surfaced roads through changed road maintenance, but this will not likely result in a measurable change in the condition or amount of late seral closed canopy coniferous forest habitat at the forest-wide scale. In addition, some existing motorized NFTS roads may receive different maintenance resulting in higher vegetation density at the road margins from resulting vegetation growth, which would provide additional vegetation cover and/or foraging habitat in localized areas. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives.

Wet Weather Seasonal Restrictions

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where late seral closed canopy coniferous forest habitat effectiveness for the California spotted owl, American marten, and the northern flying squirrel would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced roads and motorized trails are seasonally restricted during the wet weather season. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized roads and trails and therefore, the late seral closed canopy coniferous forest habitat effectiveness would not be enhanced when native surfaced motorized roads and trails are under wet weather seasonal restrictions. Under Alternative 1, not prohibiting cross country travel, including on existing motorized trails un-authorized for motorized use, would result in the greatest amount of disturbance (reduced habitat effectiveness) to species associated with late seral closed canopy coniferous forest habitat.

Prohibition of Cross Country Travel

Under Alternative 1, cross country travel would not be prohibited, potentially affecting 119,091 acres of late seral closed canopy coniferous forest habitat, potentially causing disturbance and habitat effectiveness for the American marten, California spotted owl, and the northern flying squirrel. For the action alternatives, cross country travel would be prohibited on 119,091 acres, where disturbance, avoidance, and abandonment would be reduced or eliminated.

Proposed Route Additions to the NFTS

Based on the analysis conducted, Alternative 1 directly and indirectly affects the greatest amount of late seral closed canopy coniferous forest with a 200-meter zone of influence of existing motorized trails un-authorized for motorized use, which would not be prohibited under cross country travel. Alternative 1 affects 28,200 acres (3% of Sierra Nevada-wide habitat) (Table K-18), with the potential to disturb, cause

avoidance, and abandonment of California spotted owl, American marten, and northern flying squirrel. Alternative 5 affects approximately 6,807 acres (0.7% of Sierra Nevada-wide habitat), and Alternatives 2, 4, and 6 similarly affect 972 acres of late seral closed canopy coniferous forest habitat or 0.1% of Sierra Nevada-wide habitat within 200-meter zone of influence of proposed motorized trail additions to the National Forest Transportation System (NFTS). Alternatives 3 and 7 do not affect late seral closed canopy coniferous forest habitat within a 200-meter zone of influence of proposed motorized trail additions to the NFTS. The Tahoe NF Motorized Travel Management Project will not result in a direct or indirect change in the amount of late seral closed canopy coniferous forest habitat affected by motorized roads and trails for all the alternatives. Habitat effectiveness for these species would be maintained at current levels.

Table K-18. Prohibition of Cross Country Travel and Proportion of Late Seral Closed Canopy Coniferous Forest MIS habitat within a 200-meter "Zone of Influence" of Proposed Route Additions

Late Seral Closed Canopy Coniferous Forest MIS Habitat		**Alt 1[1]**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Prohibition of Cross Country Travel within Tahoe NF project area								
Acres of late seral closed canopy coniferous forest habitat where cross country travel is prohibited		0	119,091	119,091	119,091	119,091	119,091	119,091
Acres of late seral closed canopy coniferous forest habitat where cross country travel would not be prohibited		119,091	0	0	0	0	0	0
Proportion of Late Seral Closed Canopy Coniferous Forest MIS habitat within 200-meter "Zone of Influence" of Proposed Route Additions								
Acres Late Seral Closed Coniferous Forest[2]		28,200	972	0	972	6,807	972	0
Proportion of Sierra Nevada Habitat	994,000	2.8%	0.1%	0%	0.1%	0.7%	0.1%	0%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat[2]	164,957	17%	0.6%	0%	0.6%	4%	0.6%	0%
Habitat Security Risk in Sierra Nevada		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

[1] Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel.

[2] The Zone of Influence within 200 meters of motorized routes includes both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to California spotted owl, American marten, and northern flying squirrel includes all late seral closed canopy coniferous forest habitats within the boundary of the Tahoe NF. Past and current cumulative effects to late seral closed canopy coniferous forest habitat include loss of habitat through catastrophic wildfires; timber and fuels management where cover and forage has been reduced or removed; urban development and expansion within a highly checkerboard land ownership pattern; and recreational activities including hunting, camping, and general recreation activities including all forms of motorized use including 4 wheeled drive vehicles, ATVs, and motorcycles.

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the late seral closed canopy coniferous forests within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to late seral closed canopy coniferous habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally due not result in a reduction of late seral closed canopy coniferous forest habitat because they generally retain at least 40% canopy cover, except for group selection harvest treatments for HFQLG projects on the Sierraville RD. Group selection harvests are expected to increase forest structural diversity over time. Some thinning treatments may result in the short-term reduction in cover for the spotted owl, marten, and flying squirrel, though it is expected that in the longer term, habitat will be protected by reducing wildfire risk. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which have removed late seral closed canopy coniferous forest habitats.

Currently, there is a high demand for recreational use on the Tahoe NF due to its close proximity to urban centers. The Tahoe NF provides a wide variety of recreational experiences including developed and dispersed camping, hiking, fishing, hunting, wildlife viewing, winter sports activities (downhill skiing, cross country skiing, snowmobiling), summer OHV use, and a variety of other non-motorized use (equestrian use and mountain biking). Recreational use on the Tahoe NF has significantly increased compared to the past 20 to 30 years. Because of the proximity to urban areas and population growth, increased recreational use on the Tahoe NF is expected to continue to increase in the future including camping, hiking, fishing, wildlife viewing, hunting, and OHV use. Future increases in recreational use on the Tahoe NF are expected, and therefore, increased disturbance, displacement, and avoidance could be expected, particularly during the summer months. Table K-19 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, non-motorized trail development, and special use permit re-issuances.

Table K-19. Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/ fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities, changes in cover potentially resulting in changes to foraging and/or nesting habitat. Foraging habitat enhancement in aspen and oak habitats. May affect future snag and log recruitment.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2	Short-term disturbance during harvest. Loss of snags and future logs.	Cumulative impact from loss of snags and future logs.
Fish passage construction project	1	Short-term disturbance during project implementation.	No cumulative impact
Watershed Restoration (Carman II and Perazzo)	2	Short-term disturbance during implementation. Improve riparian and meadow habitat quality used for foraging by marten.	Beneficial cumulative impact by improving long-term marten foraging quality.
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Short-term disturbance during trail construction, some increased public use may increase disturbance.	Slight increase in cumulative impact.
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

Cumulative Effects Conclusion

Based on the analysis conducted, Alternative 1 directly, indirectly, and cumulatively affects the greatest amount of late seral closed canopy coniferous forest with a 200-meter zone of influence of existing motorized trails un-authorized for motorized use, which would continue without prohibiting cross country travel. Alternative 1 reduces habitat effectiveness by 17% (28,200 acres out of 164,957 Tahoe NF habitat acres), with the potential to disturb, cause avoidance, and abandonment of California spotted owl, American marten, and northern flying squirrel. Considering the checkerboard pattern of land ownership within the Tahoe NF boundary, Alternative 1 could cause a downward trend in habitat effectiveness for these species. In addition, the cross country travel would continue and proliferate on 119,091 acres of late seral closed canopy coniferous forest habitat.

Alternative 5 affects approximately 6,807 acres (0.7% of Tahoe NF habitat), and Alternatives 2, 4, and 6 similarly affect 972 acres of late seral closed canopy coniferous forest habitat or 0.1% of Tahoe NF habitat within a 200-meter zone of influence of proposed motorized trail additions to the National Forest Transportation System (NFTS). Alternatives 3 and 7 do not affect late seral closed canopy coniferous forest habitat within a 200-meter zone of influence of proposed additions to the NFTS. The Tahoe NF Motorized Travel Management Project action alternatives will not result in a direct or indirect change in the amount of late seral closed canopy coniferous forest habitat affected by motorized routes for all the alternatives. Therefore, habitat effectiveness for these species would be maintained at current levels.

For all the alternatives, the change in the class of vehicles would not directly, indirectly, or cumulatively affect late seral closed canopy coniferous forest habitats or their habitat effectiveness. Wet weather seasonal restrictions on all native surfaced roads and motorized trails under Alternatives 4, 5, and 6 would enhance late seral closed canopy coniferous forest habitat effectiveness for the California spotted owl, American marten, and the northern flying squirrel through the reduced disturbance, avoidance, and abandonment. Finally, the prohibition of motorized cross country travel on 119,091 acres of late seral habitats would benefit these species over time, thereby preventing the continued cumulative increase in motorized route proliferation in the future.

Summary of Status and Trend at the Bioregional Scale

California spotted owl, American marten and Northern flying squirrel. The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the California spotted owl, American marten, and northern flying squirrel; hence, the late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data. This information is drawn from the detailed information on habitat and population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Habitat Status and Trend. There is currently 994,000 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands in the Sierra Nevada. The trend is slightly increasing (from 7% to 9% within the last decade on National Forest System lands).

Population Status and Trend - California spotted owl. California spotted owl has been monitored in California and throughout the Sierra Nevada through general surveys, monitoring of nests and territorial birds, and demography studies (Verner et al. 1992; USDA Forest Service 2001, 2004, 2006; USFWS 2006; Sierra Nevada Research Center 2007). Current data at the rangewide, California, and Sierra Nevada scales indicate that, although there may be localized declines in population trend [e.g., localized decreases in “lambda” (estimated annual rate of population change)], the distribution of California spotted owl populations in the Sierra Nevada is stable.

Population Status and Trend - American marten. American marten has been monitored throughout the Sierra Nevada as part of general surveys and studies from 1996-2002 (Zielinski et al. 2005). Since 2002, the American marten has been monitored on the Sierra Nevada forests as part of the Sierra Nevada Forest Plan Amendment (SNFPA) monitoring plan (USDA Forest Service 2005, 2006, 2007b). Current data at the range-wide, California, and Sierra Nevada scales indicate that, although marten appear to be distributed throughout their historic range, their distribution has become fragmented in the southern Cascades and northern Sierra Nevada, particularly in Plumas County. The distribution appears to be continuous across high-elevation forests from Placer County south through the southern end of the Sierra Nevada.

Population Status and Trend - northern flying squirrel. The northern flying squirrel has been monitored in the Sierra Nevada at various sample locations by live-trapping, ear-tagging, camera surveys, snap-trapping, and radiotelemetry: 2002-present on the Plumas and Lassen National Forests (Sierra Nevada Research Center 2007), and 1958-2004 throughout the Sierra Nevada in various monitoring efforts and studies (see USDA Forest Service 2008, Table NOFLS-IV-1). These data indicate that northern flying squirrels continue to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of northern flying squirrel populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trends

California spotted owl. Based on the small proportion of late seral closed canopy coniferous forest habitat that is directly, indirectly and cumulatively affected (0% to 3% of Sierra Nevada habitat) by the alternatives, the Tahoe NF Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change is the distribution of California spotted owl across the Sierra Nevada bioregion.

American marten. Based on the small proportion of late seral closed canopy coniferous forest habitat that is directly, indirectly and cumulatively affected (0% to 3% of Sierra Nevada habitat) by the alternatives within a 200-meter zone of influence of proposed motorized route additions, the Tahoe NF Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change is the distribution of American marten across the Sierra Nevada bioregion.

Northern flying squirrel. Based on the small proportion of late seral closed canopy coniferous forest habitat that is directly, indirectly, and cumulatively affected (0 to 3% of Sierra Nevada habitat) by project alternatives, the Tahoe NF Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change is the distribution of the northern flying squirrel across the Sierra Nevada bioregion.

Snags in Green Forest Ecosystem Component (Hairy woodpecker)

Habitat/Species Relationship

The hairy woodpecker was selected as the MIS for the ecosystem component of snags in green forests. Medium (diameter breast height between 15 to 30 inches) and large (diameter breast height greater than 30 inches) snags are most important. The hairy woodpecker uses stands of large, mature trees and snags of sparse to intermediate density; cover is also provided by tree cavities (CDFG 2005). Mature timber and dead snags or trees of moderate to large size are apparently more important than tree species (Siegel and DeSante 1999).

Project-level Effects Analysis – Snags in Green Forest Ecosystem Component

Habitat Factor(s) for the Analysis: For the proposed alternatives, the habitat factor used in this analysis to assess effects to medium ((15-30 inches dbh) and large (greater than 30 inches dbh) snags within green forest, was the amount of green forest that fell within a 60-meter zone of influence of proposed motorized trails to be added to the National Forest Transportation System (NFTS). A 60-meter zone of influence represents the proportion of snag habitat along motorized roads and trails that may be affected by

fuelwood or hazard tree removal, resulting in a reduction of snag habitat for the hairy woodpecker. This distance represents the maximum height of a snag that could be removed along proposed routes.
The no action alternative (Alternative 1) was analyzed by determining the amount of green forest habitat that fell within a 60-meter zone of influence of existing motorized trails un-authorized for motorized use that could be affected by fuelwood or hazard tree removal.

Current Condition of the Habitat Factor(s) in the Project Area

On the Tahoe NF, snags in green forest ecosystem component vary in density, size, decay class, and distribution, depending upon the forest type, presence of decay factors (insects and diseases), and the amount of management activities that have taken place. Annual precipitation also affects the amount of snags present within green forests. Snag densities are generally higher in mixed conifer forests and true fir forests. Pure eastside pine forests generally have lower snag densities compared to forest types that have higher concentrations of true fir species (red fir and white fir). Snag densities on the Tahoe NF vary from 0 snags per acre to well over 6 snags per acre.

Direct and Indirect Effects to Habitat

Change in Class of Vehicles

Overall, the change is the class of vehicles would not effect or alter the condition of snags in green forest ecosystem component for the hairy woodpecker. In addition, some existing motorized NFTS roads may receive different maintenance resulting in higher number of snags retained along routes within 60 meters, which would provide additional snags for foraging and nesting in localized areas. The resulting roadway condition would depend upon the amount and type of vegetation present and the amount of maintenance any given road receives.

Wet Weather Seasonal Restrictions

Alternatives 4, 5, and 6 would impose wet weather seasonal restrictions on all native surfaced roads and motorized trails, where hairy woodpecker habitat effectiveness of snags within green forests would be benefited through the reduced disturbance and avoidance when motorized use on native surfaced roads and motorized trails seasonally restricted during the wet weather season. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized roads and trails and therefore, the hairy woodpecker habitat effectiveness would not be enhanced when native surfaced motorized roads and trails are under wet weather seasonal restrictions. Under Alternative 1, not prohibiting cross country travel, including use on existing motorized trails not authorized for motorized use, would result in the greatest amount of disturbance (reduced habitat effectiveness) to hairy woodpecker habitat within snags within green forests.

Prohibition of Cross Country Travel

Under Alternative 1, cross country travel would not be prohibited, potentially affecting 637,148 acres of green forest habitat, potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment by the hairy woodpecker. For the action alternatives, cross country travel would be

prohibited on 637,148 acres, where disturbance, avoidance, abandonment would be reduced or eliminated.

Addition of Motorized Routes to NFTS

Table K-20 displays the alternatives affect hairy woodpecker habitat within a 60-meter zone of influence of motorized roads and trails, where snags could be removed for hazard tree removal or public fuelwood gathering. The Tahoe NF Motorized Travel Management Project could potentially directly or indirectly affect 1% (58,006 acres out of 4,381,000 Sierra Nevada habitat acres) of hairy woodpecker habitat, under Alternative 1, where snags could be removed for public safety along existing motorized trails un-authorized for motorized use. Alternative 5 affects 0.2% (10,547 acres of 4,381,000 Sierra Nevada habitat acres) of hairy woodpecker habitat. Alternatives 2, 4, and 7, similarly affects 0.1% hairy woodpecker habitat (2,637 out of 4,381,000 Sierra Nevada habitat acres), while Alternative 3 does not directly or indirectly affect hairy woodpecker habitat. It is not expected that all snags along motorized roads and trails would be removed, but incidental removal of hazard trees for public safety and access to fuelwood gathering could result in the loss of incidental snags along proposed motorized route additions. The relatively small amount of habitat within a 60-meter zone of influence is not likely to result in a measurable change in the snag habitat component at the scale of the Sierra Nevada Bioregion.

Table K-20. Prohibition of Cross Country Travel and Proportion of Snags in Green Forest Hairy Woodpecker habitat within a 60-meter "Zone of Influence" of Proposed Motorized Trail Additions to the National Forest Transportation System

Hairy Woodpecker (Snags in Green Forest Habitat Ecosystem component)		**Alt 1[1]**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Prohibition of Cross Country Travel within Tahoe NF project area								
Acres of Hairy Woodpecker habitat where cross country travel is prohibited		0	637,148	637,148	637,148	637,148	637,148	637,148
Acres of hairy woodpecker habitat where cross country travel where cross country travel would not be prohibited		637,148	0	0	0	0	0	0
Proportion of Snag Ecosystem Component in Green Forest Habitat (Hairy Woodpecker MIS Habitat) within 60-meter "Zone of Influence" of Proposed Route Additions								
Acres – Hairy Woodpecker Green Forest Habitat[2]		58,006	2,637	0	2,637	10,547	2,637	2,637
Proportion of Sierra Nevada Habitat (Based on total acres early, mid, late-open canopy, and late-closed canopy coniferous forests in SN bioregion)	4,381,000	1.3%	0.1%	0%	0.1%	0.2%	0.1%	0.1%
Habitat Security Risk in Sierra Nevada		Low	Low	Low	Low	Low	Low	Low
Proportion of Tahoe NF Habitat	990,707	6%	0.3%	0%	0.3%	1%	0.3%	0.3%
Habitat Security Risk in Tahoe NF		**Low**	**Low**	**Low**	**Low**	**Low**	**Low**	**Low**

[1] Alternative 1 includes existing routes unauthorized to motorized public use that would continue with the continuance of cross country travel.

[2] The Zone of Influence within 60 meters of motorized routes include both NFS and non-NFS lands within the boundary of the Tahoe NF due to the complex checkerboard ownership pattern. The proportion of habitat affected likely over-represents the actual amount of habitat affected on NFS lands.

Cumulative Effects to Habitat in the Analysis Area

The spatial boundary for analyzing cumulative effects to the hairy woodpecker includes all medium (15 to 30 inch dbh) and large snags (>30 inch dbh) within green forests within the boundary of the Tahoe NF. Past and current cumulative effects to the medium and large snag ecosystem component include loss of snags through catastrophic wildfires; timber and fuels management; urban development and expansion within a highly checkerboard land ownership pattern; and public fuelwood removal. In addition, hazard tree removal along NFTS roads and recreational facilities has had an impact on the snag resource. Snag recruitment and creation from natural levels and unnaturally high levels of tree mortality has also been a factor in the condition of snags on the Tahoe NF.

Appendix Q (Wildlife Cumulative Effects) provides a list and description of past, present, and reasonably foreseeable projects on National Forest System and private lands within the Tahoe NF boundary. Some, but not all, of these activities will contribute to impacts to the late seral closed canopy coniferous forests within the Tahoe NF boundary. Since 1990, more than 130,000 acres of vegetation management activities have occurred on the Tahoe NF. Some, but not all, have resulted in impacts to snags in green forest habitats. Between 2001 and 2007, over 13,000 acres of forest vegetation and fuels projects were completed, which primarily thinned, masticated, and/or burned vegetation to reduce the potential for catastrophic wildfires. These treatments generally due not result in a reduction of snags in green forest habitat because they generally retain snags throughout the project areas as required by LRMP standards and guidelines. Between 1994 and 2007, approximately 94,000 acres burned on the Tahoe NF, some of which have resulted in the loss of hairy woodpecker habitat. Facilities maintenance through hazard tree removal along roads and near recreational facilities has resulted in a limited loss of snags.

Table K-21 lists all the reasonably foreseeable future actions, including fuels, vegetation, recreation, non-motorized trail development, and special use permit reissuances

Table K-21. Direct, Indirect, and Cumulative Impact of Reasonably Foreseeable Future Projects

Project type	Number of Projects	Direct and Indirect Impact	Overall Cumulative Impact
Vegetation management/ fuels reduction – thinning, group select, and aspen enhancement	13	Short-term disturbance from harvest activities. May affect future snag and log recruitment.	Short-term adverse impacts during harvest. Long-term beneficial cumulative effects by reduced risk of habitat loss from high severity wildfires.
Hazard tree removal	2	Short-term disturbance during harvest. Loss of snags and future logs.	Cumulative impact from loss of snags and future logs.
Fish passage construction project	1	No effect to snag habitat.	No cumulative impact
Watershed Restoration (Carman II and Perazzo)	2	No impact to snag habitat.	No cumulative imact
Special Use permit renewal	4	N/A administrative action	None
Non-motorized Trail development	2	Some snag habitat may be removed for trail development.	Slight increase in cumulative impact from direct impact and future maintenance.
Designate Energy Corridor	1	N/A programmatic administrative action	Unknown, site-specific cumulative impacts may occur depending on location of the corridor.

Cumulative Effects Conclusion

The Tahoe NF Motorized Travel Management Project could potentially add to existing cumulative effects by directly or indirectly affecting 6% (58,006 acres out of 990,707 Tahoe NF acres) of hairy woodpecker habitat, under Alternative 1, where snags could be removed for public safety along existing motorized trails un-authorized for motorized use. Alternative 5 affects 1% (10,547 acres of 990,707 Tahoe NF acres) of hairy woodpecker habitat. Alternatives 2, 4, and 7, similarly affects 0.3% hairy woodpecker habitat, while Alternative 3 does not directly or indirectly affect hairy woodpecker habitat. Based on the small proportion of hairy woodpecker habitat potentially affected by the addition of motorized motorized trails to the National Forest Transportation System, the Tahoe NF Motorized Travel Management Project will not alter the existing trend in the snags in green forest ecosystem component.

The change is the class of vehicles would not effect or alter the condition of snags in green forest ecosystem component for the hairy woodpecker, but may result in higher snag densities along routes which may receive different maintenance.

Hairy woodpecker habitat effectiveness may be enhanced under Alternatives 4, 5, and 6 where wet weather seasonal restrictions on all native surfaced roads and motorized trails would be implemented. Alternatives 1, 2, 3, and 7 do not impose wet seasonal weather restrictions on native surfaced motorized roads and trails and therefore, the hairy woodpecker habitat effectiveness would not be enhanced when native surfaced motorized routes are under wet weather seasonal restrictions.

Under Alternative 1, cross country travel would not be prohibited, potentially affecting 637,148 acres of snags within green forest habitat, potentially causing reduced habitat effectiveness through disturbance, avoidance, and abandonment by the hairy woodpccker. For the action alternatives, cross country travel would be prohibited on 637,148 acres, where disturbance, avoidance, abandonment would be reduced or eliminated.

Summary of Hairy Woodpecker Status and Trend at the Bioregional Scale

The Tahoe NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the hairy woodpecker; hence, the snag effects analysis for the Tahoe NF Motorized Travel Management Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the hairy woodpecker. This information is drawn from the detailed information on habitat and distribution population trends in the SNF Bioregional MIS Report (USDA Forest Service 2008), which is hereby incorporated by reference.

Ecosystem Component Status and Trend. The current (based on 2001-2004 inventory sources) average number of medium-sized and large-sized snags ($\geq$ 15" dbh, all decay classes) per acre across major coniferous and hardwood forest types (westside mixed conifer, ponderosa pine, white fir, productive hardwoods, red fir, eastside pine) in the Sierra Nevada ranges from 1.4 per acre in eastside pine to 8.3 per acre in white fir. Detailed information by forest type, snag size, and snag decay class can be found in the SNF Bioregional MIS Report (USDA Forest Service 2008).

Data from the mid-to-late 1990s were compared with the current data to calculate the trend in total snags per acre by Regional forest type for the 10 Sierra Nevada national forests and indicate that, during

this period, snags per acre increased within westside mixed conifer (+0.80), white fir (+1.98), and red fir (+0.68) and decreased within ponderosa pine (-0.17), productive hardwoods (-0.17), and eastside pine (-0.16).

Population Status and Trend. The hairy woodpecker has been monitored in the Sierra Nevada at various sample locations by avian point counts and breeding bird survey protocols, including 1997 to present – Lassen National Forest (Burnett and Humple 2003, Burnett et al. 2005); 2002 to present - Plumas and Lassen National Forests (Sierra Nevada Research Center 2007); 1992 to 2005 – Sierra Nevada Monitoring Avian Productivity and Survivorship (MAPS) stations (Siegel and Kaschube 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that the hairy woodpecker continues to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of hairy woodpecker populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Hairy Woodpecker Trend

Based on the small proportion of the snag ecosystem component in green forest that is directly, indirectly and cumulatively affected (0 to 1% of Sierra Nevada habitat) by the project alternatives, the Tahoe NF Motorized Travel Management Project will not alter existing trend in the habitat, nor will it lead to a change is the distribution of hairy woodpecker across the Sierra Nevada bioregion.

References Cited

Bland, J. D. 2002. Surveys of Mount Pinos Sooty grouse in Kern County, California, Spring 2002. Unpubl. report, Wildl. Mgmt. Div., Calif. Dept. Fish & Game, 1416 Ninth St., Sacramento, CA 95814.

Bland, J.D. 1993. Forest grouse and mountain quail investigations: A final report for work completed during the summer of 1992. Unpubl. report, Wildl. Mgmt. Div., Calif. Dept. Fish & Game, 1416 Ninth St., Sacramento, CA.

Bland, J.D. 1997. Biogeography and conservation of sooty grouse *Dendragapus obscurus* in California. *Wildlife Biology* 3(3/4):270.

Bland, J.D. 2006. Features of the Forest Canopy at Sierra Sooty Grouse Courtship Sites, Summer 2006. CDFG Contract No. S0680003.

Brown, C. 2008. Summary of Pacific Treefrog (*Pseudacris regilla*) Occupancy in the Sierra Nevada within the range of the Mountain Yellow-legged Frog (*Rana muscosa*). Sierra Nevada Amphibian Monitoring Program draft assessment, January 18, 2008.

Burnett, R. D., and D. L. Humple. 2003. Songbird monitoring in the Lassen National Forest: Results from the 2002 field season with summaries of 6 years of data (1997-2002). PRBO Conservation Science Contribution Number 1069. 36pp.

Burnett, R.D., D.L. Humple, T.Gardali, and M.Rogner. 2005. Avian monitoring in Lassen National Forest 2004 Annual Report. PRBO Conservation Science Contribution Number 1242. 96pp.

CDFG (California Department of Fish and Game). 1998. An Assessment of Mule and Black-tailed Deer Habitats and Populations in California. Report to the Fish and Game Commission. February 1998. 57pp.

CDFG (California Department of Fish and Game). 2004a. Resident Game Bird Hunting Final Environmental Document. August 5, 2004. State of California, The Resources Agency, Department of Fish and Game. 182 pp + appendices.

CDFG (California Department of Fish and Game). 2004b. Report of the 2004 Game Take Hunter Survey. State of California, The Resources Agency, Department of Fish and Game. 20pp.

CDFG (California Department of Fish and Game). 2005. California Department of Fish and Game and California Interagency Wildlife Task Group. California Wildlife Habitat Relationships (CWHR) version 8.1. personal computer program. Sacramento, California. On-Line version. http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.asp. (Accessed: January 3, 2008).

CDFG (California Department of Fish and Game). 2007. Deer Hunting Final Environmental Document, April 10, 2007. State of California, The Resources Agency, Department of Fish and Game. 80pp + appendices.

Connelly, J. W., M. A. Schroeder, and S. J. Stiver. 2004. Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.

Connelly, J. W., S. T. Knick, M. A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines to manage sage grouse populations and their habitats. Wildlife Society Bulletin 28(4):967-985.

CPIF (California Partners in Flight). 2002.
http://www.prbo.org/calpif/htmldocs/mapdocs/conifer/2002/fospmap2002.html
http://www.prbo.org/calpif/htmldocs/mapdocs/conifer/2002/bbwomap2002.html

CPIF (California Partners in Flight). 2004.
http://www.prbo.org/calpif/htmldocs/mapdocs/riparian/2004/ywarmap2004.htm

Frazier J.W., K.B. Roby, J.A. Boberg, K. Kenfield, J.B. Reiner, D.L. Azuma, J.L. Furnish, B.P. Staab, S.L. Grant. 2005. Stream Condition Inventory Technical Guide. USDA Forest Service, Pacific Southwest Region - Ecosystem Conservation Staff. Vallejo, CA. 111 pp.

Hawkins, C.P. 2003. Development, evaluation, and application of a RIVPACS-type predictive model for assessing the biological condition of streams in Region 5 (California) national forests. Completion Report. Western center for Monitoring and Assessment of Fresh Water Ecosystems. Utah State University. Logan, Utah 23 pp.

Heath, S.K., and G. Ballard. 2003. Bird species composition, phenology, nesting substrate, and productivity for the Owens Valley alluvial fan, Eastern Sierra Nevada, California 1998-2002. Great Basin Birds 6(1):18-35.

Hughes, R.M. and D.P. Larsen. 1987. Ecoregions: an approach to surface water protection. Journal of the Water Pollution Control Federation 60:486-493.

Hutto, R.L. 1995. Composition of bird communities following stand-replacement fires in Northern Rocky Mountain (U.S.A.) conifer forests. Conservation Biology 9(5):1041-1058.

Hutto, R.L., and S.M. Gallo. 2006. The effects of postfire salvage logging on cavity-nesting birds. The Condor 108:817-831.

Karr, J.R., K.D. Fausch, P.L. Angermeier, P.R. Yant, and I.J. Schlosser. 1986. Assessing biological integrity in running waters: a method and its rationale. Illinois Natural History Survey Special Publication 5, Champaign, IL.

Kotliar, N.B., S.J. Hejl, R.L. Hutto, V.A. Saab, C.P. Melcher, and M.E. McFadzen. 2002. Effects of fire and post-fire salvage logging on avian communities in conifer-dominated forests of the western United States. Studies in Avian Biology No.25:49-64.

Lake Tahoe Basin Management Unit. 2007. Lake Tahoe Basin Management Unit Multi Species Inventory and Monitoring: A Foundation for Comprehensive Biological Status and Trend Monitoring in the Lake Tahoe Basin. Draft Report.

Mayer, K.E., and W.F. Laudenslayer, eds. 1988. A Guide to Wildlife Habitats of California. California Department of Forestry and Fire Protection, Sacramento, CA. 166pp.

NatureServe. 2007. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.2. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer (Accessed: January 2, 2008).

Resh, V.H. and D.G. Price. 1984. Sequential sampling: a cost-effective approach for monitoring benthic macroinvertebrates in environmental impact assessments. Environmental Management 8:75-80.

Resh, V.H. and D.M. Rosenberg. 1989. Spatial-temporal variability and the study of aquatic insects. Canadian Entomologist 121:941-963.

Sauer, J. R., J. E. Hines, and J. Fallon. 2007. The North American Breeding Bird Survey, Results and Analysis 1966 - 2006. Version 10.13.2007. *USGS Patuxent Wildlife Research Center*, Laurel, MD.

Siegel, R.B. and D.F. DeSante. 1999. Version 1.0. The draft avian conservation plan for the Sierra Nevada Bioregion: conservation priorities and strategies for safeguarding Sierra bird populations. Institute for Bird Populations report to California Partners in Flight. Available on-line: http://www.prbo.org/calpif/htmldocs/sierra.html.

Siegel, R.B. and D.R. Kaschube. 2007. Landbird Monitoring Results from the Monitoring Avian Productivity and Survivorship (MAPS) Program in the Sierra Nevada. Final report in fulfillment of Forest Service Agreement No. 05-PA-11052007-141. The Institute for Bird Populations. February 13, 2007. 33pp.

Sierra Nevada Research Center. 2007. Plumas Lassen Study 2006 Annual Report. USDA Forest Service, Pacific Southwest Research Station, Sierra Nevada Research Center, Davis, California. 182pp.

Smucker, K.M., R.L. Hutto, B.M. Steele. 2005. Changes in bird abundance after wildfire: importance of fire severity and time since fire. Ecological applications 15(5):1535-1549.

USDA Forest Service. 2001. Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement. Forest Service, Pacific Southwest Region. January 2001.

USDA Forest Service. 2004. Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement. Forest Service, Pacific Southwest Region. 2004.

USDA Forest Service. 2005. Sierra Nevada forest plan accomplishment monitoring report for 2004. USDA Forest Service, Pacific Southwest Region R5-MR-026. 8pp.

USDA Forest Service. 2006. Sierra Nevada forest plan accomplishment monitoring report for 2005. USDA Forest Service, Pacific Southwest Region R5-MR-000. 12pp.

USDA Forest Service. 2007a. Record of Decision, Sierra Nevada Forests Management Indicator Species Amendment. U.S. Forest Service, Pacific Southwest Region. December, 2007. 18pp.

USDA Forest Service. 2007b. Sierra Nevada forest plan accomplishment monitoring report for 2006. USDA Forest Service, Pacific Southwest Region R5-MR-149. 12pp.

USDA Forest Service. 2008. Sierra Nevada Forests Bioregional Management Indicator Species (MIS) Report: Life history and analysis of Management Indicator Species of the 10 Sierra Nevada National Forests: Eldorado, Inyo, Lassen, Modoc, Plumas, Sequoia, Sierra, Stanislaus, and Tahoe National Forests and the Lake Tahoe Basin Management Unit. Pacific Southwest Region, Vallejo, CA. January 2008.

USDA Forest Service. 2008. Tahoe NF Motorized Travel Management Project DEIS.

USFWS. 2005. Endangered and Threatened Wildlife and Plants; 12-month Finding for Petitions to List the Greater Sage-Grouse as Threatened or Endangered; Proposed Rule. Department of the Interior, Fish and Wildlife Service, 50 CFR Part 17. Federal Register: January 12, 2005, Volume 70, Number 8, pages 2244-2282.

USFWS. 2006. Endangered and Threatened Wildlife and Plants; 12-month Finding for a Petition to List the California **Spotted Owl** (*Strix occidentalis occidentalis*) as Threatened or Endangered. Department of the Interior, Fish and Wildlife Service, 50 CFR Part 17. Federal Register: May 24, 2006, Volume 71, Number 100, pages 29886-29908.

Verner, J., K.S. McKelvey, B.R. Noon, R.J. Gutierrez, G.I. Gould, Jr., and T.W. Beck., tech. coord. 1992. The California Spotted Owl: a technical assessment of its current status. Gen. Tech. Rep. PSW-GTR-133, US Forest Service, Albany, CA.

Zielinski W.J., Kucera, T.E. (Eds). 1995. American Marten, Fisher, Lynx, and Wolverine: Survey Methods for their Detection. USDA Forest Service, Pacific Southwest Research Station, General Technology Report PSW-GTR-157.

Appendix L: Biological Evaluation for Birds, Mammals, Amphibians, Reptiles, Fish and Invertebrates

Prepared by: /s/ Tina Mark Date: 9-3-2008

Journey Level Wildlife Biologist

Executive Summary

Programmatic Consultation and informal consultation with USFWS was conducted. Regional Office Programmatic consultation with USFWS is incorporated by reference. Refer to section 3.03 Terrestrial and Aquatic Species of the Tahoe NF Travel Management Project DEIS.

Table L-1. Biological Evaluation Summary

Species	Species Status	Present in Project Area: Habitat and/or Detections	Management Requirements, Standards, Guidelines, Species Specific Project Design Standards	Effects Determination	Recommended Mitigation for No Effect
California Red-legged Frog	T	N	The action alternatives follow programmatic project design criteria standards. In addtion, cross country travel will be prohibited, including concentrated use on routes unauthorized to motorized use.	No effect, occupied habitat does not occur on the Tahoe NF, but occupied habitat occurs adjacent to Tahoe NF. Over 100 suitable habitat sites have been surveyed to protocol and no frogs have been discovered on the Tahoe NF.	None
Valley Elderberry Longhorn Beetle	T	N	N/A	No effect, since no habit for this species occurs on the Tahoe National Forest.	None
Lahontan Cutthroat Trout	T	Y	Programmatic project design criteria will be followed (i.e. Proposed route additions do not intersect occupied LCT habitat and routes do not capture and delivery sediment to occupied LCT habitat)	May affect, not likely to adversely affect	The Pole Creek Road (section within close proximity to Pole Cree) will be maintained to a standard where sediment capture and delivery to Pole Creek is minimized.
Bald Eagle	S	Y	Proposed route additions to the NFTS avoid bald eagle nest sites within 0.5 miles. Cross country travel will be prohibited within bald eagle habitat, including on routes unauthorized to motorized use.	May affect individuals, not likely to result in a trend toward federal listing or a loss of population viability within the planning area of the Tahoe NF.	Proposed Routes avoid bald eagle nest sites within 0.5 miles.

Species	Species Status	Present in Project Area: Habitat and/or Detections	Management Requirements, Standards, Guidelines, Species Specific Project Design Standards	Effects Determination	Recommended Mitigation for No Effect
California Spotted Owl	S	Y	Proposed routes generally avoid Spotted owl Protected Activity Centers and within 0.25 mile of spotted owl activity centers (nest/roost sites). Cross country travel will be prohibited within spotted owl habitat, including on routes unauthorized to motorized use.	May affect individuals, not likely to result in a trend toward federal listing or a loss of population viability within the planning area of the Tahoe NF.	N/A
Great Gray Owl	S	Y	Proposed routes generally avoid suitable great gray owl habitat. Cross country travel will be prohibited within great gray owl habitat, including on routes unauthorized to motorized use.	May affect individuals, not likely to result in a trend toward federal listing or a loss of population viability within the planning area of the Tahoe NF.	N/A
Northern Goshawk	S	Y	Proposed routes generally avoid goshawk Protected Activity Centers and within 0.25 mile of goshawk owl activity centers (nest/roost sites). Cross country travel will be prohibited within goshawk habitat, including on routes unauthorized to motorized use.	May affect individuals, not likely to result in a trend toward federal listing or a loss of population viability within the planning area of the Tahoe NF.	N/A
Willow Flycatcher	S	Y	Proposed routes generally avoid occupied willow flycatcher habitat. Cross country travel will be prohibited within occupied and emphasis willow flycatcher habitat, including on routes unauthorized to motorized use.	May affect individuals, not likely to result in a trend toward federal listing or a loss of population viability within the planning area of the Tahoe NF.	N/A
Greater Sandhill Crane	S	Y	Proposed routes avoid sandhill crane breeding sites at Kyburz, Carman Valley, and Perazzo Meadows. Cross country travel will be prohibited within occupied sandhill crane habitat, including on routes unauthorized.	May affect individuals, not likely to result in a trend toward federal listing or a loss of population viability within the planning area of the Tahoe NF.	N/A
Pacific Fisher	S, C	Y	Habitat fragmentation is minimized, though species does not currently occur on the Tahoe NF. Cross country travel will be prohibited within suitable Pacific fisher habitat, including on routes unauthorized	No effect, species is not known to occur within the range of the Tahoe NF.	N/A
American Marten	S	Y	No proposed route additions through meadows or riparian areas generally avoided. Habitat fragmentation from motorized routes will be reduced. Cross country travel will be prohibited within suitable American marten habitat, including on routes unauthorized	May affect individuals, not likely to result in a trend toward federal listing or a loss of population viability within the planning area of the Tahoe NF.	N/A

Species	Species Status	Present in Project Area: Habitat and/or Detections	Management Requirements, Standards, Guidelines, Species Specific Project Design Standards	Effects Determination	Recommended Mitigation for No Effect
Sierra Nevada Red Fox	S	Y	Cross country travel will be prohibited within suitable Sierra Nevada red fox habitat, including on routes unauthorized	May affect individuals, not likely to lead to a trend toward federal listing or result in a loss of viability within the planning area of the Tahoe NF.	N/A
California Wolverine	S	Y	Cross country travel will be prohibited within 5 miles of known wolverine detections, including concentrated use on routes unauthorized to motorized use.	May affect individuals, not likely to result in a trend toward federal listing or a loss of population viability within the planning area of the Tahoe NF.	N/A
Pallid Bat	S	Y	Cross country travel will be prohibited within pallid bat habitat including concentrated use on routes unauthorized to motorized use.	May affect individuals, not likely to lead to a trend toward federal listing or result in a loss of viability within the planning area of the Tahoe NF.	N/A
Townsend's Big-eared Bat	S	Y	N/A	May affect individuals, not likely to lead to a trend toward federal listing or result in a loss of viability within the planning area of the Tahoe NF.	N/A
Western Red Bat	S	Y	Cross country travel will be prohibited within western red bat habitat, including concentrated use on routes unauthorized to motorized use.	May affect individuals, not likely to lead to a trend toward federal listing or result in a loss of viability within the planning area of the Tahoe NF.	N/A
Northwestern Pond Turtle	S	Y	Cross country travel will be prohibited within northwestern pond turtle habitat, including concentrated use on routes unauthorized to motorized use.	May affect individuals, not likely to result in a trend toward federal listing or a loss of population viability within the planning area of the Tahoe NF.	N/A
Foothill Yellow-legged Frog	S	Y	Cross country travel will be prohibited within foothill yellow-legged frog habitat, including concentrated use on routes unauthorized to motorized use.	May affect individuals, not likely to lead to a trend toward federal listing or result in a loss of viability within the planning area of the Tahoe NF.	N/A

Species	Species Status	Present in Project Area: Habitat and/or Detections	Management Requirements, Standards, Guidelines, Species Specific Project Design Standards	Effects Determination	Recommended Mitigation for No Effect
Mountain Yellow-legged Frog	S	Y	Cross country travel will be prohibited within mountain yellow-legged frog habitat, including concentrated use on routes unauthorized to motorized use.	May affect individuals, not likely to lead to a trend toward federal listing or result in a loss of viability within the planning area of the Tahoe NF.	N/A
Northern Leopard Frog	S	Y	N/A	No effect, since the northern leopard frog has not been verified on the Tahoe NF. Habitat for this species will not be affected by proposed route additions.	N/A
Great Basin Ramshorn Snail	S	Y	Cross country travel will be prohibited within Great Basin ramshorn snail habitat, including concentrated use on routes unauthorized to motorized use.	May affect individuals, not likely to lead to a trend toward federal listing or result in a loss of viability within the planning area of the Tahoe NF.	N/A
Lahontan Lake Tui Chub	S	Y	Cross country travel will be prohibited within Lahontan Lake Tui Chub habitat, including concentrated use on routes unauthorized to motorized use.	May affect individuals, not likely to lead to a trend toward federal listing or result in a loss of viability within the planning area of the Tahoe NF.	N/A
Hardhead	S	Y	N/A	No effect: The species has not been verified to occur on the Tahoe NF.	None
California Floater	S	Y	Cross country travel will be prohibited within suitable California floater habitat, including concentrated use on routes unauthorized to motorized use.	No effect: The species has not been verified to occur on the Tahoe NF, and no proposed route additions occurs within potential habitat for this species on the Tahoe NF.	None

Introduction

The purpose of this Biological Evaluation is to document analysis of the potential effects of the *Tahoe National Forest Motorized Travel Management Project* on the following bird, mammal, amphibian, reptile, invertebrate and fish species and their habitats:

Table L-2. List of United States Department of Interior Fish and Wildlife Service (USFWS) threatened, endangered, proposed species, and United States Department of Agriculture Forest Service Region 5 Forester's Sensitive Species (June 8, 1998 list)

California red-legged frog, *Rana aurora draytonii*	Threatened
Valley elderberry longhorn beetle, *Desmocerus californicus dimorphus*	Threatened
Lahontan cutthroat trout, *Oncorhynchus clarki henshawi*	Threatened
Bald eagle, *Haliaeetus leucocephalus*	Sensitive
California spotted owl, *Strix occidentalis occidentalis*	Sensitive
Great gray owl, *Strix nebulosa*	Sensitive
Northern goshawk, *Accipter gentilis*	Sensitive
Willow flycatcher, *Empidonax trailii* subspecies *brewsteri* on the west slope of the Sierran Crest and subspecies *adastus* on the east slope	Sensitive
Greater sandhill crane, *Grus canadensis tabida*	Sensitive
Pacific fisher, *Martes pennanti*	Sensitive USFWS Candidate
Marten, *Martes americana*	Sensitive
Sierra Nevada red fox, *Vulpes vulpes necator*	Sensitive
California wolverine, *Gulo gulo luteus*	Sensitive
Pallid bat, *Antrozous pallidus*	Sensitive
Townsend's big-eared bat, *Corynorhinus townsendii*	Sensitive
Western red bat, *Lasiurus blossevillii*	Sensitive
Northwestern pond turtle, *Clemmys marmorata marmorata*	Sensitive
Foothill yellow-legged frog, *Rana boylii*	Sensitive
Mountain yellow-legged frog, *Rana sierrae*	Sensitive, Candidate
Northern leopard frog, *Rana pipiens*	Sensitive
Great Basin rams-horn snail, *Helisoma newberryi newberryi*	Sensitive
Lahontan Lake tui chub, *Gila bicolor pectinifer*	Sensitive
Hardhead, *Mylopharodon conocephalus*	Sensitive
California floater, *Anodonta californiensis*	Sensitive

The Tahoe National Forest is outside of the range of *Hypomesus transpacificus* (delta smelt). *Oncorhynchyus tshawytscha* (Central Valley spring-run chinook salmon), *Oncorhynchus mykiss* (Central Valley steelhead), and *Oncorhynchus tshawytscha* (winter-run chinook salmon, Sacramento River) do not occur on the forest due to dams.

This biological evaluation was prepared in accordance with Forest Service Manual (FSM) direction 2672.42 and meets legal requirements set forth under Section 7 of the Endangered Species Act of 1973, as amended, and implementing regulations [19 U.S.C. 1536 (c), 50 CFR 402.12 (f) and 402.14 (c)].

Consultation to Date

The U.S. Fish and Wildlife Service (USFWS) is contacted every 90 days to obtain a current list of threatened, endangered, proposed and candidate species that may be present on the Tahoe National Forest (TNF). The most recent list was dated September 4, 2008 and is available for review at the Supervisor's

Office. Programmatic consultation between the USFWS and the Forest Service Pacific Southwest Region occurred during 2005/2006, and a letter of concurrence by the USFWS was issued on December 27, 2006. Under this concurrence, programmatic project design criteria (PDC) were identified for 25 threatened and endangered species; the PDC achieve a "No Effect" or "May Affect, Not Likely to Adversely Affect" determination and, when used, no further consultation with the USFWS is needed. Additional informal consultation with the USFWS Reno Office and Sacramento Office on the Lahontan cutthroat trout occurred at the Truckee Ranger District on August 22, 2007. At attendance at the meeting were Dave Arrasmith (TNF), Tina Mark (TNF), Joanne Roubique (TNF), Chad Mellison (USFWS), and Jeremiah Karuzas (USFWS).

Forest plans for national forests lying within the Sierra Nevada were amended under the Sierra Nevada Forest Plan Amendment (USDA Forest Service 2001 and 2004). The Regional Forester consulted with the California and Nevada Operations Office of Fish and Wildlife Service for that amendment. The Biological Opinion is dated January 11, 2001. The determination in the biological opinion is that the selected action is not likely to jeopardize the continued existence of species listed pursuant to the Act (California red-legged frog, valley elderberry longhorn beetle, Lahontan cutthroat trout). No terms or conditions were provided. Conservation recommendations are discussed in the corresponding species portions of this Biological Evaluation/Assessment if they are applicable to TNF species and management activities.

Current Management Direction

Current management direction on desired future conditions for Threatened, Endangered and Sensitive species on the TNF can be found in the following documents, filed at the District Office:

- Forest Service Manual and Handbooks (FSM/H 2670)
- National Forest Management Act (NFMA)
- Endangered Species Act (ESA)
- National Environmental Policy Act (NEPA)
- Tahoe National Forest Land and Resource Management Plan as amended by the Sierra Nevada Forest Plan Amendment (January 12, 2001a and b, and 2004a and b) (LRMP) and Sierra Nevada Forest Plan Amendment, Final Supplemental Environmental Impact Statement (January 2004)
- Species specific Recovery Plans which establish population goals for recovery of those species
- Species management plans
- Species management guides or conservation strategies
- Regional Forester policy and management direction
- Sierra Nevada Forest Plan Amendment, Final Supplemental Environmental Impact Statement, Record of Decision (January 2004a and b)

The January 2004 Record of Decision (ROD) for the Sierra Nevada Forest Plan Amendment (SNFPA) USDA Forest Service 2004 Supplemental Environmental Impact Statement replaces the January 2001 Record of Decision for the Sierra Nevada Forest Plan Amendment in its entirety. Detailed information including specific standards and guidelines for species management can be found in the Sierra Nevada

Forest Plan Amendment Record of Decision and Final Supplemental Environmental Impact Statement (January 2004b). The standards and guidelines in the January 2004 SNFPA ROD are incorporated by reference.

All Threatened, Endangered and Sensitive species are included in the Tahoe LRMP list of Management Indicator Species. General Forest Service direction for Threatened, Endangered and Sensitive species is summarized below:

FSM 2670.31 Threatened and Endangered Species

1. Place top priority on conservation and recovery of endangered, threatened, and proposed species and their habitats through relevant National Forest System, State and Private Forestry, and Research activities and programs.
2. Establish through the Forest planning process objectives for habitat management and/or recovery of populations, in cooperation with States, the USFWS, and other Federal agencies.
3. Through the biological evaluation process, review actions and programs authorized, funded, or carried out by the Forest Service to determine their potential for effect on threatened and endangered species and species proposed for listing.
4. Avoid all adverse impacts on threatened and endangered species and their habitat except when it is possible to compensate adverse effect totally through alternatives identified in a biological opinion rendered by the USFWS, or when the USFWS biological opinion recognizes an incidental taking. Avoid adverse impacts on species proposed for listing during the conference period and while their Federal status is being determined.
5. Initiate consultation or conference with the USFWS when the Forest Service determines that proposed activities may have an adverse effect on threatened, endangered, or proposed species or when Forest Service projects are for the specific benefit of a threatened or endangered species.
6. Identify and prescribe measures to prevent adverse modification or destruction of critical habitat and other habitats essential for the conservation of endangered, threatened, and proposed species. Protect individual organisms or populations from harm or harassment as appropriate.

FSM 2670.32 Sensitive Species

1. Assist States in achieving their goals for conservation of endemic species.
2. As part of the National Environmental Policy Act process, review programs and activities, through a biological evaluation, to determine their potential effect on sensitive species.
3. Avoid or minimize impacts to species whose viability has been identified as a concern.
4. If impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole.
5. Establish management objectives in cooperation with the States when a project on National Forest System lands may have a significant effect on sensitive species population numbers or distribution. Establish objectives for Federal candidate species, in cooperation with the USFWS and the States.

Description of the Proposed Project

See Chapter 2 (The Alternatives) of this Draft Environmental Impact Statement (DEIS) for a description of the proposed project and a detailed description of the alternatives.

Existing Environment, Effects of the Proposed Project and Determination

Existing Environment

Species information can be found within the *Tahoe National Forest Motorized Travel Management Project DEIS* and is hereby incorporated by reference. More detailed individual species account information can be found within the template of the Tahoe National Forest Biological Evaluation for Birds, Mammals, Amphibians, Reptiles, Fish and Invertebrates and is available at the Tahoe National Forest Supervisors Office. Further detail can be found in the Sierra Nevada Forest Plan Amendment Final Environmental Impact Statement (January 12, 2001) and Sierra Nevada Forest Plan Amendment Record of Decision and Final Supplemental Environmental Impact Statement (January 2004).

Effects of the Proposed Project

The effects analysis which describes the direct, indirect, and cumulative effects of the proposed project alternatives for the species addressed within this Biological Assessment/Evaluation is found in the *Tahoe National Forest Motorized Travel Management Project DEIS*, and is hereby incorporated by reference.

Determinations

The following summary determinations apply to federally listed species:

- "It is my determination that the Tahoe National Forest *Motorized Travel Management Project* will not affect the California red-legged frog and the Valley elderberry longhorn beetle."
- "It is my determination that the Tahoe National Forest *Motorized Travel Management Project* may effect, but will not likely adversely affect the Lahontan cutthroat trout."

The following summary determinations apply to Forest Service sensitive species:

- "It is my determination that implementation of Alternative 6, the preferred alternative, will not affect the Pacific fisher, northern leopard frog, and hardhead; and may affect the bald eagle, California spotted owl, great gray owl, northern goshawk, willow flycatcher, greater sandhill crane, American marten, Sierra Nevada red fox, California wolverine, pallid bat, Western red bat, Townsend's big-eared bat, northwestern pond turtle, foothill yellow-legged frog, mountain yellow-legged frog, Great basin ramshorn snail, and the Lahontan Lake tui chub, but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the Tahoe National Forest. In the absence of a range wide viability assessment, this viability determination is based on local knowledge of this species as discussed previously in this evaluation, and professional judgment."

California red-legged Frog

In 2006, the U.S. Forest Service entered into programmatic consultation with the U.S. Fish and Wildlife Service for route designation (travel management) for motor vehicles in 14 National Forests in California. The BE for the Tahoe NF Motorized Travel Management Project and this programmatic consultation is incorporated by reference. Project design criteria were developed jointly, which includes measures to avoid impacts to federally listed species, including the California red-legged frog. The U.S. Fish and Wildlife Service has agreed that, by using the Project Design Criteria for each of the Threatened and Endangered species and Critical Habitat, route designation will meet "No Effect" or "May Affect Not Likely to Adversely Affect" determinations and that they would concur with these determinations on a programmatic basis. Forest consultation can tier to the programmatic consultation with no further consultation.

The following project design criteria were developed specifically for the California red-legged frog to achieve a "No Effect" or "May Affect Not Likely to Adversely Affect" determination for routes (motorized road or trail) and area additions to the National Forest Travel System (NFTS):

Routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream associated with California red-legged frog.

- In suitable California red-legged frog habitat, routes avoid Riparian Conservation Areas except where necessary to cross streams. Crossing approaches get the riders in and out of the stream channel and riparian area in the shortest distance possible while meeting the gradient and approach length standards.
- Routes or areas that cross any stream or waterbody within 150 m (500 ft) of known occupied sites of California red-legged frog; and route or area is not within a distance of 150 m (500 ft) from wetlands (i.e. springs, wet meadows, ponds, marshes).
- In habitat occupied by California red-legged frog, routes or areas do not have the potential to capture or divert stream flow. The approaches to stream crossings are downsloped toward the stream on both sides.
- Routes or areas are located outside of Critical Aquatic Refuges, Riparian Conservation Areas, meadows, and wetlands within California red-legged frog habitat.
- No route or areas are within Critical Aquatic Refuges for California red-legged frog.

Direct and Indirect Effects

The proposed project alternatives, including the no action alternative, would not directly, indirectly, or cumulatively add impacts to any existing cumulative impacts to the California red-legged frog or its habitat, since no California red-legged frog populations occur on National Forest System lands within the boundary of the Tahoe National Forest. Approximately 100 suitable red-legged frog habitat sites have been surveyed since 1996. To date, no populations of red-legged frogs have been documented to occur on the Tahoe NF. The nearest known populations of California red-legged frog occur on private lands adjacent to Forest Service system lands in the vicinity of North Bloomfield, Nevada City, the Michigan Bluff area near the town of Foresthill, and within the Eldorado National Forest in Spivey Pond. Therefore,

it is my determination that the Tahoe National Forest Motorized Travel Management Project EIS action alternatives will not affect the California red-legged frog.

All the action alternatives would be consistent with the above Project Design Criteria, since none of the proposed route or area additions would adversely affect any occupied California red-legged frog sites adjacent to or within the boundary of the Tahoe NF.

The North Bloomfield (Rock Creek) red-legged frog site occurs several miles outside of the Forest boundary just north of Nevada City, and would not be affected by the proposed route and area additions. Two other known red-legged sites are on the Eldorado and Plumas NFs, and would not be affected by this project.

The occupied California red-legged frog site near Michigan Bluff is immediately adjacent to the Forest boundary. Alternative 5 proposes to add two motorized routes, H3004-8 and H3004-10, to the NFTS that are within close proximity to the Michigan Bluff site. Neither proposed route addition would directly or indirectly affect this red-legged frog site.

Each Project Design Criteria is addressed below:

- Routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream associated with California red-legged frog.
  Routes H3004-8 and H3004-10 are located down slope of the occupied California red-legged frog site, and therefore do not have the potential to capture surface run-off and deliver sediment to the site.
- In suitable California red-legged frog habitat, routes avoid Riparian Conservation Areas except where necessary to cross streams. Crossing approaches get the riders in and out of the stream channel and riparian area in the shortest distance possible while meeting the gradient and approach length standards.
  Routes H3004-8 and H3004-10 are located outside of Riparian Conservation Areas.
- Routes or areas that cross any stream or waterbody within 150 m (500 ft) of known occupied sites of California red-legged frog; and route or area is not within a distance of 150 m (500 ft) from wetlands (i.e. springs, wet meadows, ponds, marshes).
  Routes H3004-8 and H3004-10 are located at least 580 feet away from the edge of the occupied California red-legged frog ponds. Two ponds are greater than 850 feet from the proposed route additions.
- In habitat occupied by California red-legged frog, routes or areas do not have the potential to capture or divert stream flow. The approaches to stream crossings are downsloped toward the stream on both sides.
  As indicated above, routes H3004-8 and H3004-10 are down slope of the occupied red-legged pond sites and do not have to potential to capture sediment into the ponds.
- Routes or areas are located outside of Riparian Conservation Areas, meadows, and wetlands within California red-legged frog habitat.
  As indicated above, proposed Alternative 5 routes H3004-8 and H3004-10 are located outside of the Riparian Conservation Areas for the ponds. The Riparian Conservation Area for perennial

ponds is 300 feet from the edge of the pond. The distance of the proposed route additions exceed 500 feet from the edge of the nearest occupied pond.

- No route or areas are within Critical Aquatic Refuges for California red-legged frog. *The two Critical Aquatic Refuges (CARs) on the Tahoe NF, located at Sierra Buttes and Independence Lake, are outside the range of the California red-legged frog.*

Valley Elderberry Longhorn Beetle

In 2006, the U.S. Forest Service entered into programmatic consultation with the U.S. Fish and Wildlife Service for route designation (travel management) for motor vehicles in 14 National Forests in California. The BE for the Tahoe NF Motorized Travel Management Project and this programmatic consultation is incorporated by reference. Project design criteria were developed jointly, which includes measures to avoid impacts to federally listed species, including the Valley elderberry longhorn beetle. The U.S. Fish and Wildlife Service has agreed that, by using the Project Design Criteria for each of the Threatened and Endangered species and Critical Habitat, route designation will meet "No Effect" or "May Affect Not Likely to Adversely Affect" determinations and that they would concur with these determinations on a programmatic basis. Forest consultation can tier to the programmatic consultation with no further consultation.

The following project design criteria were developed specifically for the Valley elderberry longhorn beetle to achieve a "No Effect" or "May Affect Not Likely to Adversely Affect" determination for routes (motorized road or trail) and area additions to the National Forest Travel System (NFTS):

- Staging areas are not within 100 feet of occupied valley elderberry longhorn beetle sites or suitable habitat of elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level. *No suitable habitat for the valley elderberry longhorn beetle occurs on the Tahoe NF, and therefore, no staging areas are proposed within 100 feet of occupied valley elderberry longhorn beetle sites or suitable habitat of elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level.*
- Routes or areas are not within 20 feet of occupied valley elderberry longhorn beetle sites or suitable habitat of elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level. *No suitable habitat for the valley elderberry longhorn beetle occurs on the Tahoe NF, and therefore, no routes or areas are proposed within 20 feet of occupied valley elderberry longhorn beetle sites or suitable habitat of elderberry plants containing stems measuring 1.0 inch or greater in diameter at ground level.*

The proposed project alternatives including the no action alternative would not directly, indirectly, or cumulatively add to any existing cumulative impacts to the valley elderberry long-horn beetle, since no habitat for these species occurs on the Tahoe National Forest. Therefore, it is my determination that the Tahoe National Forest Motorized Travel Management Project EIS action alternatives will not affect the Valley elderberry long-horn beetle.

Lahontan Cutthroat Trout

During the informal consultation meeting with USFWS on August 33, 2007, it was agreed upon that if the Tahoe NF followed the October 2006 version 1 project design criteria developed through the

programmatic consultation with USFWS Sacramento Office, that the Tahoe NF would achieve a "no effect" or "may Affect not likely to adversely affect" determination for the LCT. Project design criteria were used for the action alternatives.

Consistency with Project Design Criteria to Achieve "No Effect" and "Not Likely to Adversely Affect" Determinations

- Routes and areas do not cross any stream within the occupied range of Lahontan cutthroat trout.
  - There are no proposed route additions that cross any stream occupied by Lahontan cutthroat trout.
  - The change in class of vehicles on the Pole Creek Road (Road #5708) proposed in alternatives 2, 5, and 6 crosses Pole Creek, which is occupied Lahontan cutthroat trout habitat. However, the crossing occurs on a bridge that will not re-route water surface water.
- Routes and areas are not located on active landslides and do not re-route surface water onto active landslides within watersheds that provide habitat for Lahontan cutthroat trout.
  - There are no proposed route additions that cross any stream occupied by Lahontan cutthroat trout, and therefore, no proposed route additions are located on active landslides within watersheds that provide habitat for LCT.
- Within watersheds that provide habitat for Lahontan cutthroat trout, routes or areas do not have the potential to capture surface run-off and then deliver sediment into a stream.
  - The Travel Management action alternatives do not propose route or area additions that have the potential to capture surface run-off and then deliver sediment into any occupied LCT streams.
  - For Alternatives 2, 5, and 6, the change in class of vehicles on the Pole Creek Road has the potential to increase sediment delivery to Pole Creek which is occupied Lahontan cutthroat trout habitat. Mitigation measures would be required to maintain the Pole Creek Road that is within close proximity to the Pole Creek (Riparian Conservation Area) to a higher maintenance standard where sediment delivery to occupied habitat would be minimized to prevent adverse effects to LCT.
- **"Motorized Areas"** are located outside of Riparian Conservation Areas that are within watersheds that provide habitat for Lahontan cutthroat trout.
  - The action alternatives do not propose motorized area additions within watersheds or Riparian Conservation Areas that provide habitat for Lahontan cutthroat trout.
- Within watersheds that provide habitat for Lahontan cutthroat trout, "**motorized routes"** avoid Riparian Conservation Areas.
  - The action alternatives do not propose motorized route additions within watersheds or Riparian Conservation Areas that provide habitat for Lahontan cutthroat trout.
  - The change in class of vehicles on approximately 0.5 miles of the Pole Creek Road (Road #5708) is located within the Riparian Conservation Area of Pole Creek, which is occupied Lahontan cutthroat trout habitat, and therefore may have adverse effects from potential increased sedimentation from changed maintenance standards, where the route changes from smooth surfaced to native surfaced. Mitigation measures would be required to maintain the

Pole Creek Road that is within the Pole Creek RCA to a higher maintenance standard where sediment delivery to occupied habitat would be minimized to prevent adverse effects to LCT.

In summary, none of the project alternatives proposes to add unauthorized routes that would directly, indirectly, or cumulatively affect occupied Lahontan cutthroat trout streams. The change in class of vehicles for Alternatives 2, 5, and 6, has a potential to adversely affect LCT along Pole Creek, where changed road maintenance standards could result in increased sediment capture and delivery to an occupied portion of Pole Creek (near bridge). The potential for sediment capture and delivery will be mitigated by requiring the Pole Creek Road be maintained where sediment capture and delivery to Pole Creek is minimized. Therefore, it is my determination that the Tahoe National Forest Motorized Travel Management Project may affect, not likely to adversely affect the Lahontan cutthroat trout within Pole Creek for Alternatives 2, 5, and 6. Alternative 1, the no action alternative, which does not prohibit cross country travel may directly, indirectly, and cumulatively affect occupied LCT streams, and therefore may adversely affect the Lahontan cutthroat trout. In addition, the increase and proliferation of routes unauthorized to motorized use has the potential to add to cumulative effects for Alternative 1.

Bald Eagle

The bald eagle was delisted from the list of federally threatened and endangered animal species in August 2007. The bald eagle continues to be protected by the Bald and Golden Eagle Protection Act (Eagle Act) and the Migratory Bird Treaty Act (MBTA). The Eagle Act and the MBTA protect bald eagles from a variety of harmful actions and impacts. The U.S. Fish and Wildlife Service developed National Bald Eagle Management Guidelines to advise land managers and others of protective provisions to minimize impacts to bald eagles, particularly where they may constitute “disturbance,” which is prohibited by the Eagle Act. The Eagle Act defines disturb as “agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.” The bald eagle was subsequently placed on the Regional Forester’s Sensitive Species list. The Bald Eagle Guidelines do not provide protection provisions for general motorized use, but it does provide the following guideline for off-road vehicle use: No buffer is necessary around nest sites outside the breeding season. During the breeding season, do not operate off-road vehicles within 330 feet of the nest. In open areas, where there is increased visibility and exposure to noise, this distance should be extended to 660 feet.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table L-3 summarizes the effects of the alternatives for 1) proposed motorized route additions, 2) prohibition of cross country travel, 3) changes in class of vehicles, and 4) wet weather seasonal restrictions.

Table L-3. Bald Eagle - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Route Additions	Negative effects to 8 bald eagle nest territories for a total of 9.7 miles (3.7 miles within 400 meters, and 6 miles within 400 meters to 800 meters of nest site)	Negative effects to 2 bald eagle nest territories for a total of 0.8 miles (0.1 miles within 400 meters, and 0.7 miles within 400 meters to 800 meters of nest sites)	No effect to bald eagle nest territories	Negative effects to 1 bald eagle nest territories for a total of 0.1 miles within 400 meters of nest site	Negative effects to 5 bald eagle nest territories for a total of 7.5 miles (2.8 miles within 400 meters, and 4.7 miles within 400 meters to 800 meters of nest sites)	Negative effects to 1 bald eagle nest territories for a total of 0.1 miles within 400 meters of nest site	Negative effects to 2 bald eagle nest territories for a total of 0.8 miles (0.1 miles within 400 meters, and 0.7 miles within 400 meters to 800 meters of nest sites)
Cross Country Travel	Continues on 814 acres within 400 meters of bald eagle nests, including on 3.6 miles of existing unauthorized to motorized public use, and prohibited on 0.6 miles	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.5 miles of existing routes unauthorized to motorized public use	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.6 miles of existing routes unauthorized to motorized public use	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.6 miles of existing routes unauthorized to motorized public use	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 2.8 miles of existing routes unauthorized to motorized public use	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.6 miles of existing routes unauthorized to motorized public use	Prohibited on 814 acres within 400 meters of bald eagle nests, Including on 3.5 miles of existing routes unauthorized to motorized public use
Wet Weather Restrictions	No effect	No effect	No effect	Positive Benefit - reduced disturbance during nesting season	Positive Benefit - reduced disturbance during nesting season	Positive Benefit - reduced disturbance during nesting season	No effect
Change in Class of Vehicles	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Overall Net Effect of Proposed Actions	Negative impacts to bald eagle where cross country travel continues, on 814 to 3,299 acres including on 3.6 miles of existing unauthorized to motorized public use	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.5 miles of existing routes unauthorized to motorized public use	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.6 miles of existing routes unauthorized to motorized public use	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.6 miles of existing routes unauthorized to motorized public use; and reduced effects from wet weather restrictions	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 2.8 miles of existing routes unauthorized to motorized public use; and reduced effects from wet weather restrictions	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.6 miles of existing routes unauthorized to motorized public use; and reduced effects from wet weather restrictions	Prohibition of cross country travel benefits bald eagle on 814 to 3,299 acres, including on 3.5 miles of existing routes unauthorized to motorized public use

*Alternative 1 includes existing motorized routes unauthorized to motorized public use with continued cross country travel.

Based on the analysis of effects, it is my determination that the action alternatives for the Tahoe National Forest Motorized Travel Management Project may affect the bald eagle, but do not lead to a trend toward federal listing or loss of viability within the planning area of Tahoe National Forest, since current and future cross country travel by motorized vehicles would be prohibited, including on existing routes unauthorized to motorized use. The prohibition of cross country travel will reduce the potential for disturbance to nesting bald eagles that may be vulnerable to activities associated with motorized use and cross country travel.

However, Alternative 1, no action, may affect individual bald eagles and may lead to a trend toward federal listing due to the continued route proliferation from cross country motorized travel. Alternative 1 does not prohibit cross country motorized use, and may result in increased disturbance to nesting bald eagles.

California Spotted Owl

A few studies of noise effects to spotted owls shed some light on the potential effects of motorized use on spotted owls. A study by Delaney et al. (1999) found that Mexican spotted owls were found to show an alert response to chainsaws at distances less than 0.25 miles. Preliminary study results on a Northern spotted owl study in northern California, indicated that spotted owls did not flush from nest or roost sites when motorcycles were greater than 105 meters away during the post-fledgling period (Delaney and Grubb 2001). In addition, Delaney and Grubb (2003) found that spotted owl responses to motorcycle noise depended upon an array of complex factors, including sound level and frequency distribution, stimulus distance and event duration, motorcycle type and condition, frequency of motorcycle events, number of motorcycles per group, trail slope, topography, road substrate and condition, and microphone position relative to sound source. In general, motorcycle noise did not appear to affect reproductive success. However, this study is ongoing and the impact of motorcycle noise is not conclusive at this point. A study by Wasser et al. (1997) found that stress hormone levels were significantly higher in male northern spotted owls (but not females) when they were located <0.41 km from a major logging road compared to spotted owls in areas >0.41 km from a major logging road. It is not well understood how elevated stress hormones affect spotted populations. However, Marra and Holberton (1998) reported that chronic high levels of stress hormones (corticosterone) may have negative effects on reproduction or physical condition of individual owls. Swarthout and Steidl (2001) found hikers caused juvenile and adult spotted owls to flush at <12meters and <24 meters, respectively. Mexican spotted owls did not elicit any response from hikers that exceeded a distance of 55 meters. Based on the spotted owl analysis of effects, it is my determination that implementation of all the actions alternatives for the Tahoe National Forest Motorized Travel Management Project may affect spotted owls, but are not likely to lead to a trend toward listing or a loss in population viability.

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

When considering all the direct, indirect, and cumulative impact to spotted owls within PACs, within 0.25 miles of activity centers, and within HRCAs, Table L-4 summarizes the overall net effect to California spotted owl from the proposed actions from motorized route additions, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table L-4. California Spotted Owl - Summary of Overall Net Direct, Indirect, and Cumulative Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Route Additions	Negatively affects the greatest proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs (i.e. 20% H.	Negatively affects a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 1% H.	Does not affect spotted owl PACs, within 0.25 miles of activity centers, and within HRCAs.	Negatively affects a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 1% H.	Negatively affects a small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 3% H.	Negatively affects a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 1% H.	Negatively affects a very small proportion of spotted owl habitat within PACs, within 0.25 miles of activity centers, and HRCAs.(i.e., 1% H.
Cross Country Travel	Negatively affects PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel continued.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 19% HRCAs would receive reduced impacts within 200 meters of routes unauthorized to motorized use).	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 20% HRCAs would receive reduced impacts within 200 meters of routes unauthorized to motorized use).	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 19% HRCAs would receive reduced impacts within 200 meters of routes unauthorized to motorized use).	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 17% HRCAs would receive reduced impacts within 200 meters of routes unauthorized to motorized use).	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited (i.e., 19% HRCAs would receive reduced impacts within 200 meters of routes unauthorized to motorized use).	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited public use (i.e., 20% HRCAs would receive reduced impacts within 200 meters of routes unauthorized to motorized use).
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Overall Net Effect of Proposed Actions	Negatively affects PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel continued. Increases disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.	Benefits PACs, acres within 0.25 miles of activity centers, and HRCAs, where cross country travel is prohibited. Reduces disturbance and habitat fragmentation.

*Alternative 1 includes existing motorized routes unauthorized to motorized public use with continued cross country travel.

Although some habitat fragmentation and edge effects would occur from the action alternatives, none of the action alternatives would likely cause enough fragmentation to be a concern to spotted owl population viability on the Tahoe National Forest when considering the combined effects of the project alternatives and the additional activities occurring within the cumulative effects analysis area. Based on this information and the findings from U.S. Fish and Wildlife Service, the project alternatives as proposed are not expected to result in a loss of viability or lead to a trend toward Federal listing for the California spotted. The project alternatives will not likely affect Forest-wide spotted owl population trends.

The uncertainty of long term effects to spotted owls from increasing disturbance from motorized vehicle use poses an unknown risk. Alternative 1 could cause long-term chronic effects to spotted owl from increased motorized route proliferation over time, and therefore may contribute to downward spotted owl population trends on the Tahoe National Forest.

Great Gray Owl

Summary of Direct and Indirect Effects of Proposed Actions

Table L-5 summarizes the overall net direct and indirect effect of the alternatives from motorized route additions, prohibition of cross country travel, wet weather restrictions, and changes in class of vehicles.

Table L-5. Great Gray Owl - Summary of Overall Net Direct and Indirect Effects of the Alternatives

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Motorized Routes	Negative effects within 21 meadows intersected on 5.6 miles	Negative effects within 3 meadows intersected on < 0.1 mile	No effects - no meadows affected	Negative effects within 1 meadow intersected on <0.1 mile	Negative effects within 5 meadows intersected on <0.1 mile	Negative effects within 3 meadows intersected on <0.1 mile	Negative effects within 2 meadows intersected on <0.1 mile
Additions of Open Areas (Eureka Diggins, Greenhorn, and Reservoir Areas at Stampede, Boca, and Prosser)	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Cross Country Travel	Negative effect cross country travel Continues on 3,165 meadow acres, including within 21 meadows intersected on 5.6 miles	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 18 meadow on 5.7 miles	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 21 meadow on 5.8 miles	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 20 meadow on 5.7 miles	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 17 meadow on 5.3 miles	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 18 meadow on 5.7 miles	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 19 meadow on 5.7 miles
Wet Weather Restrictions	No effect	No effect	No effect	Positive Benefit to habitat	Positive Benefit to habitat	Positive Benefit to habitat	No effect
Change in Class of Vehicles	No effect	Localized negative effects	No effect	No Effect	Localized negative effects	No Effect	Localized negative effects
Overall Net Effect of Proposed Actions	Negative effect where cross country travel continued on 21 meadows 5.6 miles and within 3,165 acres of meadow habitat	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 18 meadow on 5.7 miles	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 21 meadow on 5.8 miles	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 20 meadow on 5.7 miles	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 17 meadow on 5.3 miles	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 18 meadow on 5.7 miles	Positive Effect – Cross country travel Prohibited on 3,165 acres, including within 19 meadow on 5.7 miles

*Alternative 1 includes existing motorized routes unauthorized to motorized public use with continued cross country travel.

Currently, great gray owls have not been known to breed on the Tahoe National Forest. Therefore, the addition of unauthorized motorized routes would not directly, indirectly or cumulatively affect known breeding great gray owls. However, potential great gray owl nesting habitat does occur on the Forest and incidental great gray owls have been detected on the Sierraville Ranger District and incidental great gray owls have been documented on private land adjacent to National Forest system lands within the boundary of the Tahoe National Forest on the west side of the Forest. Alternative 6, the preferred alternative results in less than 0.1 mile intersecting suitable great gray owl meadow sites which represents 14% (3 of 21) suitable great gray owl meadow sites across the Tahoe National Forest. This amount of habitat affected by motorized routes would pose a relatively low risk to great gray owl breeding habitat.

It is my determination that the Tahoe National Forest Motorized Travel Management Project action alternatives may affect great gray owl, but is not likely to result in a trend toward Federal listing or loss of viability for this species within the planning area of the Tahoe National Forest. In the absence of a range wide viability assessment, this viability determination is based on local knowledge of this species as discussed previously in this evaluation, and professional judgment.

Alternative 1 could result in adverse great gray owl breeding habitat impacts from increased motorized route proliferation over time, and may prevent establishment of breeding great gray owls on the Tahoe National Forest.

Northern Goshawk

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

When considering all the direct, indirect, and cumulative impact to the northern goshawk within PACs, and within 0.25 miles of activity centers, Table L-6 summarizes the overall net effect to the northern goshawk from the proposed actions from motorized route additions, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table L-6. Northern Goshawk - Summary of Overall Net Direct and Indirect, Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Route Additions	Negatively affects the greatest proportion of goshawk habitat within PACs and within 0.25 miles of activity centers, (i.e. 29 miles of routes unauthorized to motorized public use affecting 68% of PACs continued with cross country travel	Negatively affects a small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., approx. 1 mile of	Does not affect goshawk habitat within PACs and within 0.25 miles of activity centers	Negatively affects a very small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., 0.02 mile of .	Negatively affects a small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., approx. 6 miles of	Negatively affects a small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., 1 mile of	Negatively affects a small proportion of goshawk habitat within PACs and within 0.25 miles of activity centers.(i.e., approx. 1 mile of proposed
Cross Country Travel	Negatively affects 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel continues (i.e. 29.4 miles of motorized routes affects 68% of PACs).	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 28 miles of routes unauthorized to motorized public use within 64% of TNF PACs).	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 29.4 miles of routes unauthorized to motorized public use, within 68% of TNF PACs).	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 29.4 miles of routes unauthorized to motorized public use within 68% of TNF PACs).	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 23.6 miles of routes unauthorized to motorized public use within 50% of TNF PACs).	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 28.3 miles of routes unauthorized to motorized public use within 64% of PACs)	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited public use (i.e., reduces impacts of 28.6 miles of routes unauthorized to motorized public use within 66% of PACs).
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	No effect	No effect	No effect	No effect	No effect	No effect	No effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel continues (i.e. 29.4 miles of motorized routes affects 68% of PACs). Increases disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 28 miles of routes unauthorized to motorized public use within 64% of TNF PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 29.4 miles of routes unauthorized to motorized public use, within 68% of TNF PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 29.4 miles of routes unauthorized to motorized public use within 68% of TNF PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 23.6 miles of routes unauthorized to motorized public use within 50% of TNF PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited (i.e., reduces impacts of 28.3 miles of routes unauthorized to motorized public use within 64% of PACs). Reduces disturbance and habitat fragmentation.	Benefits 20,036 PAC acres and 10,384 acres within 0.25 miles of activity centers, where cross country travel is prohibited public use (i.e., reduces impacts of 28.6 miles of routes unauthorized to motorized public use within 66% of PACs). Reduces disturbance and habitat fragmentation.

*Alternative 1 includes existing motorized routes unauthorized to motorized public use with continued cross country travel.

Based on the northern goshawk analysis of effects, it is determined that the Tahoe National Forest Travel Management EIS Project actions alternatives may affect northern goshawks, but are not likely to lead to a trend toward listing or a loss in population viability in the planning area of the Tahoe NF.

Although, some habitat fragmentation and edge effects would occur from the action alternatives, none of the action alternatives would likely cause enough fragmentation to be a concern to goshawk population viability on the Tahoe National Forest when considering the combined effects of the project alternatives and the additional activities occurring within the cumulative effects analysis area. Based on this information, the project alternatives as proposed are not expected to result in a loss of viability or lead to a trend toward Federal listing for the northern goshawk. The project alternatives will not likely affect Forest-wide northern goshawk population trends. However, the uncertainty of long term effects to goshawk from increasing disturbance from motorized vehicle use poses an unknown risk. Alternative 1 could cause long-term chronic effects to northern goshawk from increased motorized route proliferation over time, and therefore may contribute to a loss of viability and downward population trends on the Tahoe National Forest.

Willow Flycatcher

Summary of Direct and Indirect Effects

Table L-7 summarizes the overall net direct and indirect effect of the alternatives from motorized route additions, prohibition of cross country travel, wet weather restrictions, and changes in class of vehicles.

Table L-7. Willow Flycatcher - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Route Additions	Negative effects to 4 occupied meadows (1.2 miles). Negative effects to 18 emphasis meadows (2.7 miles).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 2 emphasis meadows negatively affected (0.13 miles).	No effect to Occupied meadows (0 meadows intersected). No effect to emphasis meadows (0 emphasis meadows intersected).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 1 emphasis meadows (0.02 mi).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 4 emphasis meadows (0.27 mi).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 2 emphasis meadows (0.13 mi).	No effect to Occupied meadows (0 meadows intersected). Negative effects to 1 emphasis meadow (0.12 mi).
Cross Country Travel	Continues on 3,075 willow flycatcher habitat acres, including within 22 meadows on 3.8 miles of existing unauthorized to motorized public use.	Prohibited on 3,075 acres, Including within 21 meadows on 3.7 miles of existing routes unauthorized to motorized public use.	Prohibited on 3,075 acres, including within 23 meadows on 3.9 miles of existing routes unauthorized to motorized public use.	Prohibited on 3,075 acres, including within 22 meadows on approx. 3.9 miles of existing routes unauthorized to motorized public use.	Prohibited on 3,075 acres, including within 20 meadows on approx. 3.6 miles of existing routes unauthorized to motorized public use.	Prohibited on 3,075 acres, including within 21 meadows on approx. 3.7 miles of existing routes unauthorized to motorized public use.	Prohibited on 3,075 acres, including within 22 meadows on approx. 3.8 miles of existing routes unauthorized to motorized public use.
Wet Weather Restrictions	No effect	No effect	No effect	Positive Benefit to habitat	Positive Benefit to habitat	Positive Benefit to habitat	No effect
Change in Class of Vehicles	No effect	Localized negative effects	No effect	Minor negative effect	Localized negative effects	Localized negative effects	Minor negative effect
Overall Net Effect of Proposed Actions	Negative effect from continued cross country travel on 22 willow flycatcher meadows on 3.8 miles of existing routes unauthorized to motorized public use with continued cross country travel on 3,075 acres.	Benefits willow flycatcher on 3,075 acres, Including within 21 meadows on 3.7 miles of existing routes unauthorized to motorized public use where cross country travel is prohibited.	Benefits willow flycatcher on 3,075 acres, including within 23 meadows on 3.9 miles of existing routes unauthorized to motorized public use where cross country travel is prohibited.	Benefits willow flycatcher 3,075 acres, including within 22 meadows on approx. 3.9 miles of existing routes unauthorized to motorized public use.	Benefits willow flycatcher on 3,075 acres, including within 20 meadows on 3.6 miles of existing routes unauthorized to motorized public use where cross country travel is prohibited.	Benefits willow flycatcher on 3,075 acres, including within 21 meadows on 3.7 miles of existing routes unauthorized to motorized public use where cross country travel is prohibited.	Benefits willow flycatcher on 3,075 acres, including within 22 meadows on 3.8 miles of existing routes unauthorized to motorized public use where cross country travel is prohibited.

*Alternative 1 includes existing motorized routes unauthorized to motorized public use with continued cross country travel.

It is my determination that the project alternatives for Tahoe National Forest Motorized Travel Management Project EIS may affect willow flycatchers, but is not likely to lead to a trend toward federally listing or result in a loss in population viability in the planning area of the Tahoe NF. The action alternatives all significantly reduce the number and miles of unauthorized wheeled motorized use and prohibits cross country travel. Furthermore, wet weather seasonal restrictions reduce the likelihood of sedimentation and erosion that may occur from wet weather motorized use for alternatives 4, 5, and 6. Alternative 1 does not prohibit cross country travel and may lead to a trend toward federal listing or a downward trend in population viability for the willow flycatcher.

Greater Sandhill Crane

Summary of Direct and Indirect Effects of Proposed Actions

Table L-8 summarizes the overall net direct and indirect effect of the proposed actions from motorized route additions, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table L-8. Sandhill Crane - Summary of Overall Net Direct and Indirect Effects of the Alternatives

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Route Additions	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.	No Effect - No routes proposed for addition.
Open Reservoir Areas at Stampede, Boca, and Prosser Reservoirs	Unmanaged motorized use continues, potential adverse effects to sandhill crane at Stampede Reservoir.	Open motorized access to reservoirs on dry soil – potential adverse effects to sandhill crane at Stampede Reservoir.	No effect	No effect	No effect	No effect	No effect
Cross Country Travel	Continues at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.	Prohibited at at Kyburz, Perazzo, and Carmen Valley.	Prohibited at at Kyburz, Perazzo, and Carmen Valley.	Prohibited at Kyburz, Perazzo, and Carmen Valley.
Wet Weather Restrictions	No effect	No effect	No effect	Positive Benefit to habitat	Positive Benefit to habitat	Positive Benefit to habitat	No effect
Change in Class of Vehicles	No effect	Localized negative effects at Carmen Valley	No effect	No Effect	Localized negative effects at Carmen Valley	No Effect	Localized negative effects at Carmen Valley
Overall Net Effect of Proposed Actions	Negative effect at Kyburz, Perazzo, and Carman Valley, and Stampede Reservoir where cross country travel continued.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited, but negative effects at Stampede Reservoir.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.	Positive effect at Kyburz, Perazzo, and Carmen Valley where cross country travel prohibited.

*Alternative 1 includes existing motorized routes unauthorized to motorized public use with continued cross country travel.

It is my determination that the Tahoe National Forest Motorized Travel Management Project action alternatives may affect sandhill cranes, but are not likely to lead to a trend toward federally listing, or a loss in sandhill crane population viability in the planning area of the Tahoe NF. The action alternatives all significantly reduce the number and miles of unauthorized wheeled motorized use and prohibits cross country travel. Furthermore, wet weather seasonal restrictions reduce the likelihood of sedimentation and erosion that may occur from wet weather motorized use for alternatives 4, 5, and 6. Alternative 1 does not prohibit cross country travel and may lead to a trend toward federal listing or a downward trend in population viability for the Greater sandhill crane.

Pacific Fisher

Due to the absence of the Pacific fisher on the Tahoe National Forest, it is my determination that the Tahoe National Forest Motorized Travel Management Project will not affect the Pacific fisher. Furthermore, this project as proposed will not likely affect any future reintroduction efforts and the ability for the fisher to become reestablished on the Tahoe National Forest since habitat fragmentation by the addition of unauthorized motorized routes is minimized. Cross country wheeled motorized use will be prohibited including on existing routes unauthorized to motorized use within suitable fisher habitat.

American Marten

Summary of Direct and Indirect Impacts to American Marten and Pacific Fisher (potential habitat for fisher only)

When considering all the direct, indirect, and cumulative impact to the American marten and potential Pacific fisher habitat, Table L-9 summarizes the overall net effect to the marten and fisher from the proposed actions from motorized route additions, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table L-9. American marten and Pacific fisher - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Proposed Motorized Route Additions	Negatively affects the greatest proportion of marten and fisher habitats with continued with cross country travel.	Negatively affects a small proportion of marten and fisher habitat.	Does not affect marten and fisher habitats.	Negatively affects a small proportion of marten and fisher habitat.	Negatively affects a small proportion of marten and fisher habitat.	Negatively affects a small proportion of marten and fisher habitat.	Negatively affects a small proportion of marten and fisher habitat.
Cross Country Travel	Negatively affects between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel continues.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel continues of TNF PACs).	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited.
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Overall Net Effect of Proposed Actions	Negatively affects between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel continues. Increases disturbance and habitat fragmentation, with the greatest proportion of motorized route densities >2 mi/mi^2.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation, by reducing motorized route densities by approx. 10%, compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 10% compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited). Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 10% compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 9% compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 9% compared to Alternative 1.	Benefits between 267,952 and 394,847 acres of marten and fisher habitats within OFEAs, late seral habitat, and Forest Carnivore Network, where motorized cross country travel is prohibited. Reduces disturbance and habitat fragmentation by reducing motorized route densities by approx. 10%, compared to Alternative 1.

*Alternative 1 includes existing motorized routes unauthorized to motorized public use with continued cross country travel.

It is my determination that all the action alternatives for the Tahoe National Forest Motorized Travel Management project may affect individual American martens, but are not likely to result in a loss of viability or lead to a trend toward federal listing. No motorized routes through meadows are proposed in Alternative 6, the preferred alternative. Motorized route additions within riparian conservation areas are significantly reduced compared to Alternative 1, no action. Habitat fragmentation from motorized routes will be considerably reduced. Future motorized route proliferation will be minimized due to prohibition of unmanaged cross country motorized travel. In addition, wet weather restrictions on native surfaced routes will reduce potential erosion and sedimentation.

California Wolverine and Sierra Nevada Red Fox

Summary of Direct, Indirect and Cumulative Effects of Proposed Actions

Table L-10 summarizes the overall net effect to red fox and wolverine from the proposed actions from motorized route additions, prohibition of cross country travel, wet weather restrictions, and seasonal closures.

Table L-10. Wolverine and Red Fox - Summary of Overall Net Direct and Indirect Effects

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Route Density	Has the highest proportion of habitat within the highest route density categories (>4 mi/mi^2) resulting in low habitat security, and the lowest proportion in the lowest density categories (<4 mi/mi^2).	Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 20% compared to Alternative 1.	Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 22% compared to Alternative 1.	Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 18% compared to Alternative 1.	Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 17% compared to Alternative 1.	Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 18% compared to Alternative 1.	Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 18% compared to Alternative 1.
Proposed Route Additions within 60 meters affecting snag and down log habitat	Negatively affects snag and down log habitat by 6% from existing routes unauthorized to motorized public use.	Negatively affects snag and down log habitat by <1% from proposed additions.	Does not affect snag and down log habitat from proposed additions.	Negatively affects snag habitat by <1% from proposed additions.	Negatively affects snag and down log habitat by 2% from proposed additions.	Negatively affects snag and down log habitat by <1% from proposed additions.	Negatively affects snag and down log habitat by <1% from proposed additions.
Cross Country Travel	Negatively affects red fox and wolverine habitat where cross country travel continued on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 715,200 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 4% habitat influenced within 60 meters of existing routes unauthorized to motorized public use.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use.
Wet Weather Restrictions	No effect	No effect	No effect	No effect	No effect	No effect	No effect
Change in Class of Vehicles	No effect	No effect	No effect	No effect	No effect	No effect	No effect

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Overall Net Effect of Proposed Actions	Negatively affects red fox and wolverine habitat where cross country travel continued on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Has the highest proportion of habitat within the highest route density categories (>4 mi/mi^2) resulting in low habitat security, and the lowest proportion in the lowest density categories (<4 mi/mi^2)	Benefits red fox and wolverine habitat where cross country travel is prohibited on 715,200 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 20% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 22% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 18% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 4% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 17% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 18% compared to Alternative 1.	Benefits red fox and wolverine habitat where cross country travel is prohibited on 717,900 acres, including 6% habitat influenced within 60 meters of existing routes unauthorized to motorized public use. Reduces the proportion of habitat in the highest route density categories (>4 mi/mi^2) and increases the proportion in the lowest density categories (>4 mi/mi$^{2)}$ by 18% compared to Alternative 1.

*Alternative 1 includes existing motorized routes unauthorized to motorized public use with continued cross country travel.

It is my determination that the Travel Management EIS project alternatives may affect the California wolverine and the Sierra Nevada red fox, but is not likely to result in a trend toward Federal listing or loss of viability for the California wolverine or the Sierra Nevada red fox within the planning area of the Tahoe National Forest. The project action alternatives would prohibit current and future cross country travel, and would significantly reduce the miles of routes unauthorized to motorized use within 5 miles of verified wolverine detections as compared to Alternative 1, no action (Alternative 1 - 104 miles, Alternative 6 - 3 miles). Across the Tahoe National Forest, fragmentation and route density would be considerably reduced compared to Alternative 1, no action. In the absence of a range wide viability assessment, this viability determination is based on local knowledge of this species as discussed previously in this evaluation, and professional judgment.

Bat Species: Pallid Bat, Townsend's Big-eared Bat, Western Red Bat

Disturbance associated with motorized use has the potential to adversely affect sensitive bat species, particularly at roost sites. Riparian habitats are important foraging habitats to the big-eared bat and western red bat. In addition, removal of snags along motorized routes has the potential to adversely affect the pallid bat, which uses snags for roosting. Therefore, it is my determination that the action alternatives for Tahoe National Forest Motorized Travel Management Project action alternatives may affect sensitive bat species, but is not likely to lead to a trend toward federally listing or a downward trend in population viability. The action alternatives all reduce the potential direct and indirect effects of motorized routes unauthorized to motorized use. Within all the action alternatives, unmanaged cross country motorized travel would be prohibited, and over time as existing routes unauthorized to motorized use are rehabilitated, the pallid bat, Townsend's big-eared bat, and western red bat and their habitats would benefit in the long term.

Northwestern Pond Turtle

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table L-11 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized trail crossings within NWPT HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table L-11. Northwestern Pond Turtle 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Crossings

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, Motorized Stream Crossings	77	77	77	77	77	77	77
Native Surfaced, Motorized Trail Crossing Additions	44	10	0	2	24	10	0
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	0	0	0	0	0	0
Cross Country Travel Prohibited on Motorized Stream Crossings unauthorized to motorized use	0	34	44	42	20	34	44
Net Native Surfaced, Motorized Crossings	121	87	77	79	101	87	77
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**
Acres of RCA Cross Country Travel	**Continues on 7,986 RCA acres**	**Prohibited on 7,986 RCA acres**	**Prohibited on 7,986 RCA acres**	**Prohibited on 7,986 RCA acres**	**Prohibited on 7,986 RCA acres**	**Prohibited on 7,986 RCA acres**	**Prohibited on 7,986 RCA acres**

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 7,986 RCA acres, including on 44 native surfaced, stream crossings. Motorized use continues on 121 native surfaced, crossings (77 NFTS and 44 unauthorized) No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 34 native surfaced, stream crossings. 87 NFTS crossings available for motorized use. No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 44 native surfaced, stream crossings 77 NFTS crossings available for motorized use. No additional protection to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 42 native surfaced, stream crossings 79 NFTS crossings available for motorized use. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 20 native surfaced, stream crossings 101 NFTS crossings available for motorized use. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 34 native surfaced, stream crossings 87 NFTS crossings available for motorized use. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 44 native surfaced, stream crossings. 77 NFTS crossings available for motorized use. No additional protection to NWPT habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing motorized routes unauthorized to motorized public use with continued cross country travel.

Table L-12 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA trail miles within NWPT HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table L-12. Northwestern Pond Turtle 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Trail Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	22.3	22.3	22.3	22.3	22.3	22.3	22.3
RCA Miles of Native Surfaced, Motorized Trail Additions*	16.3	1.6	0	0.4	7.5	3.2	0.3
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized trail miles	0	0.1	0	0	0.1	0.1	0
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0	14.6	16.3	15.9	8.7	13.0	16.0
Net NFTS Native Surfaced, Motorized RCA Miles	**38.6**	**24.0**	**22.3**	**22.7**	**29.9**	**25.6**	**22.6**
Acres of RCA Cross Country Travel	**Continues on 7,986 RCA acres**	**Prohibited on 7,986 RCA acres**	**Prohibited on 7,986 RCA acres**	**Prohibited on 7,986 RCA acres**	**Prohibited on 7,986 RCA acres**	**Prohibited on 7,986 RCA acres**	**Prohibited on 7,986 RCA acres**
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 7,986 RCA acres, including on 16.3 RCA miles of routes unauthorized to motorized use. Motorized use continues on 38.6 RCA miles (22.3 mi. NFTS and 16.3 mi. unauthorized). No additional protection to NWPT habitats from wet weather seasonal restrictions	Motorized cross country travel prohibited on 7,986 RCA acres, including on 14.6 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 24 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions	Motorized cross country travel prohibited on 7,986 RCA acres, including on 16.3 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 22.3 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions	Motorized cross country travel prohibited on 7,986 RCA acres, including on 15.9 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 22.7 RCA miles. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 8.7 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 29.9 RCA miles. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 13 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 25.6 RCA miles. Reduced sedimentation risk to NWPT habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 7,986 RCA acres, including on 16 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 22.6 RCA miles. No additional protection to NWPT habitats from wet weather seasonal restrictions

*Alternative 1 includes existing native surfaced, routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

It is my determination that the action alternatives for Tahoe National Forest Motorized Travel Management Project EIS action alternatives may affect the northwestern pond turtle, but is not likely to lead to a trend toward federally listing or a loss in population viability within the planning area of the Tahoe NF. Alternative 1 adds the greatest direct, indirect, and cumulative impacts to current existing cumulative impacts where HUC7 watersheds where pond turtles are located have the greatest route densities and stream crossing densities compared to all the action alternatives. Alternative 1 does not prohibit cross country travel and may lead to a trend toward federal listing or a downward trend in population viability for the pond turtle.

The action alternatives all reduce the potential direct and indirect effects of cross country travel, including concentrated use on routes unauthorized to motorized use. Within all the action alternatives, unmanaged cross country motorized travel would be prohibited, and over time as these routes are rehabilitated, the northwestern pond turtle and their habitat would benefit in the long term. Non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on these routes unauthorized to motorized use. In general, it is expected that impacts from non-motorized use would be less than motorized use. Over time, it is expected that these routes would become revegetated and recover through active or passive means, and ultimately benefit the northwestern pond turtle in the future.

Foothill Yellow-legged Frog

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table L-13 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized trail crossings within FYLF HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See the Travel Management Project Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table L-13. Foothill Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Crossings

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, Motorized Stream Crossings	411	411	411	411	411	411	411
Native Surfaced, Motorized Trail Crossing Additions	228	88	0	7	131	33	3
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	1	0	0	1	1	0
Motorized Stream Crossings unauthorized to motorized use Cross Country Travel is Prohibited	0	139	228	221	96	194	225
Net Native Surfaced, Motorized Crossings	**639**	**500**	**411**	**418**	**543**	**445**	**414**
Acres of RCA Cross Country Travel	**Continues on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 34,092 RCA acres, including on 228 native surfaced, stream crossings unauthorized for motorized use. Continued use on 639 motorized crossings (411 NFTS, 228 unauthorized). No additional protection to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 139 native surfaced, stream crossings. 500 NFTS native surfaced, crossings available for motorized use. No additional protection to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 228 native surfaced, stream crossings 411 NFTS native surfaced, crossings available for motorized use. No additional protection to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 221 native surfaced, stream crossings 418 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 96 native surfaced, stream crossings 543 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 194 native surfaced, stream crossings 445 NFTS native surfaced, crossings available for motorized use. Reduced sedimentation risk to FYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 225 native surfaced, stream crossings. 414 NFTS motorized crossings available for motorized use. No additional protection to FYLF habitats from wet weather seasonal restrictions

*Alternative 1 includes existing native surfaced, crossings unauthorized to motorized use, while all the action alternatives include motorized route additions.

Table L-14 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA trail miles within FYLF HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Travel Management Project Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table L-14. Foothill Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Trail Miles

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	122.3	122.3	122.3	122.3	122.3	122.3	122.3
RCA Miles of Native Surfaced, Motorized Trail Additions*	68.4	16.3	0	2.2	29.4	10.1	1.3
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0	52.1	68.4	66.2	39.0	58.0	67.1
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized trail miles	0	0.1	0	0	0.1	0.1	0
Net NFTS Native Surfaced, Motorized RCA Miles	**190.7**	**138.7**	**122.3**	**124.5**	**151.8**	**132.5**	**123.6**
Acres of RCA Cross Country Travel	**Continues on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**	**Prohibited on 34,092 RCA acres**
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 34,092 RCA acres, including on 68.4 RCA miles of routes unauthorized to motorized use. Motorized use continues on 190.7 RCA miles (122 miles NFTS, 68 miles unauthorized).	Motorized cross country travel prohibited on 34,092 RCA acres, including on 52.1 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 138.7 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 68.4 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 122.3 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 66.2 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 124.5 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 39.0 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 151.8 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 58.0 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 132.5 RCA miles.	Motorized cross country travel prohibited on 34,092 RCA acres, including on 67.1 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 123.6 RCA miles.

*Alternative 1 includes existing native surfaced, routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

It is my determination that the project alternatives for Tahoe National Forest Motorized Travel Management Project EIS action alternatives may affect foothill yellow-legged frogs, but is not likely to lead to a trend toward federally listing or a loss in population viability within the planning area of the Tahoe NF. The action alternatives all prohibit cross country travel, including concentrated use of existing routes unauthorized to motorized use. Furthermore, wet weather seasonal restrictions reduce the likelihood of sedimentation and erosion that may occur from wet weather motorized use for alternatives 4, 5, and 6.

Alternative 1 does not prohibit cross country travel and may lead to a trend toward federal listing or a downward trend in population viability for the foothill yellow-legged frog.

Under Alternative 1, unauthorized route proliferation would likely continue and increase at an accelerated rate in the future, potentially increasing sediment delivery and alteration of streambank vegetation and hydrologic condition which may affect the abundance and distribution on the Tahoe National Forest. Declining population trends of this species could be affected by Alternative 1. For all the action alternatives, future unmanaged cross country motorized wheeled travel would be prohibited, including on routes unauthorized to motorized use, where foothill yellow-legged frogs would be benefited in the long-term once these routes are rehabilitated through obliteration or other means.

Mountain Yellow-legged Frog

Summary of Direct, Indirect, and Cumulative Effects of Proposed Actions

Table L-15 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized trail crossings within MYLF HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table L-15. Mountain Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Crossings

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, Motorized Stream Crossings	299	299	299	299	299	299	299
Native Surfaced, Motorized Trail Crossing Additions*	84	42	0	1	43	15	1
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	17	0	0	17	17	0
Cross Country Travel Prohibited on Motorized Stream Crossings unauthorized to motorized use	0	42	84	83	41	69	83
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**
Net Native Surfaced, Motorized Crossings	**383**	**358**	**299**	**300**	**359**	**331**	**300**
Acres of RCA Cross Country Travel	**Continues on 22,717 RCA acres**	**Prohibited on 22,717 RCA acres**	**Prohibited on 22,717 RCA acres**	**Prohibited on 22,717 RCA acres**	**Prohibited on 22,717 RCA acres**	**Prohibited on 22,717 RCA acres**	**Prohibited on 22,717 RCA acres**

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 22,717 RCA acres, including on 84 native surfaced, stream crossings. Motorized use continues on 383 native surfaced, crossings (299 NFTS and 84 unauthorized) No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 42 native surfaced, stream crossings. 358 NFTS crossings available for motorized use. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 84 native surfaced, stream crossings. 299 NFTS crossings available for motorized use. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 83 native surfaced, stream crossings. 300 NFTS crossings available for motorized use. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 41 native surfaced, stream crossings. 359 NFTS crossings available for motorized use. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 69 native surfaced, stream crossings. 331 NFTS crossings available for motorized use. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 10 native surfaced, stream crossings. 300 NFTS crossings available for motorized use. No additional protection to MYLF habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing native surfaced, crossings unauthorized to motorized use, while all the action alternatives include motorized route additions.

Table L-16 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA trail miles within MYLF HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table L-16. Mountain Yellow-legged Frog 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Trail Miles

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	146.2	146.2	146.2	146.2	146.2	146.2	146.2
RCA Miles of Native Surfaced, Motorized Trail Additions*	45.2	13.3	0	0.6	14.1	5.7	0.6
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized trail miles	0	2.3	0	0	2.3	2.3	0
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0	29.6	45.2	44.6	28.7	37.2	44.6
Net NFTS Native Surfaced, Motorized RCA Miles	**191.4**	**161.8**	**146.2**	**146.9**	**162.7**	**154.2**	**146.8**
Acres of RCA Cross Country Travel	**Continues on 22,717 RCA acres**	**Prohibited on 22,717 RCA acres**	**Prohibited on 22,717 RCA acres**	**Prohibited on 22,717 RCA acres**	**Prohibited on 22,717 RCA acres**	**Prohibited on 22,717 RCA acres**	**Prohibited on 22,717 RCA acres**
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 22,717 RCA acres, including on 45.2 RCA miles of routes unauthorized to motorized use. Motorized use continues on 191.4 RCA miles (146 .2 mi. NFTS and 45.2 mi. unauthorized). No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 29.6 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 161.8 RCA miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 45.2 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 146.2 RCA miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 44.6 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 146.9 RCA miles. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 28.7 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 162.7 RCA miles. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 37.2 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 154.2 RCA miles. Reduced sedimentation risk to MYLF habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 22,717 RCA acres, including on 44.6 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 146.8 RCA miles. No additional protection to MYLF habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

It is my determination that the project alternatives for Tahoe National Forest Motorized Travel Management Project EIS action alternatives may affect mountain yellow-legged frogs, but is not likely to lead to a trend toward federally listing or a loss in population viability within the planning area of the Tahoe NF. The action alternatives all significantly reduce the number and miles of unauthorized wheeled motorized use and prohibits cross country travel. Furthermore, wet weather seasonal restrictions reduce the likelihood of sedimentation and erosion that may occur from wet weather motorized use for alternatives 4, 5, and 6. Alternative 1 does not prohibit cross country travel and may lead to a trend toward federal listing or a loss in population viability for the mountain yellow-legged frog within the Tahoe NF planning area.

For all the action alternatives, future unmanaged cross country motorized wheeled travel would be prohibited. In addition, cross country travel would be prohibited within mountain yellow-legged frog habitat. Non-motorized use (hiking, mountain bicycling, equestrian, etc.) may occur on existing routes unauthorized to motorized use. In general, it is expected that impacts from non-motorized use would be less than motorized use. Over time, it is expected that these routes would become revegetated and recover through active or passive means, and ultimately benefit mountain yellow-legged frogs in the future.

Northern Leopard Frog

No direct, indirect, or cumulative effects to the northern leopard frog would occur from the project alternatives, since no known populations of the northern leopard frog are currently known to occur on the Tahoe National Forest. Therefore, it is my determination that the project alternatives for Tahoe National Forest Motorized Travel Management Project EIS action alternatives will not affect the northern leopard frog.

Great Basin Ramshorn Snail

Summary of Direct, Indirect and Cumulative Effects of Proposed Actions

Table L-17 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized trail crossings within Great Basin ramshorn snail HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table L-17. Great Basin Ramshorn Snail 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Crossings

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, Motorized Stream Crossings	207	207	207	207	207	207	207
Native Surfaced, Motorized Trail Crossing Additions*	74	22	0	5	26	21	7
Change in Class of Vehicles Resulting in Smooth Surfaced to Native Surfaced Crossings	0	8	0	0	8	8	0
Cross Country Travel Prohibited on Motorized Stream Crossings unauthorized to motorized use	0	44	74	69	40	45	67
Net Native Surfaced, Motorized Crossings	281	237	207	212	241	236	214
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**
Acres of RCA Cross Country Travel	**Continues on 12,359 RCA acres**	**Prohibited on 12,359 RCA acres**	**Prohibited on 12,359 RCA acres**	**Prohibited on 12,359 RCA acres**	**Prohibited on 12,359 RCA acres**	**Prohibited on 12,359 RCA acres**	**Prohibited on 12,359 RCA acres**
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 12,359 RCA acres, including on 74 native surfaced, stream crossings. Motorized use continues on 281 native surfaced, crossings (207 NFTS and 74 unauthorized) No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 44 native surfaced, stream crossings. 237 NFTS crossings available for motorized use. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 74 native surfaced, stream crossings 207 NFTS crossings available for motorized use. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 69 native surfaced, stream crossings 212 NFTS crossings available for motorized use. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 40 native surfaced, stream crossings 241 NFTS crossings available for motorized use. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 45 native surfaced, stream crossings 236 NFTS crossings available for motorized use. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 67 native surfaced, stream crossings. 214 NFTS crossings available for motorized use. No additional protection to GBRS habitats from wet weather seasonal restrictions.

*Alternative 1 includes existing native surfaced, crossings unauthorized to motorized use, while all the action alternatives include motorized crossing additions.

Table L-18 summarizes the direct, indirect, and cumulative effects of native surfaced, motorized RCA trail miles within GBRS HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table L-18. Great Basin Ramshorn Snail 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Motorized Trail Miles

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS RCA Miles of Native Surfaced, Motorized Routes	85.5	85.5	85.5	85.5	85.5	85.5	85.5
RCA Miles of Native Surfaced, Motorized Trail Additions*	51.1	7.9	0	2.3	12.8	7.0	3.1
Change in Class of Vehicles Resulting in Maintenance Changed from Smooth Surfaced to Native Surfaced Motorized trail miles	0	0.7	0	0	0.7	0.7	0
RCA Route Miles Unauthorized to Motorized Use Where Cross Country Travel is Prohibited	0	42.5	51.1	48.8	37.5	44.4	47.9
Net NFTS Native Surfaced, Motorized RCA Miles	**136.6**	**94.1**	**85.5**	**87.8**	**99.1**	**92.2**	**88.7**
Acres of RCA Cross Country Travel	**Continues on 12,359 RCA acres**	**Prohibited on 12,359 RCA acres**	**Prohibited on 12,359 RCA acres**	**Prohibited on 12,359 RCA acres**	**Prohibited on 12,359 RCA acres**	**Prohibited on 12,359 RCA acres**	**Prohibited on 12,359 RCA acres**
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**

	Alt 1*	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Net Direct, Indirect, and Cumulative Effect of Proposed Actions	Motorized cross country travel continues on 12,359 RCA acres, including on 51.1 RCA miles of routes unauthorized to motorized use. Motorized use continues on 136.6 RCA miles (85.5 mi. NFTS and 51.1 mi. unauthorized). No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 42.5 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 94.1 RCA miles. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 51.1 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 85.5RCA miles. No additional protection to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 48.8 RCA miles of routes unauthorized for motorized use. NFTS motorized use available on 87.8RCA miles. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 37.5 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 99.1RCA miles. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 44.4 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 92.2RCA miles. Reduced sedimentation risk to GBRS habitats from wet weather seasonal restrictions.	Motorized cross country travel prohibited on 12,359 RCA acres, including on 47.9 RCA miles of routes unauthorized to motorized use. NFTS motorized use available on 88.7 RCA miles. No additional protection to GBRS habitats from wet weather seasonal restrictions

*Alternative 1 includes existing routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

It is my determination that the project alternatives for Tahoe National Forest Motorized Travel Management Project EIS action alternatives may affect the Great Basin rams-horn snail, but is not likely to lead to a trend toward federally listing or a loss in population viability within the planning area of the Tahoe NF. The action alternatives all significantly reduce the number and miles of unauthorized wheeled motorized use and prohibits cross country travel. Furthermore, wet weather seasonal restrictions reduce the likelihood of sedimentation and erosion that may occur from wet weather motorized use for alternatives 4, 5, and 6.

In addition, cross country travel would be prohibited which would likely benefit suitable ramshorn snail habitat in the long-term once existing routes unauthorized to motorized use are rehabilitated through active or passive means. In general, it is expected that impacts from non-motorized use could occur and would be less than motorized use.

Lahontan Lake Tui Chub

Table L-19 summarizes the direct, indirect, and cumulative effects to native surfaced, motorized trail crossings within Lahontan Lake tui chub HUC 7 watersheds, from existing motorized routes, motorized route additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table L-19. Lahonton Lake Tui Chub 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by Native Surfaced, Motorized Stream Crossing Numbers

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS Native Surfaced, Motorized Stream Crossings	75	75	75	75	75	75	75
Native Surfaced, Motorized Trail Crossing Additions	42	3	0	3	5	3	3
Change in Class of Vehicles Resulting in Changed Maintenance Standards Resulting in Smooth Surfaced to Native Surfaced Crossings	0	3	0	0	3	3	0
Cross Country Travel Prohibited on Motorized Crossings Unauthorized to Motorized Use	0	36	42	39	34	36	39
Net Native Surfaced, Motorized Stream Crossings	**117**	**81**	**75**	**78**	**83**	**81**	**78**
Prosser, Stampede, and Boca Reservoir Open Areas	**No Effect**	**Approximately 2,000 acres surrounding three reservoirs with potential to increase sediment risk to tui chub habitat**	**No Effect**	**No Effect**	**No Effect**	**No Effect**	**No Effect**
Acres of RCA Cross Country Travel	**Continues on 9,689 RCA acres**	**Prohibited on 9,689 RCA acres**	**Prohibited on 9,689 RCA acres**	**Prohibited on 9,689 RCA acres**	**Prohibited on 9,689 RCA acres**	**Prohibited on 9,689 RCA acres**	**Prohibited on 9,689 RCA acres**
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
NET Cumulative Effect	Cross country travel continues on 9,689 tui chub RCA acres, including on 42 native surfaced, crossings unauthorized to motorized use. 117 native surfaced, stream crossings (75 NFTS, 42 unauthorized) No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub RCA acres, including on 36 native surfaced crossings unauthorized to motorized use. 81 NFTS stream crossings available to motorized use. Motorized impacts from Open Reservoir Areas potentially increase sedimentation risk to tui chub habitat within Prosser, Stampede, and Boca reservoirs. No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub RCA acres, including on 42 native surfaced crossings unauthorized to motorized use. 75 NFTS stream crossings available to motorized use. No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, RCA acres including on 39 native surfaced crossings unauthorized to motorized use. 78 NFTS stream crossings available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, including on 34 native surfaced crossings unauthorized to motorized use. 83 NFTS stream crossings available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, including on 36 native surfaced crossings unauthorized to motorized use. 81 NFTS stream crossings available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, including on 39 native surfaced crossings unauthorized to motorized use. 78 NFTS stream crossings available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.

*Alternative 1 includes existing native surfaced, stream crossings unauthorized to motorized use, while all the other Alternatives include motorized crossing additions.

Table L-20 summarizes the direct, indirect, and cumulative effects to native surfaced, motorized RCA route miles within Lahontan Lake tui chub HUC 7 watersheds, from existing motorized routes, motorized route and area additions, and routes unauthorized to motorized public travel from the proposed actions, including wet weather seasonal restrictions, changes in class of vehicles, prohibition of cross country travel. See Chapter 3.02 Watershed and Soil Resources for more detailed information and assumptions.

Table L-20. Lahontan Lake Tui Chub 7th Field Watersheds – Summary of Direct, Indirect, and Cumulative Effect of Proposed Actions as Measured by RCA Miles

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Miles of Existing NFTS Native Surfaced, Motorized Roads and Trails	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Miles of Native Surfaced, Motorized RCA Trail Additions*	14.4	0.5	0	0	0.6	0	0.5
Change in Class of Vehicle Where Changed Maintenance Standards Result in Smooth Surfaced to Native Surfaced RCA Route Miles	0	0.4	0	0	0.4	0.4	0
Miles of Cross Country Travel Prohibited on Motorized Routes Unauthorized to Motorized Use	0	13.5	14.4	14.4	13.4	14	13.9
Net RCA Miles of Native Surfaced, Motorized Routes	**30.4**	**16.9**	**16**	**16**	**17**	**16.4**	**16.5**
Acres of Open Areas at Stampede, Prosser, and Boca Reservoirs	**0**	**2,000 acres**	**0**	**0**	**0**	**0**	**0**
Acres of RCA Cross Country Travel	**Continues on 9,689 RCA acres**	**Prohibited on 9,689 RCA acres**	**Prohibited on 9,689 RCA acres**	**Prohibited on 9,689 RCA acres**	**Prohibited on 9,689 RCA acres**	**Prohibited on 9,689 RCA acres**	**Prohibited on 9,689 RCA acres**
Wet Weather Seasonal Restrictions on all Native Surfaced Roads and Trails	**None**	**None**	**None**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**Wet Weather Restrictions would be implemented**	**None**

	Alt 1*	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
NET Cumulative Effect	Cross country travel continues on 9,689 tui chub RCA acres, including on approx. 14 miles native surfaced, RCA miles unauthorized to motorized use. Approx. 30 native surfaced, RCA miles (16 mi NFTS, 14.4 mi. unauthorized) No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub RCA acres, including on approx. 14 native surfaced RCA miles unauthorized to motorized use. Approx. 17 NFTS RCA miles available to motorized use. Increased sediment risk to tui chub habitat from 2,000 acres of Reservoir Open Areas No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub RCA acres, including on approx. 14 native surfaced RCA miles unauthorized to motorized use. Approx. 16 NFTS RCA miles available to motorized use. No additional protection to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, RCA acres including on approx. 14 native surfaced RCA miles unauthorized to motorized use. Approx. 16 NFTS RCA miles available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, including on approx. 13 native surfaced RCA miles unauthorized to motorized use. Approx. 17 NFTS RCA miles available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, including on approx. 14 native surfaced RCA miles unauthorized to motorized use. Approx. 16 NFTS RCA miles available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.	Cross country travel prohibited on 9,689 tui chub, including on approx. 14native surfaced RCA miles unauthorized to motorized use. Approx. 17 NFTS RCA miles available to motorized use. Reduced sedimentation risk to tui chub habitat from wet weather restrictions.

*Alternative 1 includes existing native surfaced, routes unauthorized to motorized use, while all the action alternatives include motorized route additions.

It is my determination that the project alternatives for Tahoe National Forest Motorized Travel Management Project EIS action alternatives may affect the Lahontan Lake tui chub, but is not likely to lead to a trend toward federally listing or a loss in population viability within the planning area of the Tahoe NF. For all the action alternatives, future unmanaged cross country motorized wheeled travel would be prohibited. In addition, the prohibition of cross country travel, including concentrated use on routes unauthorized to motorized use would likely benefit suitable tui chub habitat in the long-term once these routes are rehabilitated through obliteration or other means. Furthermore, wet weather seasonal restrictions reduce the likelihood of sedimentation and erosion that may occur from wet weather motorized use for alternatives 4, 5, and 6.

Hardhead

The hardhead has not been confirmed to occur on the Tahoe National Forest, therefore the project alternatives would not directly, indirectly, or cumulatively affect the hardhead. Therefore, it is my determination that the Tahoe National Forest Motorized Travel Management Project would not affect the hardhead.

California Floater

The California floater has not been confirmed to occur on the Tahoe National Forest, therefore the project alternatives would not directly, indirectly, or cumulatively affect the California floater. Historically, the California floater was reported from Donner Lake within private lands and near Lake Tahoe within the Truckee River. Potentially suitable habitat for the floater on the Tahoe National Forest includes the Truckee River and streams tributary to it. Recent surveys for the California floater was conducted within Donner Lake by mollusk experts, however, the species was not found during the surveys. Therefore, it is my determination that the Tahoe National Forest Motorized Travel Management Project would have no affect on the California floater.

Appendix M: Weed Risk Assessment

Executive Summary

The draft Environmental Impact Statement (DEIS) for this project analyzed 7 alternatives. The preferred alternative (Alternative 6) proposes to: prohibit cross country travel on 804,400 acres which includes 1,400 miles of motorized trail un-authorized for motorized use. Alternative 6 would add about 70 miles of motorized trail un-authorized for motorized use to the NFTS; impose wet weather seasonal closures on all native surface trails; and change 276 miles of existing National Forest Transportation System (NFTS) trails from "open to highway legal vehicles only" to "open to all vehicles." Botanical surveys are complete for about 62 miles of motorized trail. The remaining miles will be surveyed in the upcoming field season.

The following information provides a summary of the weed risk from implementation of Alternative 6. Alternative 6 has a high risk of introducing weeds into new areas and spreading weeds from areas that are already infested with weeds.

Factors	Variations	Risk
1. Inventory	Surveys of all the motorized trails proposed for addition to the NFTS in Alternative 6 are not complete. Surveys of 62 miles of proposed motorized trail showed that cheat grass, musk thistle, wooly mullein, tumble mustard, Scotch broom, Spanish broom, and bull thistle occur within 100 feet of some of the proposed motorized trails.	High risk
2. Known noxious weeds	There are many weed occurrences known to occur along Federal, State, County, and NFTS roads and trails. Weed occurrences include spotted knapweed, musk thistle, cheat grass, Scotch broom, yellow star thistle, and others.	High risk
3. Habitat vulnerability	Motorized vehicle use disturbs habitats they pass through creating conditions favorable for weed introduction and spread. They are recognized as vectors for introducing and spreading weeds into new areas.	High risk
4. Non-project dependent vectors	People use NFTS roads and trails and motorized trails un-authorized for motorized use for a variety of activities besides recreation - including mining, grazing access, mountain bike trails, horse-back riding, and hiking. These activities add to the likelihood of weed introduction.	Moderate to high risk
5. Habitat alteration expected as a result of project.	Implementation of this project will reduce the amount of ground cover and shade in and along the motorized vehicle roads/trails/areas and will keep those areas in a disturbed state.	High risk
6. Increased vectors as a result of project implementation	Use of the NFTS motorized roads and trails and motorized trails un-authorized for motorized use is expected to increase.	High risk
7. Mitigation measures	Preventative measures incorporated into the project proposal are primarily designed for motorized trail maintenance and restoration and include using weed-free mulch and other plant materials if needed for erosion control, and washing equipment before it comes into a project area if it is coming from weed infested areas.	High risk. Preventative measures can not mitigate the high risk associated with use of the motorized vehicle roads/trails/areas.
8. Anticipated weed response to proposed action	Little reduction in overall risk through preventative measures.	High risk

Introduction

Extensive infestations of weeds can permanently degrade National Forest System (NFS) lands. The term permanently degraded means with today's economics and technology. Invasive non-native plants (weeds) have already taken over or severely impaired millions of acres of western Federal lands. The biodiversity of the Sierra Nevada region is undergoing change due to alterations in human uses and fire regimes, climate change, and invasions by non-native species (Di Antonio et al. 2004). In general terms, Tahoe NFS lands are considered weed free, with most weed occurrences located along roads. Table M-1 displays the list of weeds known to occur on the TNF.

Invasive plant species are one of the greatest threats to wildlands in the United States (Mullin et al. 2000). Weed infestation and spread is one of the greatest negative impacts to maintaining or improving the health of the NFS lands. Climate changes will result in massive geographical shifts in locations of sites that provide environments for native plants. Opportunities for replacement of native species with undesirable exotic organisms will be enhanced (Franklin 2003).

A warming climate in the western part of the United States will often lead to an upward elevational migration of plant species. Rapid changes in climate may cause a loss of native plant species from the lower elevations if they can not migrate upward and establish fast enough. Stressed communities with fewer plant species distributed over large areas could have an increase in the quantity of unused resources. These stressed communities are then more available for the invasion and establishment of weeds (Tausch 2008).

When an area is heavily infested with weeds, they directly compete with native plants and can cause their local displacement. In addition, weeds can have a number of indirect effects including changes to: aesthetic values, biological diversity, and ecosystem services (D'Antonio et al. 2004). Potential impacts include: alteration of disturbance regimes (including wildfire), changes in the food base for wildlife species, soil erosion and loss of soil carbon storage, decreases in range or forest productivity, and altered recreational or aesthetic values (Mack et al. 2000, Di Antonio et al. 2004). They can hybridize with native species (ibid) altering native plant genetics.

Maintaining or improving the NFS lands requires the maintenance and improvement of the basic ecosystem elements of soil, water, and vegetation. The stability and ecological function of natural wildlands depend on a diverse community of native plants (Mullin et al. 2000). Native vegetation provides resilience against drought and flooding, minimizes erosion, promotes water infiltration and storage, along with providing wildlife and recreation values. Areas infested with weeds do not provide resilience to drought, flooding, minimize erosion, promote water quality and quantity, or provide wildlife and recreational values at the same level as native vegetation. Research has shown that sites dominated by weeds have increased rates of soil erosion and runoff causing degradation of habitat for wildlife and native vegetation.

Once weeds become established, it is hard to get rid of them. Weeds arrived in the United States (many come from Eurasia) without the insects and diseases that preyed on them, and the plants that evolved in competition with them in their native land. Without insects, diseases, etc. to control these weeds, they can increase at a rapid rate.

Disturbed areas generally have more non-native plants than non-disturbed areas. Alien, non-native invaders are more likely to have higher leaf area and lower tissue construction costs (advantageous under high light and nutrient conditions) and greater phenotypic plasticity than native plants. Increased resource availability and altered disturbance regimes associated with human activities often differentially increase the performance of invaders over that of natives (Daehler 2003).

Table M-1. Tahoe National Forest Weed List

Scientific Name	Common Name	2007 CDFA rating	California Invasive Plant Council*
Bromus tectorum	Cheat grass	Not rated	High
Carduus nutans	Musk thistle	A	Moderate
Centaurea diffusa	Diffuse knapweed	A	Moderate
Centaurea maculosa	Spotted knapweed	A	High
Centaurea melitensis	Maltese starthistle	C	Moderate
Centaurea solstitialis	Yellow starthistle	C	High
Chondrilla juncea	Skeleton weed	A	Moderate
Cirsium arvense	Canada thistle	B	Moderate
Cytisus scoparius	Scotch broom	C	Moderate
Euphorbia oblongata	Oblong spurge	B	High
Genista monspessulana	French broom	C	High
Halogeton glomeratus	Halogeton	A	Moderate
Hydrilla verticillata	Hydrilla	A	--
Hypericum perforatum	Klamath weed	C	Moderate
Isatis tinctoria	Dryer's woad	B	Moderate
Lepidium latifolium	Tall whitetop	B	High
Linaria genistifolia	Dalmatian toadflax	A	Moderate
Lythrum salicaria	Purple loosestrife	B	High
Myriophyllum spicatum	Eurasian water milfoil	C	--
Onopordum acanthium	Scotch thistle	A	High
Rubus discolor	Himalayan blackberry	Not rated	High
Spartium junceum	Spanish broom	Not rated	High
Taeniatherum caput-medusae	Medusahead	C	High
Ulex europaeus	Gorse	B	High
Verbascum thapsus	Wooly mullein	Not rated	Limited

*California Invasive Plant Council Ratings (CalIPC)

High – Severe ecological impacts, reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Species usually widely distributed ecologically among and within ecosystems.

Moderate – Substantial and apparent, but not severe, ecological impacts; attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent on ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited – Invasive, but either their ecological impacts are minor on a statewide level or information on them is insufficient to justify a higher rating, although they may cause significant problems in specific regions or habitats. Reproductive biology and other attributes result in low to moderate rates of invasion. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

The exotic plant species that have the potential to reduce local diversity or transform ecosystems have been called "transformer species" (D'Antonio et al. 2004). Transformer species have the potential to form monotypic stands, and greatly alter resource availability, trophic structure, ecosystem productivity, and/or disturbance regimes (ibid). Some of the transformer species invading the Sierra Nevada include: cheatgrass (*Bromus tectorum*), medusahead (*Taniatherum caputmedusae*), yellow star thistle (*Centaurea solstitialis*), spotted, diffuse and Russian knapweed (*Centaurea maculosa*, *C. diffusa*, and *Acroptilon repens* respectively), perennial pepperweed/tall whitetop (*Lepidium latifolium*), purple loosestrife (*Lythrum salicaria*), dalmatian toadflax (*Linaria genistifolia* var. *dalmatica*), leafy spurge (*Euphorbia esula*), gorse (*Ulex europaea*), French broom (*Genista monspessulana*), Scotch broom (*Cytisus scoparius*), Spanish broom (*Spartium junceum*), Himalayan blackberry (*Rubus discolor*), Russian olive (*Eleagnus angustifolia*) and Saltcedar (*Tamarix parviflora* and *T. ramosissima*) (ibid). A few of these weeds are widespread, but many are still relatively restricted within the Sierra Nevada (SNFPA 2001 in D'Antonio et al. 2004). There are numerous factors used to assess weed risk. Weed risk is higher if a seed source is close to or within the proposed addition to the NFTS. Areas that have been recently disturbed are more vulnerable. Developing/implementing mitigation measures can reduce the risk of weed seed/plant parts being introduced into new areas in some cases. Some weeds are more aggressive than others and would have a different response to motorized vehicle activity. Areas that have not been surveyed also have a high risk of weed presence and increased rate of spread because there is a higher likelihood that weeds that are introduced will go undetected and continue to spread. Surveys of the roads/trails/areas are not complete.

Current Management Direction

State and Federal laws, Forest Service direction, and other regulatory direction that is relevant to the management and prevention of noxious weeds and applicable to this project include:

1. **Forest Service Manual (FSM) 2080 -** Noxious Weed Management includes a policy statement calling for a risk assessment for noxious weeds to be completed for every project. Specifically, the manual states: *2081.03 – Policy*: When any ground disturbing action or activity is proposed, determine the risk of introducing or spreading noxious weeds associated with the proposed action. For projects having moderate to high risk of introducing or spreading noxious weeds, the project decision document must identify noxious weed control measures that must be undertaken during project implementation. Use contract and permit clauses to prevent the introduction or spread of noxious weeds by contractors and permittees. For example, where determined to be appropriate, use clauses requiring contractors or permittees to clean their equipment prior to entering NFS lands. *2081.2 - Prevention and Control Measures*: Determine the factors that favor the establishment and spread of noxious weeds and design management practices or prescriptions to reduce the risk of infestation or spread of noxious weeds. Where funds and other resources do not permit undertaking all desired measures, address and schedule noxious weed prevention and control in the following order:
    - **First Priority**: Prevent the introduction of new invaders,
    - **Second Priority**: Conduct early treatment of new infestations, and

- **Third Priority**: Contain and control established infestations.

2. **Executive Order 13112** of February 3, 1999 directs federal agencies to prevent the introduction of invasive species, detect and respond rapidly to and control such species, not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species unless the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.
3. **Sierra Nevada Forest Plan Amendment (SNFPA) standard and guidelines (S&Gs)**: The SNFPA (2004) lists 14 S&Gs for management of noxious weeds. In summary, the S&Gs applicable to this project direct the Forest to conduct a noxious weed risk assessment that includes weed risk, prevention, and treatment in this DEIS (NEPA document).

Description of the Alternatives

Seven alternatives are analyzed in detail. Refer to Chapter 2 of the DEIS for a complete description of the alternatives. Chapter 2 of the DEIS is included in this report by reference.

Existing Environment (Plant Communities and Habitats)

Surveys of proposed addition to the NFTS are not complete. It is possible that the unsurveyed motorized trails have weeds growing within and adjacent to them. Table M-1 lists the weeds that are known or are highly likely to occur on the TNF and the ecological impact rating of those weeds. There are known occurrences of weeds along several motorized NFTS motorized roads/trails. A weed risk analysis is not provided in this document for motorized vehicle use of NFTS roads/trails, but the motorized vehicle use of NFTS motorized roads and trails contributes to the cumulative impacts. Table M-2 provides an indication of those motorized trails with weed occurrences.

Table M-2. Weed occurrences along NFTS*

Quadrangle	Weed Species	General Location
Alleghany	*Cytisus scoparius*	Sections 19 and 20, T19N, R11E, along Henness Pass Road.
Alleghany	*Cytisus scoparius*	Sections 32, 33, 27, & 23, T19N, R10E, along Pliocene Ridge Road.
Blue Canyon	*Centaurea maculosa*	Section 6, T17N, R12E, along road #18-12 near Camp 19
Blue Canyon	*Centaurea maculosa*	Section 28, T17N, R11E, along a decommissioned road.
Blue Canyon	*Lepidium latifolium*	Sections 16, 15, 10, 11, and 2, T16 and 17N, R11E, along Interstate 80 on FS and privately owned
Blue Canyon	*Lepidium latifolium*	Section 28, T17N, R12E, along Interstate 80 on FS lands west of Soda Springs.
Blue Canyon	*Lepidium latifolium*	Sections 1, 31, and 29, T 16 and 17N, R 11 and 12E, along Interstate 80 on privately owned lands in Emigrant Gap area.
Boca	*Carduus nutans*	Sections 19, 20, 21, 22, 15, 28, 29, 30, 9, and10, T17&18N, R17E, along FS motorized trails, 4-WD motorized trails, decommissioned motorized trails, road #72-2, road #894-2, road #72-1, the Stampede Dam road, and motorized trails un-authorized for motorized use.

Quadrangle	Weed Species	General Location
Boca	*Lepidium latifolium*	Section 27, T18N, R17E, along the Hirschdale road and the railroad tracks.
Boca	*Centaurea maculosa*	Sections 16 and 9, T18N, R17E, along Boca road and in Boca campground.
Boca	*Carduus nutans*	Section 25, T18N, R17E, in the Cox-Delaney Flat area along motorized trails un-authorized for motorized use.
Boca	*Carduus nutans*	Section 26, T19N, R17E, along road #72-24.
Boca	*Carduus nutans*	Section 33, T19N, R17E, along a motorized trail un-authorized for motorized use.
Calpine	*Lepidium latifolium*	Section 17, T21N, R14E, near Calpine in the CALTRANS right-of-way of Highway 49
Calpine	*Lepidium latifolium*	Section 20, T21N, R14E, along road in Calpine in riparian
Camptonville	*Cytisus scoparius*	Sections 23, 24, and 19, T18N, R8E, along the 180 road.
Camptonville	*Centaurea melitensis*	Section 30, T18N, R9E, along motorized trail un-authorized for motorized use #ed 613-8.
Camptonville	*Cytisus scoparius*	Sections 9, 16, 20, 21, 28, 29, and 30, T18N, R8E, along the Moonshine road, Old Toll road, Marysville road, in Oregon Creek day use area, road #07-04, a motorized trail un-authorized for motorized use in section 30, road #157-1, and road # 8-2.
Camptonville	*Centaurea solstitialis*	Sections 28, 27, 34, and 33, T18 and 19N, R8E, along road #122-7, Pendola Extension road, and a decommissioned road.
Camptonville	*Cytisus scoparius*	Section 10, 27, 28, 33, 34, and 3, T19N, R8E, along road #117-2, #122-7, #120-4, #122-3, the Pendola Extension road #119, road #119-1-2, road #119-1, Young's Hill road #122, motorized trails un-authorized for motorized use, and a decommissioned road.
Camptonville	*Chondrilla juncea*	Section 6, T19N, R8E, off the 120-11 road.
Camptonville	*Cytisus scoparius*	Sections 3, 23, 26, 24, 19, 30, and 35, T19N, R 8 and 9E, along the Pendola Extension road, along road #34-2, along road #122-3, #120-4, #293-2, the Youngs Hill area, the Sleighville House area, and Weeds Point area.
Cisco Grove	*Lepidium latifolium*	Sections 22 and 23, T17N, R12E, along Interstate 80 – private lands, in the Yuba Pass area.
Cisco Grove	*Lepidium latifolium*	Sections 28 and 29, T17N, R13E, along Interstate 80 – private and FS lands, in the Big Bend area.
Dog Valley	*Carduus nutans*	Section 10, T19N, R17E, along FS road #72.
Dog Valley	*Carduus nutans*	Sections 3, 2, 14, 15, 10, 11, 4, 10, 28, 5, 6, 31, and 32, T19 and 20N, R17E,along unmarked road that is off the Merrill Valley road, the Verdi Peak road #72, NFS roads, the Henness Pass road, road #5-10-5, road #860-25-15, road #860-25-5-10, and 4-WD motorized trails.
Dog Valley	*Carduus nutans*	Section 29, T20N, R17E, along road #860-35-15-5 - off the Jones Valley road.
Dog Valley	*Carduus nutans*	Section 28, T20N, R17E, unmarked road near Crystal Peak.
Dog Valley	*Cirsium arvense*	Section 29, T20N, R17E, near Jones Valley.
Dog Valley	*Carduus nutans*	Sections 17, 18, 20 and 21, T20N, R17E, along roads #ed 860-35, 860-35-5-5, and 860-35-5-8.
Downieville	*Centaurea solstitialis*	Sections 4, 33, 34, 35, T19N, R10E, along Highway 49 in the general Downieville area.
Downieville	*Centaurea solstitialis*	Sections 36 and 31, T.19N, R10E, along Highway 49.
Downieville	*Chondrilla juncea*	Section 32, T20N, R11E, in a wet area along Highway 49.
Downieville	*Linaria genistifolia* ssp. *dalmatica*	Section 24, T19N, R10E, at the junction of the Henness Pass road (#301) and road #301-4.

Quadrangle	Weed Species	General Location
Downieville	*Cytisus scoparius*	Sections 26, 23, 24, 19, 18, 4, and 5, T19&20N, R10&11E, along the Lavezzola Creek Road.
Duncan Peak	*Cytisus scoparius*	Section 11, T15N, R11E, along road #13-17.
Dutch Flat	*Chondrilla juncea*	Sections 17, 24, and 25, T15N, R 10 and 11E, along FS road near Big Reservoir, along FS road #4140-10, and along the Iowa Hill road.
Dutch Flat	*Lepidium latifolium*	Sections 29 and 20, T16N, R11E, along Interstate 80 on private lands in the Baxter area.
Dutch Flat	*Lepidium latifolium*	Section 2, T15N, R10E, along Interstate 80 on private lands in the Dutch Flat area.
Foresthill	*Cytisus scoparius*	Section 29, T15N, R11E, along the Sugar Pine road.
Goodyears Bar	*Centaurea solstitialis*	Sections 17, 16, 15, 10, 11, T19N, R9&10E, along Highway 49 in the CALTRANS right-of-way.
Goodyears Bar	*Chondrilla juncea*	Sections 16, 17, 10, and 8, T19N, R9E, in the Indian Valley area along Highway 49, along the Indian Valley road, and in Upper Carlton campground area.
Goodyears Bar	*Centaurea solstitialis*	Sections 11, 1, 5, T19N, R10E, along Highway 49.
Goodyears Bar	*Chondrilla juncea*	Section 5, T19N, R10E, in the CALTRANS right-of–way along Highway 49.
Goodyears Bar	*Cytisus scoparius*	Sections 8 and 17, T19N, R9E, along the 490 road.
Greek Store	*Cytisus scoparius*	Section 17, T14N, R13E, along road #16-46-8.
Greek Store	*Chondrilla juncea*	Section 26, T14N, R12E, along FS road #96-17 toward the End-Of-The-World area.
Hobart Mills	*Carduus nutans*	Sections 14, 7, and 18, T18N, R16 and 17E, along roads #ed 889-14, 889-16-8, and a motorized trail un-authorized for motorized use in section 7.
Hobart Mills	*Carduus nutans*	Sections 12, 13, 24, and 30, T19N, R16 and 17 E, along road # 860-20, and 261-6 (in Captain Roberts's boat ramp area).
Hobart Mills	*Carduus nutans*	Section 32, T19N, R16E, along FS road #07-10.
Loyalton	*Centaurea maculosa*	Section 18, T21N, R16E, along the Staverville Road going toward the Loyalton landfill site.
Loyalton	*Cirsium arvense*	Section 31, T21N, R15E, along the Antelope Valley road.
Martis Peak	*Carduus nutans*	Sections 5, 7, 4, 17, 19, and 32, T17 and 18N, R17E, along a motorized trail un-authorized for motorized use, along the Truckee River near Glenshire, near Martis Reservoir, and along Interstate 80.
Martis Peak	*Carduus nutans*	Section 20, T17N, R17E, along county road.
Michigan Bluff	*Centaurea maculosa*	Sections 1, 6 and 12, T14N, R11E, at the end of Deadwood Road #6149-31.
Michigan Bluff	*Centaurea solstitialis*	Sections 30, 31, 33, 34, and 35, T13N, R 10 and 11E, scattered along the Mosquito Ridge road and FS road down to the river. Also along road to Gorman and Hoffman Pitts.
Michigan Bluff	*Chondrilla juncea*	Section 28, T14N, R11E, county road near Gorman ranch.
Michigan Bluff	*Chondrilla juncea*	Sections 15 and 22, T14N, R13E, along road #96.
Michigan Bluff	*Lepidium latifolium*	Section 27, T15N, R11E, along the Foresthill Divide road and a motorized trail un-authorized for motorized use.
Norden	*Lepidium latifolium*	Sections 8, 9, 23, and 13, T17N, R15E, along Interstate 80.
North Bloomfield	*Centaurea solstitialis*	Sections 3 and 4, T17N, R9E, along Lake City county road.
North Bloomfield	*Cytisus scoparius*	Sections 4 and 5, T18N, R9E, along Lake City county road – San Juan Ridge.

Quadrangle	Weed Species	General Location
Pike	*Chondrilla juncea*	Section 9, T18N, R9E, along Sierra County road S180 above Clerkins Ranch and near FS road #64.
Pike	*Cytisus scoparius*	Sections 16, 19, 9, 2, 1, 6, 28, 31, 32 and 33, T.18N, R9&10E, along the Pliocene Ridge Road and in the Camp Gleason area.
Pike	*Centaurea solstitialis*	Sections 33, 28, 21, and 22, T18N, R9E, along the Tyler-Foote Crossing road, and FS road #613-8.
Royal Gorge	*Cirsium arvense*	Section 21, T15N, R14E, along the south side of the middle fork of the American River where it flows into French Meadows Reservoir.
Sardine Peak	*Linaria genistifolia* ssp. *dalmatica*	Section 5, T20N, R16E, along Turner Canyon Road #50 near creek.
Sardine Peak	*Carduus nutans*	Section 8, T20N, R16E, along the Bear Valley Road #04 in an old burn.
Sardine Peak	*Carduus nutans*	Section 32, T20N, R16E, along Lemon Canyon Road #650 in an old burn.
Sardine Peak	*Carduus nutans*	Sections 3 and 8, T20N, R16E, along Smithneck Road #860 and the Bear Valley road #04.
Sardine Peak	*Carduus nutans*	Sections 23, 24 and 14, T20N, R16E, along FS road #40.
Sardine Peak	*Carduus nutans*	Section 12, T20N, R16E, along FS road #18.
Sardine Peak	*Carduus nutans*	Sections 2, 1, 10, 12, 36, 30, 25 and 26, T19 and 20N, R16 and 17E, along the 860-23, 860-23-5-40, 860-22-10, 860-22, 860-37 and Babbitt Peak roads.
Sattley	*Lepidium latifolium*	Section 4, T20N, R13E, along Highway 89 in a wet area.
Sierraville	*Lepidium latifolium*	Section 19, T20N, R15E, along Highway 89 south of Sierraville.
Sierraville	*Lepidium latifolium*	Section 31, T20N, R16E, along Sierra County Road #451 in a wet area.
Sierraville	*Carduus nutans*	Sections 25, T20N, R15E, along FS road #50 in a landing.
Soda Springs	*Lepidium latifolium*	Section 21, T17N, R14E, along Interstate 80 on privately owned lands.
Strawberry Valley	*Cytisus scoparius*	Sections 1, 6, 7 and 18, T19&20N, R8&9E, along roads #ed 39-6, 491-4 and 490.
Tahoe City	*Centaurea maculosa*	Section 8, T15N, R16E, in the Alpine Meadows area along a non-FS road (County or State motorized trail).
Truckee	*Carduus nutans*	Section 28, T17N, R16E, along road # 89-21 near Granite Flat campground.
Truckee	*Cardaria pubescens*	Section 28, T17N, R16E, Placer County lands behind the TART complex.
Truckee	*Centaurea maculosa*	Section 28 and 29, T17N, R16E, on Placer County and FS lands, along a FS motorized trail – Jackass Point area in section 29.
Truckee	*Centaurea repens*	Section 4, T16N, R16E, along Highway 89 near Rocky Wash.
Truckee	*Centaurea diffusa*	Section 33, T18N, R16E, along the Alder Creek road.
Truckee	*Lepidium latifolium*	Sections 18, 20, and 17, T18N, R16E, along Interstate 80 near Donner Lake.
Truckee	*Lepidium latifolium*	Sctions1 and 31, private lands, T17 and 18 N, R 16 and 17 E, along Interstate 80 east of Truckee.
Washington	*Centaurea solstitialis*	Section 13, T16N, R10E, below the transmission line at the junction with Lowell Hill Road.
Washington	*Lepidium latifolium*	Sections 29 and 32, T17N, R11E, along County road # 32-3 – east of Big Tunnel Spring.
Washington	*Centaurea solstitialis*	Sections 1, 6, and 12, T17N, R 10 and 11E, along FS road above Washington.
Washington	*Chondrilla juncea*	Section 7, T17N, R11E, near the falls near the town of Washington.

Quadrangle	Weed Species	General Location
Washington	*Cytisus scoparius*	Sections 1, 6, and 28, T17N, R11E, near Omega Rest stop along Highway 20 and along the Washington Gaston road.
Westville	*Centaurea solstitialis*	Sections 13 and 18, T15N, R11E, near China Wall OHV staging area at junction of Foresthill Divide road and Mitchell Mine road.

*This is an ever changing list. Some occurrences have been treated once or more than once. Not all occurrences have been treated.

Table M-3 displays the motorized trails un-authorized for motorized use that have been surveyed and provides an indication as to whether those motorized trails currently have weed infestations along some portion of the trail.

Table M-3. Surveyed motorized trails

Motorized trail	Miles surveyed	Acres surveyed	Weed information
ARM-2	.5	30	None found
ARM-5	.8	16	Cheatgrass
ARM-7	.8	8	None found
SV-004	.2	2	None found
SV-005	.6	6	None found
SV-007	.5	6	None found
SV-P5	.4	2	None found
SV-P6	.2	5	None found
SV-P7 e and w	1.4	12	None found
SV-P8	.3	2	None found
SV-P11	1.0	6	None found
SV-P12	.6	86	None found
SV-P13	.9	6	None found
SV-P14 and 14a	.7	5	Cheatgrass, musk thistle is within about 100 feet
SV-P15	1.1	25	None found
SV-P18	.6	6	None found
TKN-003	.4	3	None found
TKN-J2	.7	9	None found
TKN-J3 and J3n	1.6	15	None found
TKN-J4	1	15	None found
TKN-J5	1.4	15	None found
TKN-J6	.1	1	None found
TKN-J9	1.7	49	Cheatgrass, wooly mullein
TKN-J11	.9	6	None found
TKN-J12	.7	3	None found
TKN-J13	1.6	6	Musk thistle is adjacent to the trail but beyond 100 feet
TKN-M1	3.6	3	Cheatgrass
TKN-M2	3.4	42	Cheatgrass
TKN-Q1	.9	6	None found
TKS-11	.9	6	None found

Motorized trail	Miles surveyed	Acres surveyed	Weed information
TKS-M9	3	20	Bull thistle, orchard grass
Prosser, Boca, Stampede reservoir areas	.5	5	Wooly mullein, bull thistle
YRN-001	.1	10	None found
YRN-004	.2	1	None found
YRN-005	.5	6	None found
YRN-007	.8	18	None found
YRN-008	.3	3	Scotch broom
YRN-1	1.8	3	None found
YRN-2	1.4	3	None found
YRN-4	.6	12	None found
YRN-5a, YRN-5c	.3	2	None found
YRN-11	.2	6	None found
YRN-509	.5	3	Scotch broom, Spanish broom, cheatgrass, bull thistle
YRN-A1 - Eureka Diggings	1.7	60	None found
YRN-M3b	2.7	30	Klamath weed
YRM-M3	.3	6	Scotch broom
YRM-M4	.5	3	Scotch broom, cheatgrass
YRS-003b	.3	1	None found
YRS-B5	3.8	45	None found
YRS-B7	.2	8	None found
YRS-B10	.3	1	None found
YRS-B12	.1	1	None found
YRS-F1	.9	61	None found
YRS-G3	.5	10	None found
YRS-SF5	4	30	None found
YRS-SF6	1.4	36	Cheatgrass, bull thistle
YRS-066 and YRS-066w	1.6	18	None found
Cal Ida (25-9-P, 25-9-3-P, 35-3-P, 35-4-P, 35-4-1-P, 39-9-P, 491-3-P, 491-3-1-P, 491-3-2-P)	5.8	50	Cheatgrass, tumble mustard, Scotch broom
Totals	over **62**	about **845**	

The following discussion summarizes what is known about the weeds that occur on or near TNF system lands/along proposed additions to the NFTS. Refer to the 2003 TNF Noxious Weed Program document (with updates) for more information.

Cheatgrass (*Bromus tectorum*): Cheatgrass is a non-native annual grass that is found in most of the United States, Canada and northern Mexico (Sheley and Petroff 1999). It is found in sagebrush semi-desert in the southern Great Basin to coniferous forest of the Rocky Mountains. Cheatgrass can significantly alter native rangeland vegetation composition through competitive exclusion of native species reproduction and the facilitation of wildfires (ibid). Once introduced, it rapidly spreads into

adjacent rangeland vegetation. The sites most susceptible to cheatgrass invasion are those that have deep, loamy soils, south-facing slopes, and 12 to 22 inches (30 to 56 cm) of annual precipitation that peaks in late winter or early spring (Sheley and Petroff 1999). However, high plasticity allows the species to grow under a variety of site conditions. Humans can transport seeds in vehicles and clothing. Cheatgrass can dramatically influence plant community composition by its effects on the fire regime (ibid). For example, prior to European settlement, the fire free intervals probably varied from 20 to 25 years in higher elevation mountain big sagebrush (*Artemisia tridentata vaseyana*), to 50-100 years in drier Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) habitat types that dominated the Snake River Plain. The Snake River Plain now burns at intervals of 5 years or less because cheatgrass has increased the continuity of fine-textured fuels, which promotes frequent and larger fires (ibid). Although fire greatly reduces the density of cheatgrass plants the next growing season, the plants that establish produce so much more seed per plant, that the post-burn seed production for a site may increase by a factor of 100 (J.A. Young 1998 personal communication). Cheatgrass occurs within 100 feet of several proposed motorized trails – refer to Table M-3. Cheatgrass has a high ecological rating. Cheatgrass is spread a short distance by wind and caching rodents (DiTomaso and Healy 2007). It is spread greater distances with water and soil movement and by clinging to animals and clothing (ibid). It is known to be transported long distances through recreational and other activities (ibid).

Cheatgrass exists and will continue to spread on both sides of the forest. It will remain patchy in occurrence on the westside of the forest and will not cover large areas unless all vegetation is removed from those areas, such as in a large wildfire. On the eastside of the forest, it will continue to spread especially in disturbed areas. Cheatgrass will eventually take over plant communities such as sagebrush/bitterbrush if those plant communities experience continued disturbance. This is especially true after wildfire events. Native plant and animal diversity would be reduced in those areas of cheatgrass infestation.

Whitetop (*Cardaria pubescens*): Whitetop is a native of Russia, Iran and Afghanistan. This weed is well-adapted to moist habitats, including roadsides and ditch banks. It can dramatically reduce biodiversity and displace native plant communities. Roots grow rapidly reaching 12 to 30 feet by the second or third growing season (Mulligan and Findlay 1973 in Sheley and Petroff 1999). Seeds are known to be dispersed by vehicles, wind, water, and in hay.

Musk Thistle (*Carduus nutans*): Musk thistle is a native of Eurasia that was introduced to the U.S. in the early 1900s (Whitson et al. 1996). Musk thistle is usually a biennial plant that spends 90 percent of its life cycle as a rosette, then bolts, flowers, produces seed and dies (Roethe 1979 in Sheley and Petroff 1999). It reproduces from seed. Wind, water, wildlife, livestock and human activities disperse seed. Musk thistle is favored by disturbance (Shelley and Petroff 1999). Musk thistle is known to occur within 100 feet of SV-P14. Musk thistle has a moderate ecological impact rating. It spreads by wind, water, birds, small animals, and human activities (DiTomaso and Healy 2007). Since the eastside of the forest is known to have frequent winds (personal observation), musk thistle seed is light, and the terrain where the musk thistle is growing is fairly open, it appears to be reasonable that musk thistle seed could travel by wind up to 100 feet. This is unproven. It is unknown how far musk thistle seed will travel on tires. However, up to

100 feet was chosen to define the distance that weed seed would travel on tires. In reality the distance is probably further than 100 feet and less than 100 feet dependent on many factors.

Musk thistle will continue to spread across landscapes located on the eastside of the forest. The areas most likely to experience musk thistle infestation include those where bare ground is formed, native vegetation is reduced, and a seed source is near. Thistle seed spreads in the soil and mud attached to vehicles, and via the wind. Therefore, new bare soil areas created on the landscape are at risk of weed establishment.

Diffuse knapweed (*Centaurea diffusa*): Diffuse knapweed is a native of Eurasia and is known to infest roadsides, waste areas and dry rangelands. It is a highly competitive plant that is known to displace native vegetation.

Spotted knapweed (*Centaurea maculosa*): Spotted knapweed is a native of Eurasia that was introduced to the U.S. as a contaminant of alfalfa and clover seed. Western states are experiencing a reduction in desirable plant communities as this plant is allowed to spread (Whitson et al. 1996). Knapweeds readily establish themselves on any disturbed soil. Their early spring growth makes them competitive for soil moisture and nutrients. There is some evidence that knapweeds produce chemicals that inhibit surrounding vegetation (ibid). Spotted knapweed is spread by wind and passing animals for short distances. Long distance transport occurs when seeds become attached to passing animals, rodents, birds, vehicles, and shoes. Rivers and other watercourses, crop seed and hay also transport seed. Disturbance favors spotted knapweed (ibid). Once established, spotted knapweed is able to form solid stands. Disturbance allows rapid establishment and spread; however, spotted knapweed is also capable of invading undisturbed areas.

Known occurrences of this “A” rated weed are targeted for elimination by the State of California. In addition, County personnel drive up and down State, County, Federal and Forest Service roads to detect new weed occurrences. Also, Forest Service employees trained in weed identification survey roadsides leading to project areas. However, County and Forest Service personnel do not drive off the NFTS. Once spotted knapweed occurrences become established, they are very difficult to control. In one Montana study, a single vehicle in a single trip was shown to spread 2,000 knapweed seeds (Douglass et al 1999).

Malta starthistle (*Centaurea melitensis*): Malta starthistle or tocalote is native to southern Europe (DiTomaso and Healy 2007). It grows in a variety of soils and habitats but is generally found in fields, along roads and in openings. It spreads by seeds primarily through human activities such as road maintenance and on vehicles. Dense infestations displace native plants.

Russian knapweed (*Centaurea repens*): Russian knapweed is a native of Eurasia and is considered widely established in the western United States. It is known to infest disturbed areas such as cultivated fields, orchards, and roadsides. It spreads through its deep growing roots which can be over 8 feet deep.

Yellow starthistle (*Centaurea solstitialis*): Yellow starthistle is native to the Mediterranean region of Europe. It was initially introduced around 1850 to Oakland California (Mullin et al 2000) as a seed contaminant in alfalfa imported from Chile. It is a deep-rooted annual that flowers during the dry summer months, after most other Mediterranean-climate species have set seed. Yellow star thistle displaces native plant communities and reduces plant diversity (Sheley and Petroff 1999, Mullin et al 2000). Once established, it reduces wildlife habitat and forage, displaces native plants, and decreases native plant and

animal diversity. It has the ability to germinate rapidly under favorable and unfavorable field conditions. This allows yellow star thistle the opportunity to capture and use resources before neighboring species.

Yellow star thistle will continue to spread on both sides of the forest, but is most abundant at lower elevations on the west side of the forest. It will move into drier habitats that lack soil cover such as along roads and trails. It will also move into areas on the landscape that lack soil cover. It is spread primarily by road maintenance and on vehicles.

Skeleton weed (*Chondrilla juncea*): Skeleton weed infests millions of acres in the Pacific Northwest and California. It thrives in well-drained, sandy-textured or rocky soils, along roadsides, and in rangelands, pastures, and grain fields (Sheley and Petroff 1999). Skeleton weed displaces native vegetation. It has roots that can reach a depth of 8 feet. Seeds are dispersed mainly by wind, water, trains, vehicles, and machinery (ibid). Sheley and Petroff report that it is important to refrain from driving vehicles and machinery through skeleton weed infested areas during the seeding period and to wash the undercarriage of vehicles and machinery before leaving infested areas.

Skeleton weed will continue to spread on both sides of the forest. Vehicles spread seeds by moving them from place-to-place in soil or mud. Vehicles also help to spread this weed by creating patches of bare soil. This weed does not usually invade areas with vegetative cover. Once established, it is difficult to remove.

Canada thistle (*Cirsium arvense*): Canada thistle is a native of Eurasia. It has a wide habitat range and is fairly adaptable (Sheley and Petroff 1999). It is usually found in open areas with some moisture, including along roadsides and railroad rights-of-way. It can propagate sexually and asexually which gives it the competitive advantage over many native species. The most likely mechanism of seed dispersal today is through human activities (ibid).

Bull thistle (*Cirsium vulgare*): Bull thistle is found in disturbed or degraded land such as roadsides (Sheley and Petroff 1999). Disturbance favors bull thistle because seed production and seedling establishment are enhanced under disturbed conditions. Water, animals and human activities disperse the seed. Wind may also disperse seed, but at a lesser extent.

Bull thistle will continue to spread on both sides of the forest. The areas most likely to experience bull thistle infestation include those where bare ground is formed, native vegetation is reduced, and a seed source is near. Vehicles create bare soil and eliminate native vegetation. Plant communities that are in healthy condition will eventually crowd out this disturbance-loving thistle. However, continued disturbance will spread it.

Scotch broom (*Cytisus scoparius*): Scotch broom was introduced into California from Europe in the 1850s as an ornamental. It is now naturalized in California. Soil disturbance encourages seedling establishment. Scotch broom also regenerates from the stem. This shrub aggressively displaces native plant species.

Scotch broom will continue to spread especially on the westside of the forest. Scotch broom spreads primarily by seed. Vehicles carry seeds from place-to-place in mud or soil. Large areas of Scotch broom change the vegetative structure of that area making it more vulnerable to intense wildfire by creating ladders into the trees.

Klamath weed (*Hypericum perforatum*): Klamath weed is a native of Europe. It has been introduced throughout the world. Introduction of a successful biological control agent has reduced infestations by 99 percent in many areas of the western United States. However, other populations are still increasing in size even thought the biological controls are present (Sheley and Petroff 1999). St. Johnswort seedlings are not strong competitors with other vegetation for light, nutrients, space, and moisture (ibid). They may exhibit high mortality under stress conditions (ibid). Wind (short distances), animals and/or humans (long distances) disperse seeds (ibid). Even though St. Johnswort has a wide distribution, there are still areas where it has not invaded. Prevention is easier, more environmentally desirable, and more cost-effective than the management of large-scale infestations.

Klamath weed will continue to spread on both sides of the forest. Occurrences will remain patchy and will be located primarily along the sides of roads and trails. Klamath weed seedlings are not strong competitors so reducing other vegetation benefits them. Therefore, it is expected that they will remain in disturbed areas. However, it is also expected that existing biological control agents will control this weed so it does not become widespread.

Tall whitetop/perennial pepperweed (*Lepidium latifolium*): Perennial pepperweed is a native of Eurasia. It grows in waste places, wet areas, ditches and roadsides. It spreads by seeds or by segments of rhizomes. It is an aggressive wetland invader.

Tall whitetop will continue to spread along roads, especially if occurrences go undetected and they aren't treated. When vehicles pull off of roads, they frequently carry weed seeds to new areas. Once this weed becomes established, it is very difficult to control. County personnel drive up and down roads looking for weeds and target tall whitetop occurrences for eradication. County personnel (and Forest Service employees) do not drive off roads within the forest.

Dalmatian toadflax (*Linaria genistifolia* ssp. *dalmatica*): Dalmatian toadflax was probably introduced into this country as an ornamental. It is a native of southeastern Europe. It displaces native vegetation. It is found along roads and in fields. It has an extensive and deep root system along with a waxy leaf. This weed will spread on both sides of the forest if seed is introduced into new areas and goes undetected. Known occurrences will continue to be treated to control and/or eliminate them.

Himalayan blackberry (*Rubus discolor*): There are 2 non-native *Rubus* species in California (Himalayan and cutleaf – *Rubus laciniatus*). Himalayan blackberry is the most common and troublesome. Himalayan blackberry is native to Western Europe and was probably introduced to North America in 1885 as a cultivated crop (Bailey 1945 in Brossard et al. 2000). By 1945 it had become naturalized along the West Coast. It produces many seeds that are readily dispersed by mammals and birds. Seeds are also spread via rivers and streams, and it also spreads vegetatively. It is known to grow well on a variety of soils including barren, infertile soil types.

Himalayan blackberry colonizes areas initially disturbed and then neglected by humans and can dominate areas if not controlled (Bossard et al. 2000). It is a strong competitor that rapidly displaces native plants. This blackberry will continue to spread on the west side of the forest. Vehicle use will create bare soil within wet habitats and transport seed. Creation of more bare soil allows the blackberries to spread even more rapidly.

Tumble mustard (*Sisymbrium altissimum*): This annual weed is native to Europe (Whitson et al 1996). It is spread via seeds. It often breaks off at soil level when mature and scatters seed as it tumbles in the wind. It is considered widely scattered throughout the United States. However, the dense growth of this weed located along motorized trail 35-4-P in an old landing is unusual for the TNF (personal observation by the author). Disturbance – including motorized vehicles - will spread this weed.

Wooly mullein (*Verbascum thapsus*): This biennial plant is native to Asia and is common throughout the temperate parts of North America (Whitson et al 1996). It is difficult to control due to the large number of seeds produced per plant. This plant is not considered a high risk to ecological health because it is not a strong competitor with other vegetation. It is usually replaced by native vegetation in the long term. Wooly mullein will continue to spread on both sides of the forest via seeds. Vehicles will spread seeds by moving them from place-to-place in soil or mud. Continued disturbance will create new areas for it to move into.

General Effects of Motorized Vehicle Use

Background: The TNF is located in a part of the Sierra Nevada where biodiversity is at increased risk due to alterations in human uses, fire regimes, climatic change and changes brought about by weed invasion (D' Antonio et al. 2004). In general terms, TNF system lands are considered weed free, with most weed occurrences located along roads and/or in highly disturbed areas such as landings. The lower elevations on the westside of the forest currently contain the worst weed infestations and provide the entry points for many weeds into the TNF. It is a major "source" for weeds that are moving upslope into coniferous forests. On the eastside of the forest, many weed infestations appear to travel from the state of Nevada.

When an area is heavily infested with weeds, the weeds directly compete with native plants and cause their local displacement. In addition, weeds can have a number of indirect effects including changes to: aesthetic values, biological diversity, and ecosystem services (D'Antonio et al. 2004). Potential impacts include: alteration of disturbance regimes (including wildfire), changes in the food base for wildlife species, soil erosion and loss of soil carbon storage, decreases in range or forest productivity, and altered recreational or aesthetic values (Mack et al. 2000, D' Antonio et al. 2004). They can hybridize with native species (ibid) altering native plant genetics.

Maintaining or improving the NFS lands requires the maintenance and improvement of the basic ecosystem elements of soil, water, and vegetation. The stability and ecological function of natural wildlands depend on a diverse community of native plants (Mullin et al 2000). Native vegetation provides resilience against drought, flooding, minimizes erosion, promotes water infiltration and storage, along with providing wildlife and recreation values. Areas infested with weeds do not provide these ecosystem services at the same level as native vegetation. Research has shown that sites dominated by weeds have increased rates of soil erosion and runoff causing degradation of habitat for wildlife and native vegetation.

Disturbed areas generally have more weeds than non-disturbed areas. Weeds are more likely to have higher leaf area and lower tissue construction costs (advantageous under high light and nutrient conditions) and greater phenotypic plasticity than native plants. Increased resource availability and altered

disturbance regimes associated with human activities often differentially increase the performance of weeds over that of natives (Daehler 2003).

Motorized vehicle use and weed introduction and spread: Motorized vehicle use is known to enhance weed introduction in a number of ways (Trombulak and Frissell 2000) including increasing weed introduction by moving weed seed and plant parts from place-to-place in the mud/soil on their tires, and/or on the vehicle body. Motorized vehicle use disturbs native plant communities and makes the habitat more suitable for weed growth by reducing native plant cover. When native plants are replaced by weeds, the entire ecosystem can be impacted including microbial flora and fauna and insect pollinators, all of which contribute to normal ecosystem function. In addition, these disturbed areas create edges within the various plant communities where they are located. Edges are recognized as potential starting points for invasions of weeds into the less disturbed areas of the rest of the plant community such as forested areas (Pauchard and Alaback 2005). Less disturbed areas such as the interior of a forest are usually considered less susceptible to weed invasion because of a combination of factors such as competition from native species, fewer sites for seed germination, less solar radiation and less seed dispersal. However, weed establishment is not based on disturbance alone. When a weed seed source is sufficiently close to a plant community, that plant community/habitat is at increased risk of weed introduction and spread.

The disturbed areas within and adjacent to major highways, general forest roads, two-tracked non-maintained roads, and motorcycle trails (system trails and motorized trails un-authorized for motorized use) provide habitat for any weed seed deposited there. Lose of native vegetation due to season of use of the motorized vehicle has not been fully studied. However, weeds are known to be spread by motorized vehicle use regardless of the season of use. Native vegetation is also known to be physically damaged by motorized vehicle use regardless of the season of use. Season of use may or may not affect the rate of spread of weeds, and/or the creation of bare soil. When weeds become established in these edge areas, they provide the weed seed source for new occurrences of weed in the areas adjacent. When native plants are replaced by weeds, the entire ecosystem can be altered. For example, when motorized vehicle use introduces weeds into new areas and the weeds become established, the fuel pattern is frequently changed.

Fuel pattern changes: Establishing new areas for motorized vehicle use increases the risk of weeds being introduced into new areas and changing the fuel patterns in that area. Motorized vehicle roads/trails/areas can act as breaks in the landscape fuels. However, areas that are disturbed can have much higher weed abundance than adjacent undisturbed areas. For example, one study found that weeds were over 200 percent higher on fuel breaks than in adjacent wildland areas (Merriam et al. 2005). Fuel breaks/disturbed areas/the shoulders of motorized roads/trails/areas can provide establishment sites for weeds and those weeds may move into surrounding areas, especially if those surrounding areas have been disturbed. Scotch and Spanish brooms, cheatgrass, and other weeds all change the arrangement of vegetation, the amount of soil moisture at specific times of the year, the amount of fuel available to burn, and fire behavior. In addition, motorized vehicle use of the various motorized trails is known to increase the chance of ignition through engine sparks, sparks from friction (e.g. rock bouncing on rock), and human negligence. If a wildfire occurs in a weed infested area, many weeds such as cheatgrass and

French/Spanish broom have the competitive edge over native plants when the burned area begins to revegetate.

Effects to soils: Disturbance by motorized vehicles can have long-term effects to soils and favor weed establishment. Motorized vehicles compact soils reducing water infiltration and accelerating erosion. They also displace soils and sheer off vegetative roots. If these effects are severe there can be a loss of soil productivity. Numerous passes by vehicles over vegetation causes the plants to die exposing the soil organic layer. The loss of vegetative cover makes the soil organic layer more susceptible to erosion. Loss of vegetative cover and the soil organic layer reduces the ability of the soil to hold moisture. Many weed species are more capable of utilizing less productive soils with less soil moisture. Weeds can also produce secondary chemical compounds that inhibit native plant germination and growth. These compounds also affect nutrient cycling rates by inhibiting soil microbial fauna activity.

Rate of spread: The rate that weeds are introduced to a new motorized trail is unknown. In one study, Rooney (2003) collected mud from the undercarriage of 14 motorized vehicles. He found that seeds germinated from the soil collected from 4 of those vehicles. In the same study, he reported that each vehicle carries an average of 3.6 seeds. When he multiplied this number by the number of motorized vehicle user days, he estimated that about 6 million seeds were transported per vehicle per year in Wisconsin. Rooney predicted that over the long term, with motorized vehicles as seed dispersers, the fraction of roads/trails colonized by weeds would increase until all motorized trails had reached a weed saturation level. This prediction was based on the lack of constant, extensive, effective surveillance of motorized trails. He noted that motorized vehicles are known seed carriers, that there is invariably a time lag between the time weeds colonize an area and when they are detected, and another time lag between detection and eradication efforts. He also reported that weeds are generally better adapted to vehicular dispersal than native species due to their small seed size, high seed production, and persistent seed banks. In this analysis, one half mile was chosen to define the distance that weed seed would travel on tires. In reality the distance is probably further than 100 feet and less than 100 feet dependent on many factors.

Impacts to rare plants/plant communities: Sensitive plants and fungi and/or watchlist plants/plant communities located in and/or near motorized vehicle roads/trails/areas have a high risk of negative impacts from weed introduction and spread. Several of the known occurrences of weeds on the TNF are known to directly and indirectly impact sensitive plant occurrences. For example, an occurrence of the sensitive species *Clarkia biloba* ssp. *brandegeae* is currently being impacted by the invasion of yellow star thistle along the Mosquito Ridge road located outside of Foresthill. Rare plant occurrences located along roads/trails/areas are at increased risk of loss of individuals and habitat due to weed introduction and spread over the short and long term. The sensitive plant occurrences that have known weed occurrences located within 100 feet are at even greater risk of negative impacts from weed infestation.

Surveys of about 62 miles of motorized trails un-authorized for motorized use have been completed to date. Sensitive species were discovered within 100 feet of several routes; *Bruchia bolanderi* along TKN-J5, *Epilobium howellii* at the end of YRN-001, and *Ivesia sericoleuca* along TKN-M2. Cheatgrass is known to occur within 100 feet of the TKN-M2 *Ivesia sericoleuca* occurrence. Aspen plant communities (watchlist plant communities) were found within 30 feet of TKN-M2, TKS-11, SV-005, SV-P8, and SV-P14. A vernal pool was located at the end of TKN-J2. Musk thistle (*Carduus nutans*) and cheatgrass

(*Bromus tectorum*) are known to occur within 100 feet of SV-P14 and TKN-M2 respectively. Musk thistle has a moderate ecological impact rating. It spreads by wind, water, birds, small animals, and human activities (DiTomaso and Healy 2007). Since the eastside of the forest is known to have frequent winds (personal observation), musk thistle seed is light, and the terrain where the musk thistle is growing is fairly open, it appears to be reasonable that musk thistle seed could travel by wind up to 100 feet or more. This is unproven. It is unknown how far musk thistle seed will travel on tires. However, up to 100 feet was chosen to define the distance that weed seed would travel on tires. In reality the distance is probably further than 100 feet and less than 100 feet dependent on many factors. Cheatgrass has a high ecological rating. Cheatgrass is spread a short distance by wind and caching rodents (DiTomaso and Healy 2007). It is spread greater distances with water and soil movement and by clinging to animals and clothing (ibid). It is known to be transported long distances through recreational and other activities (ibid).

Vegetative recovery in weed infested areas: When the motorized vehicle use on a motorized trail un-authorized for motorized use, the recovery of native vegetation can be affected by the presence of weeds within and adjacent to that motorized trail. Vegetative recovery in areas infested with weeds may not occur if the weeds are not eliminated and desired native vegetation is encouraged (Bard et al 2008). The amount of time needed for the motorized trail to revegetate with native species is dependent on many factors including the type of weed at the site.

Motorized trail maintenance: As mentioned above, motorized vehicle roads/trails/areas on NFS lands are high-risk sites for the introduction and spread of weeds (Ferguson et al. 2003). Transporting seeds and weed parts on vehicles, removing competing vegetation, and mixing soil during maintenance and construction provide ideal conditions for the introduction, germination and establishment of weed seeds (ibid). Grading disturbs soil and competing vegetation, and transports soil, weed seeds and weed parts to new locations. Cleaning ditches moves soils and creates ideal seedbeds. Seeds from equipment can be deposited in stream crossings and washed downstream. Mower heads can also move weed seeds and parts to new locations. This movement of weed seed and parts can happen at any time of the year since the seeds and parts are present in the soil at infested sites at all times of the year. Stockpiles of crushed aggregate can be infested with weeds. When that aggregate is moved to a new location, the weeds go with it. Those alternatives that propose the greatest number of miles of roads/trails/areas will have the greatest need for maintenance and the highest risk of weed introduction into new areas.

Effects of dispersed camping, campgrounds, and trailheads: Another aspect of motorized vehicle use that helps to spread weeds is tied to the use of recreational areas and facilities, such as trailheads, campgrounds, and dispersed camping areas. The “areas” referred to in this analysis are the roads/trails (spurs) that lead to dispersed camping sites. Motorized vehicle use on these spurs adds to the cumulative impacts of motorized vehicle use on NFS lands. Since the spurs lead to dispersed camping sites and/or away from campgrounds/trailheads, use of dispersed camping sites, campgrounds and trailheads also adds to the cumulative effects of motorized vehicle use of NFS lands. Campgrounds and trailheads are frequently the first sites on NFS lands that a motorized vehicle comes in contact with after leaving major highways. In some cases, the motorized vehicle is transported via trailer to the campground and trailhead. Therefore, campgrounds and trailheads frequently receive weed seed and plant parts. Campgrounds and trailheads have constant soil disturbance which provides a good seedbed for any weed seed that is

deposited. In addition, users can also disperse weed seeds on their clothing, footwear, and camping equipment. Campgrounds and trailheads have a high risk of weed introduction. Those campgrounds and trailheads located in or near RCAs have a high risk of transporting weed seed and plant parts great distances. Many weeds are adapted to riparian areas and rapidly become established on sites where soils have been disturbed, (such as eroding stream banks, road and trail crossings, and motorized trails un-authorized for motorized use) and streams can carry weed seeds and plant parts great distances, increasing weed spread. Aquatic weeds, such as purple loosestrife, can take over whole wetland ecosystems, impeding water flow and reducing the quality of wetland habitats.

Native plant community fragmentation: The Sierra Nevada region is at increased risk of weed invasion. As mentioned above, this increased risk occurs at a time when the biodiversity of the Sierra Nevada region is undergoing change due to alterations in human uses, fire regimes, and climatic change - in addition to changes brought about by weed invasion (D' Antonio et al. 2004). The lower elevations on the westside of the forest currently contain the majority of weed infestations and provide the entry points for many weeds into the TNF. Weed seed from these areas is being transported upslope into coniferous forests. The number of acres of TNF system lands infested with weeds is currently unknown. Most weed infestations occur along roads and/or trails and in highly disturbed areas such as landings.

Adding motorized trails (to the NFTS) within large blocks of land unfragmented by motorized vehicle use increases the cumulative impacts to native vegetation on TNF system lands by reducing the connectivity of native plant communities. Motorized vehicle use within large blocks of land that is unfragmented increases the risk that weeds will be introduced into these areas and spread – reducing the amount of native vegetation. Large blocks of land that lack motorized vehicle access are less likely to experience problems with weeds and are more likely to be able to maintain intact native plant communities. The largest blocks of land that exist on the TNF that lack motorized vehicle access (outside of wilderness and research natural areas) are the inventoried roadless areas. Eliminating motorized vehicles from natural areas is the most effective strategy for stopping the introduction of weeds into new areas (Rooney 2003).

Surveys to date have detected some Klamath weed and an occasional bull thistle along proposed motorized trails located within inventoried roadless areas. The proposed motorized trails in inventoried roadless areas currently receive low to moderate use. However, once these roads/trails/areas are shown on maps as being part of the TNF system, it is expected that they will receive increased use. Increased use will increase the risk of weed introduction and spread. Early detection of new weed introductions in these areas will be difficult since many are not easily accessible by regular 4 wheel drive vehicles. Many of these motorized roads/trails/areas have a high level of difficulty and are considered remote. TNF personnel trained in weed identification rarely travel them. This means that weeds can be introduced and go undetected for long periods of time. Infestations of weeds into these relatively undisturbed areas would negatively impacts the ecological health of those areas if the infestations become large and displace native vegetation.

Loss of water: Another impact of extensive weed infestation is loss of water. On the average, California receives about 200 million acre/feet of rainfall per year. About 60 percent or 125 million acre/feet of the total precipitation evaporates or is transpired by vegetation, which includes weeds. Ounce

for ounce, weeds such as yellow star thistle absorb water at a faster rate than most native plants. Aggressive root development throughout the season enables weeds such as yellow star thistle to drain moisture away from soil layers where it would be available to localized annual and perennial grasses (Gerlach et al. 1998).

Season of Use, Temporary Order, Change in Class of Vehicles and Present and Reasonably Foreseeable Actions

Season of Use: In general terms, the season of use can benefit native vegetation but it is difficult to quantify those benefits. Motorized vehicle use no matter what the season provides a continuous source of weed seed introduction and also provides disturbed areas within and adjacent to the motorized road/trail/area. Lose of native vegetation due to season of use of the motorized vehicle has not been fully studied. However, weeds are known to be spread by motorized vehicle use regardless of the season of use. Native vegetation is known to be physically damaged by motorized vehicle use regardless of the season of use. Season of use may or may not affect the rate of spread of weeds, how much native vegetation is killed or injured, and/or the creation of bare soil. Weed seed and plant parts can be introduced into new areas regardless of the time of year the motorized trail is used. Many weed seeds remain viable for long periods of time so they could be introduced along a motorized trail during the dry period of the year and germinate during the wet period of the year.

However, it may be true that wet soil and weed seed clings to tires/vehicles more readily than dry soil and weed seed. If this is a reasonable assumption, prohibiting use of motorized trails when the soils are the wettest may reduce that rate of weed introduction and spread. This is an unproven assumption and the difference in rate of weed introduction can not be quantified. The number of variables that would affect the rate of introduction and spread along a specific motorized trail varies by such factors as type of weed, whether the motorized trail has wet/moist soil areas year-around, where the vehicle is coming from, and the weather that particular day (for example, did it rain). Therefore, in this analysis, season of use is not considered a significant variable when comparing impacts to native vegetation by alternatives.

The impact to native vegetation from the season that the motorized vehicle use occurs varies by plant community. However, the significance of beneficial or negative impacts from the season of use action is difficult to quantify for a number of reasons. Removing motorized vehicle use from NFTS motorized roads and trails, and motorized trails un-authorized for motorized use during the wet season does reduce the potential amount of erosion from that motorized road or trail that could occur especially if the motorized road or trail becomes rutted. However, this amount of potential erosion can not be quantified. Determining where the rutting and erosion would take place and if that erosion would impact rare plant and fungi species and/or rare plant communities is difficult. It is reasonable to assume that native vegetation located within 100 feet of a motorized trail would not benefit if it experienced soil erosion due to motorized vehicle use regardless of the season of use. Native vegetation in aquatic/riparian plant communities is always subject to erosion and/or soil rutting because those native plants grow in soils that are wet/moist year-around. Serpentine (ultra-mafic soils) plant communities are considered highly erosive year-around.

Temporary order: The TNF has issued a temporary forest order which prohibits travel off of existing motorized trails as shown on Forest Order exhibit maps. The order is established for a period not to exceed two years to protect resources and help prevent additional motorized trails un-authorized for motorized use from being established while the TNF undertakes implementation of the Travel Management Rule and the production of the Motor Vehicle Use Map (MVUM). Therefore, the creation of new motorized trails un-authorized for motorized use (which is the expression of cross country travel) and the associated resource damage caused by cross country travel has been legally – at least temporarily – stopped. This analysis recognizes the miles of motorized trail un-authorized for motorized use that were known when the analysis began, i.e. 1,400 miles. For this analysis, implementation of the temporary order is considered beneficial to native vegetation. Comparing the no action alternative that allows cross country travel to the action alternatives that do not allow cross country travel provides the reader with an overview of how cross country travel impacts native vegetation.

Change in class of vehicles: Changing the class of vehicle allowed to use a particular road does not change impacts to native vegetation. These roads already have hardened surfaces that lack vegetation. It is likely that direct impacts to native vegetation occurred when the road was developed. Indirect impacts of dust and increased risk of weed introduction still occur within 100 feet of native surface roads. These indirect and cumulative impacts would continue regardless of the type of vehicle using the road. In addition, there are no studies that indicate one type of vehicle spreads weed seed and/or weed plant parts more than another. Therefore, changing the class of vehicle does not make the road more or less susceptible to weed introduction and spread and does not reduce the risks to native vegetation.

Implementation of present and reasonably foreseeable projects: Implementation of present and reasonably foreseeable management activities also contributes to the introduction and spread of weeds. Refer to Table M-4 for a list of reasonably foreseeable projects. For example, fuel reduction/timber harvest/aspen improvement projects routinely require washing of equipment if it is coming to a project area from a weed infested area. However, implementation of fuel reduction/timber harvest/aspen improvement projects do not require treatment of weeds located along access roads or within existing landings or adjacent areas before new areas are disturbed. Soil disturbance is known to create conditions that are favorable to weed establishment if a seed source is near by. On going projects such as utility corridor construction and maintenance require use of native plant materials for erosion control, but do not require vehicle inspection before vehicles drive down established corridors to inspect the utility corridors. Mining operations are also ongoing projects on the TNF that are known to spread weeds and/or create conditions favorable for weed establishment. Spotted knapweed was found along a mining trail in the American River Ranger district. It is believed (but unproven) that the quad runner used by the miner had spotted knapweed seed on it when it was transported to California from Montana. On going livestock grazing projects are also known to spread weed seeds on their coats or within droppings.

Table M-4. Reasonably foreseeable activities considered in cumulative effects analysis

Project	Description
Renew Pacific Bell's expired phone line easements and special use permits	Renew phone line permits, including removing abandoned poles and cables and possible burying and/or co-locating phone lines with power lines in some areas.
Mohawk/Alchemist plan of operation	Operation of underground mine along the Middle Yuba River
Gold Valley resource protection plan	Implement actions proposed to improve Gold Valley and reduce erosion from specific roads/trails.
Carvin aspen enhancement	Remove conifers to improve condition of an aspen clone.
Canyon Forest Health	Reduce fuels, thin forest stands, decommission roads.
Tahoe Truckee Sanitary Agency permit renewal	Issue a special use permit to the Tahoe Truckee Sanitary Agency to operate and maintain a sewage interceptor and export conduit pipeline on a strip of NFS lands – 3.73 miles long and 20 feet wide.
Sugarplum	Remove dead, dying, and hazard trees near improvements, thin forest stands.
Legacy Trail	Construct nonmotorized multiple use trail from private land in the town of Truckee to Glenshire subdivision.
Glenshire Drive re-alignment	Construct a portion of Glenshire Drive on NFS lands to make room for the repositioning of the railroad track.
Donner Summit PUD permit renewal	Renew/reissue a permit to Donner Summit PUD for operation/maintenance of the existing sewer treatment plant. Permit includes buildings on NFS lands which house PUD administrative offices and a fire station.
DMB Highlands Siller Ranch fire access road	Designate about 400 feet of a motorized trail un-authorized for motorized use as a special use road to be used by Siller Ranch for emergency access to a subdivision.
Truckee Donner PUD Alder Creek road powerline tie	Construct about 500 feet of distribution powerline to connect existing systems both east and west of Highway 89 north to reduce the risk of spot outages.
Yuba Pass hazard tree	Remove hazard trees along NFS roads and state highway 49.
Phoenix	Thin and reduce fuels on about 5,058 acres in areas formerly analyzed in the Euro and Checkmate Project EAs using HFQLG direction.
Montez	Thin and reduce fuels on about 180 acres using HFQLG direction.
Little Truckee River Trail	Construct about 1 miles of multiple use trail between highway 89 north and FS road #450-10-20 – connect to Upper Little Truckee River campground.
Kangaroo	Mechanically thin 44 acres, group select 47 acres, thin 7 acres of conifer in an aspen clone, construct ½ mile of temporary road.
Jackson Meadows hazard tree	Remove hazard trees from campgrounds, along NFS and county roads from Jackson Meadows Reservoir to Little Truckee Summit.
Dinkum	Thin 229 acres, group select 72 acres; remove conifers form 7 acres of aspen, construct ¾ mile of temporary roads.
Coppins	Construct fish/frog passage at stream crossing below NFS road 07.
Carman II watershed restoration	Implement watershed restoration activities
Brumby	Mechanically thin 530 acres, group select 30 acres, remove conifers for 3 acres of aspen, construct 1.3 miles of new permanent road, and about 1 mile of temporary road.
Mears	Thin, salvage and sanitize dead and dying trees
Last Chance	Thin and reduce fuels as a collaborative project – Sierra Nevada Adaptive management project.
Foresthill genetic center plantation	Thin and remove surplus trees in the Foresthill Genetic Resource Center.
East Fork	Thin and remove trees.
Casa Loma	Hand thin trees and brush to reduce fuels

Project	Description
Sierra Pacific power line permit	Re-issue a special use permit for all existing Sierra Pacific power lines.
PG&E distribution line permit	Renew the special use permit for existing lines and facilities
BKS grazing allotment management plans	Update the allotment management plans for the Boca, Kyburz, Sagehen, Sierra Crest and Summit grazing allotments.
Designate energy corridors on federal land in 11 western states	In accordance with section 368 of the Energy Policy Act of 2005, "The Sec of Agriculture, Commerce, Defense, Energy and Interior, in consultation with FERC, States, tribal or local units of government will designate energy corridors on federal land.

Alternative Implementation

Mitigation measures specified in Appendix A (Road Cards) will be implemented in all of the action alternatives. These mitigation measures will provide benefits to native vegetation.

All alternatives carry a high risk of weed introduction into new areas over the long term because motorized vehicles are considered one of the main vectors for transporting weed seed and plant parts from place to place. The level of motorized vehicle use on a particular motorized trail does not necessarily tie to the amount of weed seed transported or the number of weed occurrences that become established on that motorized trail. Motorized vehicle use of a motorized trail un-authorized for motorized use just once could introduce weed seeds into a new area – it depends on where the vehicle has been and when and where the weed seed falls off that vehicle. However, it is believed that the action alternatives that allow the most miles of proposed additions to the NFTS have the greatest risk of weed introduction and spread. Refer to Table M-5 for the miles of roads and trails available for motorized use.

Indicator Measures: The following general indicator measures were used to compare alternatives. These indicator measures were selected based on literature review and profession judgment.

1. Weed infestations within 100 feet of the proposed motorized trail. In this analysis, 100 feet was chosen to define the distance that weed seed would travel on tires. In reality the distance is probably further than 100 feet and/or less than 100 feet dependent on many factors.
2. Miles of motorized trail proposed to add to the NFTS within inventoried roadless areas.

Elements of the proposal: In addition to the indicator measures, the alternatives are compared by plant community with a focus on the four major parts of the proposal:

1. Prohibition of cross country travel
2. Additions to the National Forest Transportation System (NFTS).
3. Cumulative effects including all of the above and the reasonably foreseeable.

List of Assumptions: This evaluation of risk is also based on several assumptions to help analyze direct, indirect, and cumulative effects. These assumptions are listed below:

1. Impacts to soils and vegetation are assumed to be limited to the first 30 and 100 feet of the motorized trail.
2. Native vegetation located within 100 feet of a proposed addition to the NFTS may be directly and indirectly impacted by motorized vehicle use - regardless of the alternative selected. Reductions in native vegetation allow weeds to become established more readily.

3. Unsurveyed motorized trails un-authorized for motorized use are assumed to have weeds until surveys have been completed.
4. Non-native plants (weeds) will continue to spread along and within surfaced and unsurfaced motorized roads and trails.
5. NFTS motorized roads and trails and newly proposed additions to the NFTS could have increased use which may increase impacts to native vegetation through production of dust, etc.
6. The projects identified in Table M-4 will be analyzed and implemented on TNF system lands within the next 5 to 10 years.
7. All vehicles will need to be assumed "equal." Hence the ability to spread weeds does not vary by motorized vehicle type. [The type of motorized vehicle is not a factor since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007)].
8. Volunteers can effectively maintain adopted trails over the long term.
9. Weed seed can travel up to 100 feet on motorized vehicle tires. (It is recognized that the distance is probably further than 100 feet and less than 100 feet dependent on many factors.)

Noxious Weeds

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country use is prohibited.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact native vegetation in the short and long term by increasing the risk of weed introduction and spread on TNF system lands. Implementation of Alternative 1 carries the highest risk of introduction and spread of aggressive, non-native plants (weeds) since it does not prohibit cross country travel and it does not prohibit use of about 1,400 miles of motorized trails un-authorized for motorized use. Motorized vehicles could access more NFS lands and potentially spread weeds to all accessible areas. Under implementation of Alternative 1, the number of motorized trails un-authorized for motorized use would increase through cross country use.

Those motorized trails un-authorized for motorized use that are known to have weed infestations have a high risk of spreading weeds to new areas. Surveys to date have identified several motorized trails that are infested with weeds. Refer to Table M-3. The motorized trails displayed in Table M-3 have the highest short and long term risk of weed spread.

Different weeds have different ecological impacts. Table M-1 provides an indication of the ecological impact of the type of weed that infests the motorized trail. Under implementation of Alternative 1, all of the motorized trails identified in Table M-3 would continue to be used and that use would spread weeds along the motorized trails as well as across the landscape from cross country use. Refer to the following discussion:

Cheatgrass: Motorized trails known to have cheatgrass infestations within 100 feet of the motorized trails include: ARM-5, SV-P14, TKN-J9, TKN-M1, TKN-M2, YRM-M4, YRN-509, and YRS-SF6. There

is a high risk that cheatgrass will spread along these motorized trails in the short and long term. Native plants could be displaced by cheatgrass in the short (5 years or less) and long term (over 5 years).

Musk thistle: Motorized trails known to have musk thistle infestations within 100 feet of the motorized trails include: SV-P14 and TKN-J13. Motorized vehicle use of these motorized trails could spread musk thistle along these motorized trails and into other areas.

Bull thistle: Bull thistle is known to occur along TKS-M9 and YRS-SF6. Bull thistle will spread along these motorized trails and into new areas – especially disturbed areas.

Klamath weed: Klamath weed is known to occur along motorized trail YRN-M3b. Klamath weed will spread along YRN-M3b in the short term and into new areas over the long term (over five years).

Wooly mullein: Wooly mullein is known to occur within 100 feet of TKN-J9. Wooly mullein will spread along this motorized trail in the short term and into other areas over the long term.

Action Alternatives: All of the action alternatives prohibit cross country travel on 717,900 acres. Prohibiting cross country travel reduces the risk of introduction and spread of weeds by reducing the amount of NFS lands available for motorized travel. Therefore, the risk of direct/indirect impacts to native vegetation from weed introduction and spread is less under the action alternatives in the long term.

In addition, all of the action alternatives prohibit use of some portion of the 1,400 miles of motorized trails un-authorized for motorized use. Prohibiting use of motorized trails un-authorized for motorized use also reduces the risk of spreading weeds. Alternative 5 prohibits use of about 1117 miles of motorized trails un-authorized for motorized use or about 80 percent of them. Alternatives 2 and 6 prohibit use of about 95 percent of the 1,400 miles of motorized trail un-authorized for motorized use. Alternative 4 and 7 prohibit use of 98 and 97 percent respectively. Alternative 3 prohibits use of all motorized trails un-authorized for motorized use and has the least risk of introducing weeds into new areas and spreading weeds from existing infestations of all of the action alternatives. However, use of NFTS will continue to spread weeds also.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trails un-authorized for motorized use proposed to be added to the NFTS system.

No Action: Alternative 1 does not propose the addition of any motorized trails to the NFTS.

Action Alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles of motorized trail, which would reduce the risk of weed introduction and spread into new areas. All of the action alternatives prohibit cross country travel which also reduces the risk of introduction and spread of weeds. Therefore, the risk of direct/indirect impacts to native plant communities from weed introduction and spread is less under the action alternatives than the no action alternative in the long term.

In addition, surveys to date (refer to Table M-5) have located weed occurrences within 100 feet of specific motorized trails: ARM-5, SV-P14, TKN-J9, TKN-J13, TKN-M1, TKN-M2, TKS-M9, YRM-M3, YRM-M4, YRN-008, YRN-509, YRN-M3b, YRS-SF6, and 35-4-P of the Cal Ida network. As noted previously, 100 feet was chosen as the distance that weed seed can travel along a motorized trail. One hundred feet was also chosen as the distance that weed seed would be dispersed from a parent plant. The

distance that weed seed travels from a parent plant and the distance weed seed can travel in mud and dirt on tires is probably more and less than 100 feet dependent on many factors. One hundred feet was chosen for analysis purposes only. The actual distance that weed seed is dispersed from a parent plant and the actual distance that weed seed travels on vehicle tires is dependent on such factors as the type of seed and the moisture content of the soil. It is known that vehicle tires spread weed seed from one site to another (Von Der Lippe and Kowarik 2007). Those motorized trails that have weeds present also have weed seed present. Therefore, those action alternatives that propose motorized trails with weed occurrences have a high risk of spreading weeds into new areas.

Alternatives 5 and 6 propose the addition of all of the motorized trails un-authorized for motorized use known to have weed occurrences. Alternative 2 proposes 13 of the 14 motorized trails known to have weeds. Alternative 7 proposes the addition of 9 of the 14 motorized trails known to have weed occurrences. Alternative 4 proposes the addition of 7 of the 14 motorized trails known to have weed occurrences. Alternative 3 does not propose the addition of any of the 14 motorized trails known to have weed occurrences. Implementation of Alternative 3 could still spread weeds but, since it does not allow cross country travel and does not propose any additions to the NFTS, it is believed that the rate of weed spread would be slower. This is unproven.

Overall, of the action alternatives, Alternative 5 which would add about 283 miles of motorized trail un-authorized for motorized use has the greatest risk of introducing weeds into new areas and spreading weeds from areas already infested. Alternatives 2 and 6 propose 73 and 70 miles respectively. Alternative 7 proposes 45 miles and Alternative 4 proposes about 31 miles. Alternative 3 does not propose the addition of motorized trails un-authorized for motorized use to the NFTS and has the least risk of introducing and spreading weeds along motorized trails un-authorized for motorized use through motorized vehicle travel. None of the action alternatives allow cross country travel which reduces the risk of weeds being introduced into new areas.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact TNF system lands and native vegetation, as well as the benefits from closing motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by frequently evaluating motorized trails, implementing mitigations to reduce impacts to native vegetation, and conducting early detection and treatment of weeds. Frequent motorized trail evaluation to detect weeds combined with rapid treatment of those weeds avoids significant impacts to TNF system lands and native plant communities in the short and long term.

Past: Most of the TNF is considered relatively weed free. This relatively weed free state may indicate that a source of weed seed was not available when TNF native plant communities were disturbed in the last century. This is unknown but appears to be a reasonable assumption based on literature that documents the progression of various weed species across California and the nation. It is also possible that weeds have persisted at low levels in some areas for decades before spreading rapidly when favorable conditions developed (Shepperd et al 2006). Many of the weeds found in California forests today were

introduced intentionally or unintentionally by European settlers beginning in the 18th century (Bossard et al 2000). The lack of weed infestation in previously disturbed areas may also indicate less access onto the TNF by motorized vehicles. It is widely recognized that motorized vehicle use has increased over the last decade. It is also widely recognized that motorized use helps to spread weeds from place to place both by creating habitat along motorized trails and by carrying seed/weed plant parts on vehicles. However weeds were introduced, it is known that they are spreading across California. Jepson (1925) listed 292 non-native (weed) plant species in California. By the end of the 20th century the estimate for non-native plant species in California has risen to 1,045 (Randall and others 1998 in Shepperd et al 2006).

Current: In general terms, most weed occurrences on the TNF are located along State/County/Federal/NFS roads. Weed infestations degrade NFS lands (including native plant communities) by directly competing with native plants and causing their displacement. Weeds are known to occur along both NFTS roads and trails and motorized trails un-authorized for motorized use. Ongoing management actions such as utility corridors maintenance, mining operation, and livestock grazing continue to spread weeds from place to place across the forest. As noted in other sections of this document, there are weed infestations competing with native plants for soil, water and nutrients in several locations.

Motorized vehicle use of NFTS motorized roads and trails are also an ongoing activity that is known to negatively impact native vegetation through the introduction of weeds. Motorized vehicle use of NFTS trails removes native vegetation, creating bare soil conditions. Dust from use of native surface road sand trails decreases native vegetation cover by reducing rates of photosynthesis, leaf conductance, transpiration, and water-use efficiency. Dust from motorized vehicle use has also been shown to increase temperatures of leaves and stems and decrease leaf surface areas (Munger et al 2003) negatively impacting plant vigor. Reduced native plant vigor increases the chance that weeds can become established.

Reasonably foreseeable: Implementation of those projects identified in Table M-4 may introduce weed seed and/or weed plant parts into new areas even though washing of equipment that operates off roads if it is coming from a weed infested area is required in most fuel reduction projects along with the use of certified weed free plant materials for erosion control (when needed). However, all of the projects listed in Table M-4 involve travel on NFTS roads and could introduce weed seed into new areas from their vehicles. Ground disturbance favors weed spread if the weeds are already on or near the area being disturbed. It is reasonably foreseeable that weeds will continue to spread on the TNF and will be introduced into native plant communities over the short and long term.

No action: Implementation of Alternative 1 adds to the cumulative risk of weeds being introduced and spreading into native plant communities. Implementation of Alternative 1 has a high risk of introducing weeds into new areas and spreading weeds from areas that are already infested with weeds because Alternative 1 allows cross country travel and does not prohibit use of motorized trails un-authorized for motorized use. Therefore, it has the greatest risk of negative impacts to TNF native plant communities, of any of the alternatives since it allows motorized vehicle use on the greatest amount of NFS land. Motorized vehicle use provides a continuous source of weed seed introduction and also provides disturbed areas within and adjacent to the motorized vehicle roads/trails/areas.

Action Alternatives: None of the action alternatives allow cross country use. Therefore, all of the action alternatives have less risk of introducing weeds into native plant communities than Alternative 1.

Alternative 5: Of the action alternatives, implementation of Alternative 5 has the greatest risk of weed introduction and spread and therefore the greatest risk of negative impacts to native plant communities since it proposes the addition of the most motorized trails un-authorized for motorized use into the NFTS. Of the action alternatives, Alternative 5 adds the most miles of motorized trail un-authorized for motorized use to the NFTS - about 283 of the 1400 miles of motorized trail un-authorized for motorized use – or about 22 percent. Of the action alternatives, Alternative 5 prohibits use of the fewest motorized trails un-authorized for motorized use - about 79 percent of them. In addition, the surveys of historic motorized trails proposed in Alternative 5 are not required. Therefore, these historic motorized trails may have weed occurrences that would go undetected and would spread and grow in size. Implementation of Alternative 5 therefore has a high risk of impacting native plant communities over the short and long term through the introduction and spread of weeds.

Alternatives 2 and 6: Alternatives 2 and 6 have a greater risk of spreading weeds into native plant communities in the short and long term than Alternatives 3, 4, and 7, but not as great a risk as Alternatives 1 and 5. Alternative 2 proposes the addition of 73 of the 1400 motorized trail un-authorized for motorized use miles or about 6 percent and prohibits use of about 95 percent of them. Alternative 6 proposes the addition of 70 miles or about 5 percent and prohibit use of about 95 percent of them. In addition, Alternative 2 adds shoreline access on dry soils in the Prosser, Boca and Stampede reservoir areas. Reservoir shoreline areas are known to have weed occurrences when the water level is low. For example, Canada thistle is known to occur along the low water line of French Meadows reservoir and musk thistle and other weeds are known to occur along the Boca reservoir low water line. When these weed occurrences are covered with water, many of the weed seeds are killed. However, some of the weed seed floats to new areas. Any motorized vehicle use in the areas where the weeds are located will spread the weeds to new areas. Alternative 2 also proposes the addition of Eureka Diggings and Greenhorn areas. These are generally unvegetated areas where vehicles are not restricted to motorized trails. These unvegetated areas provide sites where weeds can readily become established without competition from native vegetation. Established weed sites can spread weed seed to new areas as vehicles go from infested sites to other areas. Therefore, the risk of spreading weeds into native plant communities is higher in Alternative 2 than in Alternative 6, primarily because Alternative 2 has more area open for motorized vehicle use.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 have a lower risk of spreading weeds into native plant communities than implementation of Alternatives 1, 2, 5, and 6. Alternative 4 proposes the addition of 31 miles of motorized trail un-authorized for motorized use to the NFTS or about 2 percent of the 1400 miles of motorized trail un-authorized for motorized use and prohibits use of 98 percent of them. Alternative 7 proposes the addition of about 45 miles or about 3 percent and prohibits use of about 97 percent of them. The short and long term risk of negative impacts to native plant communities from weed introduction and spread is lower because these alternatives propose the addition of fewer miles of motorized trail additions to the NFTS and prohibit cross country use.

Alternative 3: Alternative 3 has the least risk of weed introduction and spread into native plant communities from motorized trails un-authorized for motorized use than any of the alternatives, because it does not propose the addition of motorized trails un-authorized for motorized use to the NFTS, it prohibits use of 1400 miles of motorized trail un-authorized for motorized use to motorized vehicle use, and does not allow cross country travel.

Native Plant Biodiversity and Plant Community Fragmentation

1. Prohibition of cross country travel

Indicator used to measure effects:

- Acres of cross country travel prohibited within inventoried roadless areas.

No action: Alternative 1 does not prohibit use of motorized trails un-authorized for motorized use located within inventoried roadless areas. Alternative 1 does not prohibit cross country travel. Under implementation of Alternative 1, 54 miles of motorized trails un-authorized for motorized use located within inventoried roadless areas would be available for motorized vehicle use and accessible areas within those inventoried roadless areas would be available for cross country travel. As discussed above, this increases the risk of weed introduction and spread within these areas - increasing the risk of loss of native plant biodiversity and the risk of native plant community fragmentation. Large weed occurrences within inventoried roadless areas could significantly impact native plant communities over the long term.

Action alternatives: All of the action alternatives prohibit cross country travel within inventoried roadless areas. Therefore there is less long term risk to native plant diversity and less risk of fragmentation impacts to native plant communities located within inventoried roadless areas under implementation of the action alternatives.

2. Additions to the National Forest Transportation System (NFTS)

Indicator used to measure effects:

- Miles of motorized trail un-authorized for motorized use proposed for addition to the NFTS that are located within inventoried roadless areas.

No action: Implementation of Alternative 1 does not add motorized trails to the NFTS.

Action Alternatives: Compared to Alternative 1, all action alternatives would reduce the number of miles of motorized trail un-authorized for motorized use in inventoried roadless areas. Of the action alternatives, Alternative 5 proposes the addition of the greatest number of motorized trail un-authorized for motorized use – about 16 miles. Sixteen miles of motorized trail is about 30 percent of the existing miles of motorized trail un-authorized for motorized use within these areas. Of the action alternatives, Alternative 5 has the highest long term risk to native plant diversity and greatest risk of fragmentation impacts to native plant communities located within inventoried roadless areas. Refer to Table M-5 which displays the number of miles of motorized trails un-authorized for motorized use proposed by alternative in inventoried roadless areas. Alternative 2 adds 9 miles, Alternative 6 adds 8 miles, and Alternative 7 adds seven miles, which is 17 to 13 percent of the miles of motorized trail un-authorized for motorized use within these areas. Alternatives 3 and 4 do not add miles of motorized vehicle motorized trail within

inventoried roadless areas. Alternatives 3 and 4 have the lowest risk to native plant diversity and least risk of fragmentation impacts to native plant communities located within inventoried roadless areas.

Large blocks of land such as inventoried roadless areas are especially important areas for maintaining native plant and plant community diversity (Loomis et al. 2000). Inventoried roadless areas provide a natural benchmark or control to judge the effects of human development on natural systems and to understand relatively undisturbed ecological processes. In addition, naturally functioning ecosystems (plant communities) such as those often found in inventoried roadless areas provide many valuable services including watershed protection, carbon storage, nutrient cycling, pest control, pollination, and fish and wildlife habitat (ibid).

Table M-5. Total miles of roads and trails in inventoried roadless areas by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross country travel	Continues	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited	Prohibited
Roads open to highway legal vehicles only	1	0	1	1	0	0	1
Roads open to all vehicles	33	34	33	32	34	32	33
Trails open to all vehicles	51	57	51	51	64	57	56
Trails open to ATV's and motorcycles only	0	0	0	0	0	0	0
Trails open to motorcycles only	44	48	44	44	47	47	47
Private/other jurisdiction roads	23	23	23	23	23	23	23
Motorized trails un-authorized for motorized use	54	0	0	0	0	0	0
Subtotal Motorized	**206**	**161**	**152**	**152**	**168**	**160**	**159**
NFS nonmotorized trails	88	88	88	88	88	88	88
NFS nonmotorized & nonmechanical trails	62	62	62	62	62	62	62
Motorized trails un-authorized for motorized use prohibited to motorized use	5	50	59	59	44	51	52

Native plant communities with motorized trails through them are more likely to be exposed to disruption by human activities and to experience problems with weeds. Adding motorized trails within inventoried roadless areas increases the risk of negative impacts to that native plant community. Once these motorized trail additions are shown on maps, they could receive increased use. Additional use could increases the risk of weed seed being introduced into the inventoried roadless area. Early detection of new weed introductions would be difficult since these areas are remote and generally accessible only by specialized 4 wheel drive/motorcycle equipment. TNF personnel trained in weed identification rarely travel them. Weeds could be introduced and go undetected for long periods of time. Infestations of weeds into these relatively weed free areas could negatively impact native plant communities by displacement of native plants by weeds.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact native plant communities within inventoried roadless areas, as well as the benefits from

closing motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by frequently evaluating motorized trails, implementing mitigations to reduce impacts to native plant communities, and conducting early detection and treatment of weeds. Frequent motorized trail evaluation to detect weeds combined with rapid treatment of those weeds avoids significant impacts to TNF system lands in the short and long term.

Past: Inventoried roadless areas are areas that are considered relatively undisturbed by humans. However, human activities such as mining and livestock grazing have occurred in some of these areas for over a century. Inventoried roadless areas were not identified until the late 1970s during the Roadless Area Review and Evaluation (RARE I and RARE II). The character and amount of roads, private land, and motorized trails varies greatly by roadless area. Refer to section 3.09 for more information.

Current: Current management activities that occur within TNF inventoried roadless areas include use of NFTS roads and trails, activities on private land that are adjacent to NFS lands, livestock grazing and minerals operations. The amount of use of NFTS roads and trails, the types of private land activities, the amount and location of livestock grazing, and the minerals operations also vary by inventoried roadless area. For example, the following motorized trails un-authorized for motorized use are proposed in the West Yuba inventoried roadless area: YRN-M3b, YRN-M3a, YRN-7, and YRN-M2. All of these motorized trails except YRN-7 were pioneered by miners to access mining claims. The East Yuba roadless area also has active mining operations. YRN-001, YRN-M1, YRN-11, YRN 5a and 5c, YRN-9, YRN-007, and YRN-4 are all motorized trails un-authorized for motorized use proposed within the East Yuba roadless area. Of these motorized trails, YRN-M1, YRN-007, and YRN-4 were pioneered by miners. YRN-11, YRN 5a and 5c, YRN-9 and probably YRN-001 were pioneered by users. Motorized trails used by miners to access their mining claims will remain available for their use regardless of the alternative selected. Refer to section 3.09 (Inventoried Roadless Areas and Special Areas) of the DEIS for more information about each roadless area.

Reasonably foreseeable: Implementation of those projects identified in Table M-4 would not impact inventoried roadless areas. None of those projects are located within inventoried roadless areas.

No action: Implementing Alternative 1 has a greater risk of negative impacts to native plant diversity and a greater risk of negative impacts to native plant communities located within inventoried roadless areas than the action alternatives. Alternative 1 has a higher risk of these negative impacts to plant diversity and connectivity primarily due to allowing cross country travel and allowing motorized use on all 54 miles of motorized trail un-authorized for motorized use within roadless areas.

Motorized vehicle disturbance within inventoried roadless areas can reduce native plant biodiversity. Loss of native plant biodiversity is dependent on the intensity of motorized vehicle use, but even a single vehicle pass can destroy or disrupt many types of plant communities. Plants with shallow root systems may be especially vulnerable (Wilshire 1983, Lacey et al. 1997). This loss of native vegetation increases the risk of soil loss due to wind and water erosion. Soil loss increases the decomposition of organic matter, weakens soil aggregate stability and can result in the formation of inorganic surface crusts. Inorganic surface crusts increase water runoff, inhibit germination and emergence of seedlings, and reduce water penetration into the soil. Natural soil stabilizers such as organic (lichen, fungal and algal)

soil crusts are highly vulnerable to cross country motorized vehicle use. All of these impacts contribute to native plant community degradation and fragmentation.

Motorized vehicle use can fragment native plant communities. Those native plants with specific pollination and habitat requirements are the most vulnerable to habitat fragmentation impacts. Motorized trails are frequently identified as the cause of habitat fragmentation. Cross country motorized vehicle use has been shown to have the same fragmentation effects as motorized trails. Cross country motorized vehicle use has been shown to reduce perennial and annual plant cover, reduce plant density, and overall above-ground vegetative biomass (Hall 1989). In general terms, the degree of plant loss depends on the intensity of motorized vehicle use.

The density of NFTS motorized trails in the various roadless areas is described in section 3.09 (Inventoried Roadless Areas and Special Areas). Under Alternative 1, cross country use in roadless areas could create high road and trail density over the long term with negative cumulative impacts to native plant communities. Several areas on the TNF have a high density of motorized vehicle roads/trails/areas – however none of the watersheds within inventoried roadless areas are considered high risk watersheds. Refer to section 3.02 (Soil and Watershed Resources) of the DEIS.

The inventoried roadless areas on the TNF are considered relatively free of motorized trails and are assumed to provide quality habitat for native plant communities. Since complete botanical surveys of inventoried roadless areas and other areas of the forest are not available, these assumptions are unproven. However, it is expected that inventoried roadless areas on the TNF provide important biological strongholds for native plants and communities just as they do across the nation. Native plants in TNF inventoried roadless areas are less likely to be exposed to disruption by human activities such as collection, trampling, and other disturbance. This lower level of disruption may make roadless areas important references for understanding the natural composition and dynamics of native plant communities.

TNF inventoried roadless areas are less likely to experience problems with nonnative invasive plants (weeds) and are more likely to be able to maintain intact native plant communities. Native plants benefit within inventoried roadless areas by having reduced risk of future habitat degradation and disturbance, and conservation of existing biological strongholds. Implementation of the no action alternative would not provide these benefits to native plants.

Native plant communities are at increased risk of adverse cumulative effects from increased population growth and associated land uses, land conversions, and nonnative plant (weed) invasions. Therefore, the value of relatively unfragmented blocks of land such as inventoried roadless areas native plant communities is likely to increase as habitat loss and habitat degradation increase in scope and magnitude. Native plant community degradation from the invasion and/or encroachment of non-native plant and animal species are increasing.

Action Alternatives: All of the action alternatives reduce impacts to native plants and plant communities by reducing the number of motorized trails un-authorized for motorized use within inventoried roadless areas and prohibiting cross country travel. The action alternatives that propose the addition of the most miles of motorized trail un-authorized for motorized use to the NFTS within inventoried roadless areas have the greatest risk of negatively impacting native plant biodiversity and

fragmenting native plant communities. The risk to native plants is closely tied to the high risk of introducing weeds into large blocks of land that are currently considered weed free.

Alternative 5: Of the action alternatives, implementation of Alternative 5 has the greatest risk of negative impacts to native plant diversity and has a greater risk of negative impacts to native plant communities through fragmentation. Of the action alternatives, Alternative 5 proposes the addition of the greatest number of motorized trails un-authorized for motorized use located in inventoried roadless areas – about 16 miles. Sixteen miles of motorized trail is about 30 percent of the existing miles of motorized trail un-authorized for motorized use within these areas. Alternative 5 would prohibit use of 38 miles of motorized trail un-authorized for motorized use within these areas or about 70 percent of the 54 miles of motorized trail un-authorized for motorized use. Implementation of Alternative 5 has more miles of motorized trail and more risk of weed introduction and spread within large geographic areas. The significance of these impacts is hard to quantify. However, the risk is believed to be a long term risk (over five years) since motorized vehicle use of motorized trails un-authorized for motorized use is currently considered low to moderate.

Alternatives 2, 6 and 7: Implementation of Alternatives 2, 6 and 7 have more risk of negative impacts to native plant diversity and native plant community fragmentation caused by weed introduction and spread than Alternatives 3 and 4, but not as much as Alternatives 1 and 5. Alternative 2 adds 9 miles, Alternative 6 adds 8 miles, and Alternative 7 adds seven miles, which is 17 to 13 percent of the miles of motorized trail un-authorized for motorized use within these areas. Conversely, Alternative 2 would prohibit use of about 45 miles of motorized trail un-authorized for motorized use or about 83 percent; Alternative 6 would prohibit use of 46 miles or about 85 percent, Alternative 7 would prohibit use of about 47 miles or about 87 percent.

Alternatives 3 and 4: Implementation of Alternatives 3 and 4 have the least risk of negative impacts to native plant biodiversity and fragmentation of native plant communities within roadless areas through introduction and spread of weeds. Alternative 3 and 4 do not propose additions to the NFTS within inventoried roadless areas. Alternatives 3 and 4 do not allow motorized vehicle use of motorized trail un-authorized for motorized use located within roadless areas. Implementation of Alternatives 3 and 4 will benefit native plants (if they occur there)/native plant diversity/native plant community connectivity by reducing the risk of weed introduction and spread by motorized vehicles.

Recommendations

The following recommendations were made to help prevent weed introduction and/or spread during reconstruction and maintenance and are now considered part of the project proposal:

- Use only certified-weed free plant materials for erosion control.
- Wash all equipment before it comes into the project area if it is coming from a weed-infested area.
- Continue cooperative efforts – including weed identification education.
- Work with motorized vehicle users to identify weeds and assist in weed eradication.
- Monitor motorized trails annually so weed occurrences can be detected and treated while they are small in size.

Project Files

The following information was used to develop this weed risk assessment. This information can be located in the project files:

- References
- Maps of soil and vegetative conditions
- TNF weed occurrence records
- TNF survey records
- TNF GIS weed layer

Appendix N: Watchlist Plant and Plant Community Report

Introduction

The National Forest Management Act (NFMA) directs that a diversity of plant species be provided as consistent with overall multiple-use goals. NFMA regulations also direct the Forest Service (FS) to preserve and enhance the diversity of plant communities, including native and desirable naturalized plant plants such that diversity mimics what might be expected under natural conditions, where appropriate and to the extent practicable (SNFPA, 2001, Chapter 3, page 1).

Biological diversity can be viewed as the representation of the variation in living organisms and the physical and biological complexes in which they occur (Luce et al. 2001). Diversity also includes within-species variation as represented by genes, distinct life histories, life stages, or even behavioral types, as well as the structural and functional characteristics of whole communities (Franklin 1993 in Luce et al. 2001). Representation of diverse environments is important. Since natural disturbances such as wildfires will alter habitats whether humans manage them or not, all habitats are vulnerable to change. Therefore, some redundancy of diverse habitat representation is important.

Plants/plant communities must be viable if they are to be preserved or enhanced. The Committee of Scientists (1999) defined viability as: “A viable plant is defined as consisting of self-sustaining populations that are well distributed throughout the plant’s range. Self-sustaining populations are those that are sufficiently abundant and have sufficient genetic diversity to display the array of life-history strategies and forms that will provide for their persistence and adaptability over time.” The capacity for a plant to persist and evolve over time as they adapt to environmental conditions cannot be directly measured. In this report, this capacity is inferred from habitat quality, abundance, and distribution. The purpose of this review is to determine whether the proposed project would adversely affect the ability of any of the plants or plant communities listed in Table N-1 to persist over time.

Potential habitat for TNF watchlist plants and communities was identified within using aerial photos, vegetation, soil, and elevation maps. Descriptions of the procedure used to conduct the potential habitat search are located at the Supervisor’s Office in the TNF Sensitive Plant Program Standards and Guidelines (2003 with updates). Table N-1 provides a list of all of the watchlist plants known or suspected to occur on the TNF and watchlist plant communities that are being tracked. For the effects of project implementation related to sensitive plants, please refer to the plant biological evaluation for this project.

New information about each of the watchlist plants and plant communities evaluated in this document is shared routinely among National Forest (NF) botanists within a particular plants’ range. This information sharing is done via phone, e-mail, at training sessions and workshops, etc. In addition, the TNF works cooperatively (ongoing basis) with the California Department of Fish and Game in development of the Natural Diversity Database, and with the California Native Plants (CNPS) to gather information about rare plants. The TNF rare plant program document provides a more detailed summary of what is known about each of the watchlist plants and plant communities.

Table N-1 also provides the CNPS listing for each of the watchlist plants. This CNPS listing provides an indication of rarity as per definition. CNPS list 1B plants are considered rare or endangered in California and elsewhere. CNPS list 2 plants are considered rare, threatened, or endangered in California but more common elsewhere. CNPS list 3 plants are those that need more information. CNPS 4 plants are those plants of limited distribution.

Watchlist plants/plant communities do not meet all of the criteria to be included on the Regional Forester's Sensitive List, but are of sufficient concern that they are considered in the NEPA planning process. They include plant that are locally rare (as opposed to declining throughout their range), are of public concern, occur as disjunct populations, are newly described taxa, or are lacking sufficient information on population size, threats, trend or distribution.

Table N-1. Tahoe National Forest watchlist plants and plant communities

Species/Community	CNPS List*	Habitat
Allium sanbornii var. *congdonii*	4	1,000-5,000 feet, serpentine soils
Allium sanbornii var. *sanbornii*	4	1,000-5,000 feet, serpentine soils
Androsace occidentalis var. *simplex*	2	About 5,500 feet, moist areas
Asplenium trichomanes-ramosum	2	Below 8,000 feet, limestone crevices
Chlorgalum grandiflorum	1B	900-2,000 feet, serpentine soils
Claytonia megarhiza	2	Above 8,000 feet, talus/rock crevices
Darlingtonia californica	4	Below 7,000 feet, fens, wet areas
Drosera anglica	2	Below 7,000 feet, fens, wet areas
Drosera rotundifolia	None	Below 8,000 feet, fens, wet areas
Erigeron petrophyllus var. *sierrensis*	4	900-5,700 feet, serpentine/rocky soils
Juncus marginatus var. *marginatus*	2	Below 3,000 feet, wet areas
Lilium humboldtii ssp. *humboldtii*	4	1,500-3,500 feet, forest
Meesia longiseta	None	All elevations, fens/peatlands/wet areas
Mimulus lacinatus	4	Above 3,000 feet, seeps in granite
Perideridia bacigalupi	4	1,700-3,500 feet, serpentine
Potamogeton filiformis	2	1,000-7,000 feet, lakes and ponds
Rhynchospora alba	2	Below 6,600 feet, wet places
Rhynchospora capitellata	2	Below 6,600 feet, wet places
Scutellaria galericulata	2	4,000-7,000 feet, streambanks
Sphagnum plant (*Sphagnum strictum* is a CNPS list 2)	None	All elevations, fens/ peatlands/wet areas
Tonestus eximius	4	8,000-10,000 feet, granitic areas
Utricularia minor	4	Above 1,500 feet, shallow water
Veronica cusickii	4	Above 6,500 feet, moist soils
Special Aquatic Features	None	All elevations on the TNF, wet areas
Aspen Groves	None	Above 5,500 feet, moist areas

*California Native Plant Society's Inventory of rare and endangered plants of California, sixth edition, 2001

Description of the Alternatives

Seven alternatives are analyzed in detail. Refer to Chapter 2 of the DEIS for a complete description of the alternatives. Chapter 2 of the DEIS is included in this report by reference.

Existing Environment (plant communities and habitats)

Introduction: The following information summarizes the types of plant communities on the TNF at a large landscape scale. The type of motorized vehicle use that occurs on the TNF is also summarized. This information is provided to paint a picture of the existing environment for watchlist plants and plant communities as pertains to the existing motorized vehicle use. This information also provides a background for the analysis of effects.

Summary of the existing condition of NFTS and motorized trails un-authorized for motorized use: Many of the existing NFTS motorized vehicle roads and trails were pioneered by users. Some NFTS motorized roads and trails started out as mining trails made by pack animals, or were skid trails formed during timber harvest. Some NFTS motorized roads and trails were designed and developed by the TNF as management level 1 and 2 roads, and were constructed to minimize tread loss and sustain long-term use. In general, motorized trails un-authorized for motorized use do not contain water control designs such as rolling dips. Some have erosion problems. Some NFTS and motorized trails un-authorized for motorized use roads and/or trails are located in areas where they are causing damage to watchlist plants/plant communities and other resources. Refer to Tables N-7 and N-8.

Motorized trails un-authorized for motorized use have been proposed for addition to the NFTS on all districts within a variety of plant communities. Table N-2 displays the watchlist plants and plant communities known to be impacted by motorized vehicles through use of NFTS roads and trails. Some of the proposed motorized trails un-authorized for motorized use are currently revegetating - sections of the proposed trail no longer resemble a road or trail. Some have been on-the-ground for over 50 years such as an old mining trail that has become a motorcycle trail. Some were more recently created by motorized vehicle users who flagged in areas and constructed the road or trail on their own. Some proposed motorized trails un-authorized for motorized use are drivable by passenger vehicles, and some can only be used by specialized 4-wheel drive vehicles and/or motorcycles.

Table N-2. Watchlist plants and plant communities known to be impacted by motorized vehicle use on NFTS roads and/or trails

Road/trail/area	Impact/comment
0019-024	The NFTS road and the connected motorized trail un-authorized for motorized use go through a wetland.
Undetermined	The road goes through an occurrence of the watchlist plant - *Rhynchospora capitellata*.
0301-006 - Cornish House	The road goes through a fen and an occurrence of the watchlist plant *Drosera rotundifolia*.
0401-002	The road goes through a fen and an occurrence of the watchlist plant *Drosera rotundifolia*.
11E67	The NFTS motorized trail passes through a fen/wetland with the watchlist plant *Sphagnum* moss.
12E68 – Summit Fen	The NFTS road and trail are adjacent to a fen/wetland complex with the watchlist plants – *Drosera rotundifolia* and *Sphagnum* moss.

Road/trail/area	Impact/comment
11E70	A portion of the NFTS motorized trail passes through a wet meadow.
11E74 and/or 11E75	A portion of the NFTS motorized trail passes through a wetland/wet meadow and is draining Hawley meadow.
Portion of 0050-008	This section of the NFTS road has been decommissioned twice to reduce impacts to fens in Murphy Flat area. Motorized vehicle use continues.
0050-012	NFTS road and connected motorized trail un-authorized for motorized use go through wetlands with *Darlingtonia californica* and *Drosera rotundifolia*.
0050-012	NFTS road and connected motorized trail un-authorized for motorized use go through a fen with *Darlingtonia californica* and *Drosera rotundifolia*.
0050-012-02	NFTS road goes through fen/wetlands with *Sphagnum* moss – Old Condon Mill area.
Henness Pass	The State/County/non-forest road is adjacent to a peatland in section 10.
0098-003	NFTS road goes through a fen/wetland with *Drosera rotundifolia* and *Darlingtonia californica*.
0098-004	NFS road goes through a fen/wetland with *Drosera rotundifolia* and *Darlingtonia californica*.
0637-004	The county road and connected motorized trail un-authorized for motorized use are adjacent to 2 occurrences of the watchlist plant – *Allium sanbornii* variety *sanbornii.*

Watchlist plants and plant communities known to be impacted by motorized vehicle use: As previously mentioned, Table N-2 displays the watchlist plants and plant communities on the TNF that are known to be impacted by motorized vehicle use. Known impacts are considered direct, indirect and cumulative. Since surveys of all NFTS motorized roads and trails and motorized trails un-authorized for motorized use are not complete, the list displayed in Table N-2 is not comprehensive.

In general, motorized vehicle use in the areas identified in Table N-2 is known to have injured or killed watchlist plants, undercut their root systems, increased erosion of soil within the habitat, changed the amount and flow of water within the habitat, and introduced weeds. In addition, in some cases, motorized vehicle use near streams/lakes/rivers has been known to cause at least short term reductions in water quality by gasoline and/or motor oil entering the soil and water from water washing off engine fluids. All of the as yet unsurveyed motorized trails un-authorized for motorized use have potential habitat for watchlist plants and plant communities. Table N-3 displays the motorized trails un-authorized for motorized use that have been surveyed. None of the TNF watchlist plants or plant communities is dependent on motorized vehicle disturbance for their viability.

General description of the plant communities on the TNF: Several different classification systems have been developed to define and characterize vegetative patterns. These classification systems are generally based on three plant community characteristics: composition, structure and function. In this analysis, the TNF landscape is described in two geographic subdivisions (Miles and Goudey 1997): Sierra Nevada Foothills Section (M261F) and Sierra Nevada Section (M261E).

Sierra Nevada Foothills Section: This section is located in the western portion of the TNF as a narrow belt dividing the Great Central Valley section and the Sierra Nevada section. The climate is considered Mediterranean, with dry, hot summers, and wet, cool winters. Average annual precipitation ranges from 8 inches in the south to 40 inches in the north falling primarily as rain. The average annual temperature ranges from 45°F to 64°F. This section consists of sedimentary, granitic, volcanic and ultramafic rocks formed during the Mesozoic Era. Principal land forms include river canyons, lava-

capped mesas and mountain slopes formed by streams. The elevation ranges from 200 to 5,000 feet. Soils are typically well drained. Predominant potential natural vegetation includes the following vegetation alliances: blue oak, needle grasslands, mixed chaparral, foothill pine, and valley oak. Dominant vegetation in riparian plant communities includes various willow, Fremont cottonwood, and white alder.

Table N-3. Motorized trails un-authorized for motorized use with completed surveys to date

Motorized trail	Miles surveyed	Acres surveyed
ARM-2	.5	30
ARM-5	.8	16
ARM-7	.8	8
SV-004	.2	2
SV-005	.6	6
SV-007	.5	6
SV-P5	.4	2
SV-P6	.2	5
SV-P7 e and w	1.4	12
SV-P8	.3	2
SV-P11	1.0	6
SV-P12	.6	86
SV-P13	.9	6
SV-P14 and 14a	.7	5
SV-P15	1.1	25
SV-P18	.6	6
TKN-003	.4	3
TKN-J2	.7	9
TKN-J3 and J3n	1.6	15
TKN-J4	1	15
TKN-J5	1.4	15
TKN-J6	.1	1
TKN-J9	1.7	49
TKN-J11	.9	6
TKN-J12	.7	3
TKN-J13	1.6	6
TKN-M1	3.6	43
TKN-M2	3.4	42
TKN-Q1	.9	6
TKS-11	.9	6
TKS-M9	3	20

Motorized trail	Miles surveyed	Acres surveyed
Prosser	.5	5
YRN-001	.1	10
YRN-004	.2	1
YRN-005	.5	6
YRN-007	.8	18
YRN-008	.3	3
YRN-1	1.8	3
YRN-2	1.4	3
YRN-4	.6	12
YRN-5a, YRN-5c	.3	2
YRN-11	.2	6
YRN-509	.5	3
YRN-A1 - Eureka Diggings	1.7	60
YRN-M3b	2.7	30
YRM-M3	.3	6
YRM-M4	.5	3
YRS-003b	.3	1
YRS-B5	3.8	45
YRS-B7	.2	8
YRS-B10	.3	1
YRS-B12	.1	1
YRS-F1	.9	61
YRS-G3	.5	10
YRS-SF5	4	30
YRS-SF6	1.4	36
YRS-066 and YRS-066w	1.6	18
Cal Ida (25-9-P, 25-9-3-P, 35-3-P, 35-4-P, 35-4-1-P, 39-9-P, 491-3-P, 491-3-1-P, 491-3-2-P)	5.8	50
Totals	over **62**	about **845**

Sierra Nevada Section: The rest of the TNF falls in the Sierra Nevada Section. In this section, the climate is typically montane Mediterranean, with dry, warm summers and wet, cold winters. Temperatures range from very cold to temperate and moisture is semi-arid to subhumid. Temperature and climate are

highly influenced by local topography, elevation, aspect and slope. Generally, precipitation is greatest at the mid to high elevations on the west side of the crest, occurring predominantly in the form of snow. The east side of the crest and lower westside elevations adjacent to the Foothill section receive the least rainfall of this section. Average annual precipitation ranges from 10 to 90 inches. Summer thunderstorms occur, but significant precipitation is usually localized. The average annual temperature is 42° F to 60°F. This section consists of granitic and ultramafic rocks, strongly metamorphosed sedimentary and volcanic rocks, and volcanic rocks. The principal landforms include river canyons, broad, gently sloping ridges; mountain slopes formed by glaciers and mountain slopes formed by streams. Elevation ranges from 1,000 to 14,495 feet. Some of the most productive forest soils in the Pacific southwest occur in this ecological section. Predominant potential natural vegetation includes: ponderosa pine, Jeffrey pine, big sagebrush, western juniper, mixed conifer, white fir, red fir, lodgepole pine, huckleberry oak, aspen, and mountain hemlock. Dominant vegetation in riparian plant communities includes various willow, black cottonwood, montane wetland shrub habitat, and mountain alder.

These geographic subdivisions contain a variety of plant communities. Four of those plant communities/ecosystems are considered limited on the TNF, i.e. aquatic/riparian, serpentine, older-forest, and oak woodland. Watchlist plants that are dependent on these plant communities are more at risk from implementation of the proposed project than those that are not as habitat specific.

The following discussion groups TNF watchlist plants by the types of plant community where they grow. This grouping provides a rough approximation of the type of plant community each plant needs and allows an evaluation of how the potential habitat is impacted by motorized vehicle use. A summary of potential impacts to those plant communities is also included. Currently, the TNF has roughly 717,900 acres of land that is considered open to vehicle motorized use. However, some of these acres can not be accessed by motorized vehicles due to terrain and vegetation density.

Aquatic/riparian plant communities: For this analysis, these plant communities include: wet meadows; seeps; fens; vernally wet areas; riparian vegetation along streams, lakes, and reservoirs; wet/moist rock cliffs; and springs. Watchlist plants and plant communities that occur in/are dependent on aquatic/riparian plant communities include: *Androsace occidentalis* var. *simplex, Darlingtonia californica, Drosera anglica, Drosera rotundifolia, Juncus marginatus* var. *marginatus, Meesia longiseta, Mimulus lacinatus, Potamogeton filiformis, Rhynchospora alba, Rhynchospora capitellata, Scutellaria galericulata, Sphagnum plant , Utricularia minor, Veronica cusickii,* special aquatic features and aspen groves.

Hydrologic alteration is considered one of the biggest threats to watchlist plants dependent on aquatic/riparian plant communities. Since many of the aquatic/riparian plant communities are very small in size and not mapped in the GIS database, the wet meadow and stream (buffered by 100 feet) GIS layers were used as a proxy to represent them. It is noted that many of these very small (in size) springs/seeps/peatlands/fens are not accurately represented on TNF GIS layers except where they occur along trails that have already been surveyed. According to TNF GIS records, about 867 miles of NFTS motorized roads and trails (NFS lands and private and other jurisdiction roads) are located within the Riparian Conservation Areas (RCAs) for aquatic/riparian plant communities (within 150 feet of intermittent streams and 300 feet of perennial streams). For purposes of this analysis, impacts to watchlist

plants and plant communities could occur if they are located within 100 feet (generally indirect impacts such as dust) of an occurrence or 100 feet of an unsurveyed aquatic/riparian plant community (NFS lands). About 345 miles of NFTS roads and trails (NFS lands and private and other jurisdiction roads) within 100 feet of perennial and intermittent water sources, and/or 100 feet of wet meadows on the TNF. GIS analysis indicates that the TNF has about 2,787 miles or about 12 percent of NFTS motorized roads and trails are located within 100 feet of riparian vegetation.

The condition of NFTS motorized roads and trails vary. Some appear stable with no obvious erosion problems. Some show extensive damage to aquatic/riparian plant communities along portions of the road or trail. For example, along the Fordyce and Rubicon NFTS motorized roads there are several areas of wet soil that have been compacted by motorized vehicle use to depths of up to 4 feet deep. In some areas these damaged wetland areas have been closed with logs and slash to keep vehicles out. However, these areas continue to be mud holes with compacted soils that lack vegetation. These mud holes will continue to erode during peak flows through the area unless other restoration measures are implemented. The significance of this erosion is unknown since the mud holes are not necessarily hydrologically connected (on the surface) to streams. However, where these conditions are noted, they are identified as restoration and rehabilitation needs.

Several motorized trails un-authorized for motorized use have portions located within RCAs and have water crossings. According to soil and water surveys (refer to section 3.02[1]), 33 percent of the motorized trails un-authorized for motorized use have stream crossings. The condition of these crossings and the RCAs varies. Of the 37 crossings described in section 3.02, 46 percent were found to have acceptable resource impacts (resource impacts refers to soil and water resources). Forty nine percent of the 37 crossings were found to be contributing some level of sediment to the adjacent stream. About 5 percent of the 37 crossings had failed culverts and were in need of major repair.

Watchlist plants dependent on aquatic/riparian plant communities benefit most when the health of the aquatic/riparian plant community is maintained or improved. Motorized vehicle use negatively impacts these plant communities by changing the pattern of water flow, reducing vegetative cover, compacting soil, increasing erosion, depositing petroleum products thereby reducing water quality, and introducing invasive non-native plants (weeds). The significance of these impacts varies. Motorized trails un-authorized for motorized use with the most perennial and intermittent stream crossings have a greater risk of negatively impacting aquatic/riparian plant communities associated with those streams through negative impacts to soil, water, and vegetation. In addition, motorized vehicle use within special aquatic features (such as fens, wet meadows, etc.) is considered significant if significant amounts of vegetation are lost due to that use.

Compaction of soils and loss of vegetation in special aquatic features alters surface and subsurface flow patterns and can result in areas of bare soil. In fens, compaction of soils and loss of vegetation can result in areas of bare peat. These areas of exposed peat will in turn dry out which can lead to a loss of peat. Damage from wheel tracks can also weaken or destroy the rhizomatous root network of clonal peat-forming plants. Bare ground exposes organic soils to the atmosphere allowing their decomposition.

[1] The number of crossings displayed in section 3.02 (Soils and Watershed Resources) does not match the number of crossings in Appendix N because section 3.02 displays native surface roads only.

Functioning fens store carbon. Fens with bare ground that exceeds 20 percent of the total area may be losing peat, have a negative carbon balance, and could be degraded or lost (Cooper et al. 2004). Current research shows that maintaining and/or improving the hydrology is essential to fen health. Loss of moisture to a fen plant community can cause the plants that make up those plant communities to die, creating bare soils. Many of the plants that make up fen biodiversity are sensitive to minor changes in water chemistry and hydrology (Bursik and Moseley 1992 in Dillingham 2005).

Peat-forming wetlands provide important benefits in a watershed such as improving water quality and providing habitat for unique plant communities (http://www.epa.gov/owow/wetlands/types/fen - accessed 3/2/2006). In the United States, most peatlands have experienced a decline in acreage at a rate of about eight percent from 1950 to 1970 (mostly from mining and draining for cropland, fuel and fertilizer) (ibid). Because of the large historical loss of this type of ecosystem, remaining fens are considered rare, and it is crucial to protect them (ibid).

Darlingtonia californica, *Drosera rotundifolia*, and *Sphagnum* moss species are all fen dependent plants that are currently being impacted by motorized vehicle use in Summit and Pat Yore Flat fens. Damage from motorized vehicle use has altered surface and subsurface flow patterns, resulted in areas of bare peat and has created bare soil. This cross country use has contributed to the cumulative impacts that fen and fen dependent plants are experiencing.

Some native riparian vegetation is adept at recovering from disturbance such as motorized vehicle use as long as the soil is healthy (healthy soil is not compacted or lost through erosion) and the hydrology of the disturbed area is not severely modified. However, each riparian site is different – for example, each stream has a unique combination of channel morphology, streamside vegetation, hydrology, geology, and soils. Therefore the recovery rates of riparian vegetation will vary. Motorized trails un-authorized for motorized use that are located adjacent to streams and groundwater discharge areas (seeps and springs) will be susceptible to excessive wetness and periodic flooding (Leung and Marion 1996) and may continue to erode even after the motorized use is removed. The presence of weeds indicates a degrading ecosystem (Thompson et al 1998). Motorized trails with extensive weed infestation may not recover vegetatively – without restoration project implementation.

Light use: If the motorized vehicle disturbance was light (bare soil was not created/is limited, the motorized trail is already revegetating, and/or streambanks and floodplains were not significantly altered), vegetative recovery will occur rapidly (1 to 2 years based on personal observations) since the roots of the riparian vegetation will still be intact. Native riparian tree and shrub species have deep rooted, soil binding root systems. If native tree and shrub root systems are intact, plants such as white or mountain alder (*Alnus rhombifolia* and *A. tenuifolia*) will sprout from the root crown and grow throughout the first growing season after the disturbance. Native rhizomatous riparian plants such as sedges (*Carex* species) will also continue to grow and provide soil cover if their root systems have not been significantly disturbed.

Heavy use: Heavily used riparian areas will have reduced infiltration due to soil compaction, and subsequent surface runoff; reduced and/or eliminated vegetative cover; and the streams and floodplains may have been physically modified. If restoration actions are not taken, erosion may continue and worsen dependent on many factors such as storm and high peak runoff events. In the case of riparian vegetation

associated with streams, where a channel is beginning a cycle of erosion, native riparian vegetation seed sources may be absent, the channel gradients may be steep and recovery may require decades or longer (Elmore and Beschta 1987). These areas may not recover without restoration efforts and would be high priority restoration project areas.

Riparian vegetation associated with meadows can heal when remedial treatments reverse the downward trend in the following indicators (Zeedyk 1996):

- Incised channel with active headward erosion
- Eroding soil surface marked by sheet, rill or gully erosion, lowered water table and receding capillary zone
- Surface drying with loss of hydric soils
- Declining population of wetland plants
- Increasing numbers of upland plant
- Disappearance of wetland obligate fauna

Restoration of wet meadow areas begins when available soil moisture increases and the duration of moisture availability is extended enough to meet the minimum seasonal growth requirements of locally adapted wetland plants, especially sedges and rushes (Zeedyk 1996). Allowing motorized roads and trails located within wet meadows to heal themselves is seldom a responsible decision with regard to restoring wetland integrity (Zeedyk 1996). The road or trail surface must be reshaped to allow overland runoff to cross over rather than be captured by the road or trail. Simple revegetation is seldom sufficient to assure meadow restoration – structural work is usually required (ibid). This is especially true where the road or trail has incised below the meadow surface.

Riparian vegetation recovery in disturbed areas located in fen/spring/seep areas would be similar to what is described above under light and/or heavy use. However, if fen plant communities are heavily disturbed and the hydrology altered, the fen plant community may be converted to a wet meadow plant community.

Intermediate use: In areas that have received intermediate use, the existing condition of riparian vegetation impacted by motorized vehicles falls somewhere between being able to recover on its own, and needing extensive restoration work. Riparian vegetation located within 30 feet of a motorized trail un-authorized for motorized use will need site specific evaluation to determine what is needed for revegetation, and/or monitoring to determine whether vegetative recovery is occurring. The greater soil moisture in riparian plant communities magnifies the amount of plant and soil damage (Yorks et al 1997).

Aquatic/riparian plant communities have been significantly reduced in size and amount by past management. Riparian plant communities make up only about 1 percent of the landscape in the United States (Knopf 1988 in Bleich et al. 2005). Some reports estimate that over 90 percent of aquatic/riparian plant communities have been lost within the state of California. They have significantly greater biodiversity than adjacent uplands (Kondolf et al. 1996), providing habitat for both aquatic and terrestrial plants including those that are rare or endemic.

Serpentine/copper/heavy metal plant communities: These plant communities include rocks and the soils derived from serpentine and areas of rock outcrop with copper and/or heavy metals. Serpentine rocks have iron magnesium silicate and impurities of chromium, nickel, and other toxic elements. As these

rocks weather, soils develop that are high in magnesium and iron, low in calcium, and toxic to plants that are not specifically adapted to them. Therefore, they contain unique plant communities. Watchlist plants that occur on serpentine soils include: *Allium sanbornii* var. *congdonii*, *Allium sanbornii* var. *sanbornii*, *Chlorogalum grandiflorum*, and *Perideridia bacigalupi*. Many serpentine floras in California contain a high degree of endemism (Brooks 1987). TNF serpentines occur primarily along the lower western slopes of the forest (Kruckeberg 1984).

Motorized vehicle use impacts these plant communities by reducing vegetative cover, creating disturbed soils that are vulnerable to increased erosion, and by introducing weeds. Many serpentine plant communities are open terrain lacking vegetation (Kruckeberg 1984). Motorized vehicle use impacts these plant communities by reducing vegetative cover, creating disturbed soils that are vulnerable to increased erosion, and by introducing weeds. About 1,660 acres of serpentine soils are currently impacted by NFTS and motorized trails un-authorized for motorized use roads and trails (areas within 100 feet of roads and trails). This is about 12 percent of the total 14,412 acres that occur on the TNF. The significance of this percentage is unknown. These plant communities do not heal from disturbance very readily. Areas of copper/heavy metal are usually small in size, and are not mapped in the forest GIS system. Therefore, in this analysis, they are represented by serpentine plant communities.

Older forest plant communities: The TNF watchlist does not currently contain any watchlist plant and/or plant communities that are dependent on older forest plant communities. Refer to the plant biological evaluation (Appendix J) for this project for more information about older forest plant communities on the TNF.

Oak woodland plant communities: California's oak woodlands are largely privately owned and are estimated to cover about 10 million acres (Ewing et al. in Bartolome and Standiford 1992). They provide shelter and food for wildlife, wood and fuel for humans, and feed for livestock (Jimerson and Carothers 2002). Oak woodlands contain some of the highest plant diversity found in California native plant communities (Jimerson and others in Jimerson and Carothers 2002). The TNF manages about 13,886 acres of oak woodland. Oak woodlands on TNF system lands are generally at or below 3500 feet. These plant communities have experienced extensive historic disturbance through harvest of the oaks for fuelwood cutting, mining timbers, domestic and commercial construction, and widespread and heavy livestock grazing (ibid). No other ecosystem in the Sierra Nevada has experienced more human influence over a longer time period than the oak woodlands (Anderson in SNFPA 2001). Threats to oak woodlands across the State include: urbanization, conversion to agriculture, fragmentation, low rates of regeneration, competition from weeds, and sudden oak death. Motorized vehicles impact these plant communities on TNF lands by: introducing and spreading weeds, damaging native vegetation, increasing soil erosion, and fragmenting habitats. The TNF does not have watchlist plants that are entirely dependent on oak woodlands.

Forested edge/opening communities: Forests of all ages contain edges and openings. Plants dependent on edges and openings within forested plant communities are not considered habitat specific. Edges and openings are constantly being created as trees and other vegetation dies, and lost as vegetation grows into them. It is estimated that the TNF has about 543,300 acres of forested edge/opening plant communities. Watchlist plants with potential habitat within openings and in edge situations include:

Androsace occidentalis var. *simplex*, *Erigeron petrophyllus* var. *sierrensis*, and *Lilium humboldtii* ssp. *humboldtii*. Motorized vehicle use impacts these habitats by increasing the risk of weed introduction and spread, reducing plant cover, increasing erosion, reducing photosynthetic ability by covering vegetation with dust, changing water flow patterns, and compacting soil.

High elevation opening and rocky area communities: Some plants only grow in openings at high elevations (6,000 feet and above). Trees may be present in these areas but closed canopy situations do not usually exist. These plants generally grow in rocky openings and/or on rock outcrops and do not appear to be dependent on specific plant communities. It is estimated that the TNF has about 43,240 acres of high elevation opening and rocky area plant communities. Watchlist plants with potential habitat within these types of plant communities include: *Asplenium trichomanes-ramosum*, *Claytonia megarhiza*, and *Tonestus eximius*.

When motorized vehicle use occurs near or within these plant communities, the damage can be severe. Plants dependent on high elevation openings and rocky areas may not compete well with other vegetation. Therefore, weed introduction and/or spread can be a significant impact. These plant communities are already subject to natural erosion and have a short growing period. Any disturbance increases erosion and causes significant impacts to the soil and water components of the plant community.

Watchlist plant habitats and weeds: Motorized vehicle use is known to increase weed introduction by carrying weed seed and plant parts from one site to another. Table N-4 displays the motorized trails with weed occurrences known to occur within 100 feet of some portion of the motorized trail (TNF weed occurrence records).

In general terms, the TNF is considered weed free with most weed occurrences located along State/County/Federal/NFTS roads. Refer to the weed risk assessment for this project that is located in Appendix M for more information about weeds. Weeds compete with native plants for nutrients and water and are known to cause the local displacement of native vegetation. Weed infestations can change disturbance regimes, increase soil erosion, cause a loss of soil carbon storage, and decrease productivity. The stability and ecological function of NFS lands depends on a diverse community of native plants (including watchlist plants) to provide resilience against drought, reduction to the risk of flooding, to minimize erosion, promote water infiltration and storage, and to provide wildlife and recreation values.

Table N-4. Known weed occurrences within 100 feet of proposed additions to the NFTS

Motorized trail ID	Weed occurrences known to occur within 100 feet of the motorized trail un-authorized for motorized use	Ecological impact rating (Cal IPC)
ARM-5	Large patches of cheatgrass are located adjacent to the trail	High
SV-P14	Musk thistle is within about 100 feet.	Moderate
TKN-J9	Wooly mullein and cheatgrass along the motorized trail	High (cheat grass) wooly mullein limited
TKN-J13	Musk thistle is adjacent to the motorized trail.	Moderate
TKN-M1	Cheatgrass is located in and adjacent to the motorized trail	High
TKN-M2	Patches of cheatgrass adjacent to the north end of the motorized trail	High
TKS-M9	Small amounts of bull thistle and orchard grass adjacent.	Moderate
YRM-M3	Scotch broom is adjacent	High

Motorized trail ID	Weed occurrences known to occur within 100 feet of the motorized trail un-authorized for motorized use	Ecological impact rating (Cal IPC)
YRM-M4	Scotch broom and cheatgrass	High
YRN-008	Scotch broom	High
YRN-509	Scotch and Spanish broom and cheatgrass	High
YRN-M3b	Klamath weed	Moderate
YRS-SF6	Bull thistle and cheatgrass	Moderate
35-4-P (Cal Ida)	Cheatgrass and tumble mustard are adjacent	High

The following provides watchlist plant/plant community specific information about each of the plants and/or plant communities on the TNF watchlist:

Sanborn's Onions (*Allium sanbornii* var. *congdonii* and *Allium sanbornii* var. *sanbornii***)**: These onions occur on serpentine outcrops in the foothills and lower slopes of the western Sierra Nevada between Shasta and Calaveras Counties at elevations between 800 and 4,500 feet. These onions are CNPS list-4 plants. Primary threats are from loss of habitat. An occurrence of *Allium sanbornii* var. *sanbornii* is currently being directly impacted by motorized trails un-authorized for motorized use vehicles off of the Washington Road and indirectly through runoff from a culvert that is associated with the Washington road.

Rock-jasmine (*Androsace occidentalis* var. *simplex***)**: This plant is known to occur in Placer County within the state of California, and in Arizona, New Mexico, Texas, Utah, and elsewhere. Only one occurrence has been documented in the state of California in the Emigrant Gap area of the TNF. This plant is known to grow in moist areas at elevations between 5,000 and 6,000 feet. It is a CNPS list-2 plant. It is found in upper montane coniferous forest, usually in mesic plant communities. Surveys to date have not located this plant along any motorized trail un-authorized for motorized use.

Green Spleenwort (*Asplenium trichomanes-ramosum***)**: This small fern is found in Alaska to Newfoundland, Eurasia, Vermont, Wyoming, and south through Oregon. However, there is one disjunct occurrence in the Sierra Buttes on the YRRD. It is a CNPS list-2 plant. This disjunct occurrence is growing in a cool, moist, shaded limestone crevice. It is the southernmost locality for the plant in North America. The known locations are isolated and few threats are anticipated. Potential habitat includes limestone crevices below 8,000 feet. Surveys to date have not located this plant or any limestone crevices along any motorized trail un-authorized for motorized use.

Red-Hills soaproot (*Chlorogalum grandiflorum***)**: This soaproot grows on serpentine slopes on open shrubby or wooded hills at elevations from 900 to 2,000 feet. It is a CNPS list-1B plant. It is found on the western slopes of the Sierra Nevada foothills from Tuolumne County north to Shasta County. Surveys to date have not located this plant along any motorized trail un-authorized for motorized use.

Fell-fields Claytonia (*Claytonia megarhiza***)**: This plant grows in subalpine gravels, talus and crevices at 8,000 feet and above. It is known form Alpine, Mono, Modoc, Mariposa, Nevada, and Tuolumne Counties and the state of Oregon. It is a CNPS list-2 plant. On the TNF, there are occurrences of this plant on the Sierraville Ranger District (RD), north of Mount Lola. Surveys to date have not located this plant along any motorized trail un-authorized for motorized use.

California Pitcher Plant (*Darlingtonia californica***)**: This plant is known from Butte, Del Norte, Nevada, Plumas, Shasta, Sierra, Siskiyou, Trinity, and Yuba Counties and the state of Oregon. It is found in fens, meadows and seeps. The elevational range for this plant on the TNF is below 6,000 feet. In other areas, it is known to grow at elevations above 7,000 feet. It is a CNPS list-4 plant. Horticultural collecting, mining, and hydrologic changes to the habitat are threats. Surveys to date have not located this plant along any proposed motorized trail un-authorized for motorized use. There are California pitcher plants in Pat Yore fen that have been damaged by cross country motorized vehicle use.

English *(Drosera anglica)* **and round-leaved (***Drosera rotundifolia***) sundews**: English sundew is known to occur in Lassen, Nevada, Plumas, Shasta, Sierra, and Siskiyou Counties in California. It also grows in Oregon, Washington, and elsewhere. Round-leaved sundew is known to occur in many counties in California. It also grows in Oregon, Washington, and elsewhere. Both sundews are found in fens, meadows and seeps. Surveys to date have not located this plant along any proposed additions to the NFTS. However, there are *Drosera rotundifolia* plants located in Summit fen that have been directly and indirectly impacted by cross country motorized vehicle use and they are being indirectly impacted by use of the NFTS road - Summit road.

Northern Sierra or fleabane daisy (*Erigeron petrophilus* var. *sierrensis***)**: This daisy is known to occur in Butte, El Dorado, Nevada, Plumas, Sierra, and Yuba Counties in California. There are no known occurrences on TNF system lands. It is found in cismontane woodland, lower montane coniferous forest, and upper montane coniferous forest/sometimes serpentinite at elevations from 900 to 5,700 feet. It is a CNPS list-4 plant. Surveys to date have not located this plant along any proposed motorized trail un-authorized for motorized use.

Red-anthered Rush *(Juncus marginatus* var. *marginatus***)**: This rush is known to grow in Nevada County in California and in Arizona and elsewhere. It grows in marshes and swamps below 3,300 feet. It is a CNPS list-2 plant. It is a perennial rhizomatous herb that blooms in July. Surveys to date have not located this plant along any proposed motorized trail un-authorized for motorized use.

Humboldt's Tiger Lily (*Lilium humboldtii* ssp. *humboldtii*): This lily is known to grow from Butte to Fresno Counties. It is a CNPS list-4 plant. It is found at the forest edge and in openings from 1,500 to 3,500 feet. The major threats are loss of habitat. This plant is known to occur along several system, County, and State roads in the lower elevations of the TNF.

Hump moss (*Meesia longiseta*): The range of occurrence for this moss is from Greenland to Alaska and south to Canada and the northeastern and western portions of the United States (Nature Serve 2008). It has not been found on NFS lands in California, but two collections have been made in Yosemite National Park in Tuolumne County (Norris and Shevock 2004). The elevational range is unknown. Trend is unknown. It occurs in the fen and riparian forest guilds. Hydrological processes are important to maintain these riparian habitats. Threats include even small-scale disturbances caused by water diversions, roads, trails, channels, ditches, cattle trails, and other management actions that change the hydrology (Woods 2001, Cooper et al 1998, Weixelman 2007).

Cut-leaf Monkey flower (*Mimulus lacinatus***)**: This monkey flower is known from Amador, Butte, Fresno, Madera, Mariposa, Plumas, Tulare and Tuolumne Counties. It grows in chaparral, lower montane coniferous forest, and upper montane coniferous forest in seeps on granite outcrops above 3,000 feet. It is

a CNPS list-4 plant. It is an annual that blooms April-July. Surveys to date have not located this plant along any of the proposed motorized trail un-authorized for motorized use.

Bacigalupi's yampah (*Perideridia bacigalupi***)**: This plant is known to occur from Butte to Tuolumne Counties. It is present in Nevada County in the McCourtney road area. This plant is found in chaparral, and in pine woodland, generally in serpentine soils at elevations between 1,700 and 3,500 feet. It is a CNPS list-4 plant. Surveys to date have not located this plant along any of the proposed motorized trail un-authorized for motorized use.

Slender-leaved Pondweed (*Potamogeton filiformis***)**: This pondweed is known from Contra Costa, Lassen, Merced, Mono, Santa Clara, and Sierra Counties and from other states. It is a CNPS list-2 plant. It is found in marshes and swamps and assorted shallow freshwater from 1,000 to 7,000 feet. It is a perennial, aquatic, rhizomatous herb that blooms in May-July. Surveys to date have not located this plant along any of the proposed motorized trail un-authorized for motorized use.

White beaked-rush (*Rhynchospora alba***)**: This grass-like plant is found in Del Norte, Inyo, Lassen, Mendocino, Mariposa, Nevada, Plumas, Sonoma, and Trinity Counties and in the state of Oregon and elsewhere. It is found in bogs, fens, wet meadows, seeps, marshes, and freshwater swamps below 6,600 feet. It is a CNPS list-2 plant. It is a perennial herb that is rhizomatous. It blooms July – August. Surveys to date have not located this plant along any of the proposed motorized trail un-authorized for motorized use.

Brownish beaked-rush (*Rhynchospora capitellata***)**: This grass-like plant is found in Butte, Mariposa, Nevada, Plumas, Shasta, Sonoma, Tehama, and Trinity Counties and in the state of Oregon and elsewhere. It is found in lower montane coniferous forest, in meadows, seeps, marshes, swamps, and upper montane coniferous forest below 6,600 feet in elevation. It is not listed by CNPS. It is a perennial that blooms July – August. Surveys to date have not located this plant along any of the proposed motorized trail un-authorized for motorized use.

Marsh Skullcap (*Scutellaria galericulata***)**: This plant is known to occur in El Dorado, Lassen, Modoc, Nevada, Placer, Plumas, Shasta, San Joaquin, and Siskiyou Counties and in the state of Oregon and elsewhere. It is found in lower montane coniferous forest, in wet meadows, seeps, marshes and swamps from 4,000 to 7,000 feet. It is a CNPS list-2 plant. It is a perennial herb that is rhizomatous. Surveys to date have not located this plant along any of the proposed motorized trails un-authorized for motorized use.

Peat moss (*Sphagnum* species**)**: On the TNF *Sphagnum* moss is known to grow in fens/peatlands. This moss is found on the fringes of those peatlands under riparian shrubs. There are several species of *Sphagnum* moss on the TNF. *Sphagnum* moss is known to occur in several fens that are located adjacent to NFTS roads/trails such as Summit and Pat Yore Flat fens.

Tahoe tonestus (*Tonestus eximius***)**: This plant is known to occur in Alpine, El Dorado, and Inyo Counties and the state of Nevada. It grows in granitic areas in subalpine coniferous forest between 8,000 and 10,000 feet. It is a CNPS list-4 plant. Surveys to date have not located this plant along any of the proposed motorized trails un-authorized for motorized use.

Lesser Bladderwort (*Utricularia minor***)**: This carnivorous plant is known to grow in Butte, El Dorado, Fresno, Lassen, Modoc, Nevada, Plumas, Shasta, Sierra, Tehama, Tulare, and Tuolumne

Counties and in the State of Arizona and elsewhere. It is found in bogs, fens, marshes, swamps, and in shallow freshwater communities above 1,500 feet. It is a CNPS list-4 plant. It is a perennial herb that is aquatic. It is endangered in Oregon. Surveys to date have not located this plant along any of the proposed motorized trails un-authorized for motorized use.

Cusick's Speedwell (*Veronica cusickii***)**: This perennial speedwell is known to grow in scattered localities in the Sierra Nevada and Klamath Mountains of California. It is found in gravelly soil in wet, high mountain meadows and forest openings at elevations of 7,000 to 9,700 feet. It is often found near areas of steep rocky terrain such as ski slopes. It is a CNPS list-4 plant. Surveys to date have not located this plant along any of the proposed motorized trails un-authorized for motorized use.

Special aquatic features: Special aquatic features (SAF) as identified in the SNFPA (2001), are small, irregularly distributed aquatic and riparian habitats including fens and peatlands. These environments have significantly greater biodiversity than adjacent uplands (Kondolf et al. 1996), providing habitat for both aquatic and terrestrial plant and animal species. Special aquatic habitats are also important for rare or endemic plant and animal species. Small, isolated aquatic habitats (e.g., fens, peatlands, springs, and seeps) have a high probability of containing rare or endemic invertebrate species (Erman 1996, Erman and Erman 1990).

Fens are wetlands that have at least 40 cm of organic soils in the upper 80 cm of the soil profile. This organic soil is commonly referred to as peat. Fens form where the rate of plant growth exceeds the rate of carbon decomposition of litter. Both saturated soils and cool temperatures slow decomposition to the point that productivity exceeds decomposition, resulting in an accumulation of organic matter (i.e. peat). Fens are considered uncommon plant communities. They form slowly (peat accumulates slowly, anywhere from 11 to 41 cm (4.3 to 16.2 inches) per thousand years) and are sensitive to disturbance. Surveys to date have located several seeps/springs/peatlands along proposed motorized trails un-authorized for motorized use.

Aspen (*Populus tremuloides***) communities**: Aspen plant communities have probably never covered large areas of the Sierra Nevada (Shepperd et al. 2006). Maintaining and restoring aspen communities are important because they have high biodiversity, second only to riparian areas. Aspen communities rarely reproduce from seed. The aspen clones found within the TNF may be thousands of years old and have reproduced in the past by vegetative regeneration. Aspen clones depend on disturbance to stimulate vegetative regeneration via root suckering and to reduce competition from conifers (Sheppard and Smith 1993). Aspen trees are not long-lived, living to about 200 years. Removal of competing vegetation reduces competition with aspen trees for light, water and nutrients. Removal of conifers (and other disturbances) also provides the possibility of root, stem, insect, and foliar damage to aspen – primarily from wounds to existing trees. This damage may not be apparent immediately. Decay is likely to increase with age from stem wounds (Hinds and Sheppard 1987). Damage to aspen trees could result in infections and subsequent mortality that might offset survival benefits from reduced competition for light, water, and nutrients.

Shepperd et al. (2006), report that recreation activities impact aspen in a variety of ways. Soil compaction from OHV use can alter soil properties. This occurs most commonly when numerous vehicle passes cause the stripping of small moisture-absorbing roots from large lateral roots. They also reported

that soil compaction within stands may increase runoff from storm events and lead to erosion and sedimentation of waterways. Motorized uses were reported to cause more impact than non-motorized uses and horses to cause more impact than hikers. They also reported that all of these impacts were increased when soils were saturated. In one study (Montana), 200 passes by a motorcycle removed twice as much vegetation as the same number of passes by a horse, and nine times as much vegetation as 200 hikers (Shepperd et al. 2006). Soil compaction impacts in this study did not diminish for up to 14 years (ibid).

Surveys to date have discovered that following motorized trails that are proposed for addition to the NFTS pass through aspen clones: TKN-M2, TKS-11, SV-005, SV-P8, and SV-P14.

Implementation of the Alternatives

This evaluation used presence of watchlist plants/plant communities detected in on-the-ground surveys and an analysis of unsurveyed potential habitat to determination effects to watchlist plants/plant communities. Since surveys of NFTS motorized roads and trails, and motorized trails un-authorized for motorized use are not complete, this analysis assumes that the plant is present within the identified potential habitat until surveys are complete. This may or may not be true. Mitigation measures specified in Appendix A (Road Cards) will be implemented in all of the action alternatives. These mitigation measures will provide benefits to watchlist plants. Part of the project description for all of the action alternatives is to mitigate serious and adverse erosion problems on motorized trails un-authorized for motorized use before they are available for use. Regardless of the alternative selected, watchlist plants/plant communities will continue to be negatively impacted by motorized vehicle use until erosion from motorized trails un-authorized for motorized use is reduced and/or eliminated. Surveys of about 62 miles of proposed NFTS additions showed that some have erosion problems along some portion of the motorized trail. Refer to the survey records located in the project files.

All of the action alternatives prohibit cross country travel and therefore have less risk of negative impacts to watchlist plants and plant communities. When motorized vehicle use is prohibited on motorized trails un-authorized for motorized use (as under the action alternatives), a number of things could happen to those motorized trails that could change the risk of negative impacts to watchlist plants. Some of the motorized trails un-authorized for motorized use may be actively closed by the TNF after conducting NEPA. This would benefit watchlist plants/plant communities because they would have reduced risk after the motorized trail un-authorized for motorized use was prohibited. Some of the motorized trails may be proposed for addition to the NFTS at a later date – after conducting NEPA. In this scenario, watchlist plants/plant communities would be avoided during reconstruction/maintenance, but would be at increased risk from dust and weed invasion. Some of the motorized trails un-authorized for motorized use may revegetate in the short term and will not be visible on the ground. Under this scenario some watchlist plants would benefit. Others that need openings would not benefit. Others may continue to be used for non-motorized recreation. Non-motorized recreational activities can also negatively impact watchlist plants through direct impacts to the plants and competition from invading weeds, but foot and horse travel are considered less impacting than motorized vehicle use.

Indicator Measures: The following general indicator measures were used to compare alternatives. These indicator measures were selected based on literature review of possible impacts to watchlist plants/plant communities, and native plant connectivity; and profession judgment.

1. Number of perennial and intermittent water crossings.
2. Proposed additions to the NFTS within 100 feet of unsurveyed potential habitat.
3. Watchlist plants/plant community within 30 feet of proposed additions to the NFTS (direct effects).
4. Watchlist plants/plant community within 100 feet of proposed additions to the NFTS (indirect effects).
5. Weed infestations within 100 feet of proposed addition to the NFTS.
6. Miles of proposed addition to the NFTS within inventoried roadless areas.

Elements of the proposal: In addition to the indicator measures, the alternatives are compared by plant community with a focus on the major parts of the proposal:

1. Prohibition of cross country travel (including prohibition of use of motorized trails un-authorized for motorized use).
2. Additions to the National Forest Transportation System (NFTS).
3. Cumulative effects including all of the above and the reasonably foreseeable.

Changes in class of vehicle and alternative differences due to implementation of wet weather restrictions are difficult to quantify from one alternative to the next. Therefore, these proposed actions are discussed in general terms for all of the alternatives.

List of Assumptions: This evaluation is also based on several assumptions to help analyze direct, indirect, and cumulative effects. These assumptions are listed below:

1. Impacts to watchlist plants/plant communities are assumed to be limited to 30 feet from the motorized trail (direct) and 100 feet from the motorized trail (indirect).
2. Watchlist plants/plant communities located within 100 feet of a proposed addition to the NFTS are (at least) indirectly impacted by motorized vehicle use - regardless of the alternative selected.
3. Watchlist plants/plant communities located within 30 feet of a proposed motorized trail additions to the NFTS may be directly impacted by motorized vehicle use regardless of the alternative selected.
4. Watchlist plants/plant communities occur within the identified potential habitat that has not been surveyed. Occurrence is assumed until surveys are completed.
5. Non-native plants (weeds) will continue to spread along and within surfaced and unsurfaced motorized trails un-authorized for motorized use.
6. Existing and newly proposed roads/trails/areas will have increased use which may increase impacts to watchlist plants and plant communities through production of dust, etc.
7. The projects identified in Table N-5 will be analyzed and implemented on TNF system lands within the next 5 to 10 years.
8. All vehicles will need to be assumed “equal.” Hence the impacts to watchlist plants/plant communities from a motorcycle are assumed equal to those impacts from a 4 wheel drive

vehicle. [The type of motorized vehicle is not a factor since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007)].

9. Volunteers can effectively maintain adopted trails over the long term.

Reasonably foreseeable actions: When past impacts and the impacts of implementing the various alternatives are added to the impacts of those actions identified in Table N-5, there is even more risk to watchlist plants/plant communities. In addition, over the long term, with continued disturbance, some of the native plant communities could be converted to other types of plant communities, such as conversion of fens/peatlands to wet meadows.

Table N-5. Reasonably foreseeable activities considered in cumulative effects analysis

Project	Description
Renew Pacific Bell's expired phone line easements and special use permits	Renew phone line permits, including removing abandoned poles and cables and possible burying and/or co-locating phone lines with power lines in some areas.
Gold Valley resource protection plan	Implement actions proposed to improve Gold Valley and reduce erosion from specific roads/trails.
Carvin aspen enhancement	Remove conifers to improve condition of an aspen clone.
Canyon Forest Health	Reduce fuels, thin forest stands, decommission roads.
Tahoe Truckee Sanitary Agency permit renewal	Issue a special use permit to the Tahoe Truckee Sanitary Agency to operate and maintain a sewage interceptor and export conduit pipeline on a strip of NFS lands – 3.73 miles long and 20 feet wide.
Sugarplum	Remove dead, dying, and hazard trees near improvements, thin forest stands.
Legacy Trail	Construct nonmotorized multiple use trail from private land in the town of Truckee to Glenshire subdivision.
Glenshire Drive re-alignment	Construct a portion of Glenshire Drive on NFS lands to make room for the repositioning of the railroad track.
Donner Summit PUD permit renewal	Renew/reissue a permit to Donner Summit PUD for operation/maintenance of the existing sewer treatment plant. Permit includes buildings on NFS lands which house PUD administrative offices and a fire station.
DMB Highlands Siller Ranch fire access road	Designate about 400 feet of a motorized trail un-authorized for motorized use as a special use road to be used by Siller Ranch for emergency access to a subdivision.
Truckee Donner PUD Alder Creek road powerline tie	Construct about 500 feet of distribution powerline to connect existing systems both east and west of Highway 89 north to reduce the risk of spot outages.
Yuba Pass hazard tree	Remove hazard trees along NFS roads and state highway 49.
Phoenix	Thin and reduce fuels on about 5,058 acres in areas formerly analyzed in the Euro and Checkmate Project EAs using HFQLG direction.
Montez	Thin and reduce fuels on about 180 acres using HFQLG direction.
Little Truckee River Trail	Construct about 1 miles of multiple use trail between highway 89 north and FS road #450-10-20 – connect to Upper Little Truckee River campground.
Kangaroo	Mechanically thin 44 acres, group select 47 acres, thin 7 acres of conifer in an aspen clone, construct ½ mile of temporary road.
Jackson Meadows hazard tree	Remove hazard trees from campgrounds, along NFS and county roads from Jackson Meadows Reservoir to Little Truckee Summit.
Dinkum	Thin 229 acres, group select 72 acres; remove conifers form 7 acres of aspen, construct ¾ mile of temporary roads.
Carman II watershed restoration	Implement watershed restoration activities
Brumby	Mechanically thin 530 acres, group select 30 acres, remove conifers for 3 acres of aspen, construct 1.3 miles of new permanent road, and about 1 mile

Project	Description
	of temporary road.
Mears	Thin, salvage and sanitize dead and dying trees
Last Chance	Thin and reduce fuels as a collaborative project – Sierra Nevada Adaptive management project.
East Fork	Thin and remove trees.
Casa Loma	Hand thin trees and brush to reduce fuels
Sierra Pacific power line permit	Re-issue a special use permit for all existing Sierra Pacific power lines.
PG&E distribution line permit	Renew the special use permit for existing lines and facilities
BKS grazing allotment management plans	Update the allotment management plans for the Boca, Kyburz, Sagehen, Sierra Crest and Summit grazing allotments.
Designate energy corridors on federal land in 11 western states.	In accordance with section 368 of the Energy Policy Act of 2005, "The Sec of Agriculture, Commerce, Defense, Energy and Interior, in consultation with FERC, States, tribal or local units of government will designate energy corridors on federal land.

General impacts of motorized vehicle use: This analysis includes information from more than a decade of plant/plant community monitoring, years of personal field observations, and the TNF database.

Direct impacts to watchlist plants and plant communities occur from use of NFTS motorized roads and trails, and use of motorized trails un-authorized for motorized use. The significance of the impacts is dependent on the location of the road or trail in relation to the watchlist plant or plant community, the amount of motorized vehicle use at the site of the occurrence, the season in which the use occurs, and the condition of the occurrence being impacted (species/community trend). In general terms, when watchlist plants are located immediately adjacent to a motorized road or trail they are at increased risk of adverse impacts. Known impacts include:

- Direct impacts to plants causing injury or death when plants are run over
- Indirect impacts to plants and plant communities from increased risk of weed introduction and spread
- Indirect impacts to plants and plant communities from changed hydrology – generally from below ground water interception by the motorized road or trail, but also from interception of overland flow by the wheel tracks, and/or channeling of water along the wheel tracks - dumping water and sediment into the adjacent plant community, and undercutting roots
- Indirect impacts to plants and plant communities from increased erosion - from wind, and the channeling of water carrying sediment when ground cover is reduced
- Indirect impacts from increased risk to pollinators (reduction in number of pollinators) when vegetation is reduced/eliminated and/or the pollinator is killed
- Indirect impacts from soil compaction that reduces seed germination and seedling survival, and soil infiltration of water
- Indirect impacts from loss of vegetative cover of associated plant species that may benefit or negatively impact the plants by the creation of bare soil and/or contribution to the impacts listed above
- Indirect impacts from possible loss of genetic variability due to habitat fragmentation

- Cumulative impacts to ecosystems/habitats – many of the watchlist plants are habitat specific and at least some of those habitats are fragile and do not recover readily from disturbance

Season of Use: In general terms, the season of use can benefit watchlist plants and plant communities but it is difficult to quantify those benefits. Motorized vehicle use no matter what the season provides a continuous source of weed seed introduction and also provides disturbed areas within and adjacent to the motorized trails un-authorized for motorized use. Lose of native vegetation due to season of use of the motorized vehicle has not been fully studied. However, weeds are known to be spread by motorized vehicle use regardless of the season of use. Native vegetation such as watchlist plants and plant communities are known to be physically damaged by motorized vehicle use regardless of the season of use. Season of use may or may not affect the rate of spread of weeds, how much native vegetation is killed or injured, and/or the creation of bare soil. Weed seed and plant parts can be introduced into new areas regardless of the time of year the motorized road or trail is used. Many weed seeds remain viable for long periods of time so they could be introduced along a motorized road or trail during the dry period of the year and germinate during the wet period of the year.

However, it may be true that wet soil and weed seed clings to tires/vehicles more readily than dry soil and weed seed. If this is a reasonable assumption, prohibiting use of motorized roads and trails when the soils are the wettest may reduce that rate of weed introduction and spread. This is an unproven assumption and the difference in rate of weed introduction can not be quantified. The number of variables that would affect the rate of introduction and spread along a specific motorized road or trail varies by such factors as type of weed, whether the road or trail has wet/moist soil areas year-around, where the vehicle is coming from, and the weather that particular day (for example, did it rain). Therefore, in this analysis, season of use is not considered a significant variable when comparing impacts to watchlist plants and/or plant communities by alternatives.

The impact to native vegetation from the season that the motorized vehicle use occurs varies by plant community and by rare plant species. However, the significance of beneficial or negative impacts from the season of use action is difficult to quantify for a number of reasons. Removing motorized vehicle use from NFTS motorized roads and trails during the wet season does reduce the potential amount of erosion from that motorized road or trail that could occur especially if it becomes rutted. However, this amount of potential erosion can not be quantified. Determining where the rutting and erosion would take place and if that erosion would impact watchlist plants or plant communities is difficult. It is reasonable to assume that those watchlist plants and plant communities located within 30 feet of a motorized trail un-authorized for motorized use would not benefit if that watchlist plant or plant community experienced soil erosion due to motorized vehicle use regardless of the season of use. Those watchlist plants and plant communities that are aquatic/riparian plant community dependent are always subject to erosion and/or soil rutting because those native plants grow in soils that are wet/moist year-around. Serpentine (ultra-mafic soils) plant communities are considered highly erosive year-around.

Temporary order: The TNF has issued a temporary forest order which prohibits travel off of existing motorized roads and trails as shown on Forest Order exhibit maps. The order is established for a period not to exceed two years to protect resources and help prevent additional motorized trails un-authorized for motorized use from being established while the TNF undertakes implementation of the Travel

Management Rule and the production of the Motor Vehicle Use Map (MVUM). Therefore, the creation of new motorized trails un-authorized for motorized use (which is the expression of cross country travel) and the associated resource damage caused by cross country travel has been legally – at least temporarily – stopped. This analysis recognizes the miles of motorized trails un-authorized for motorized use that were known when the analysis began, i.e. 1,400 miles. For this analysis, implementation of the temporary order is considered beneficial to native vegetation. Comparing the no action alternative that allows cross country travel to the action alternatives that prohibit cross country travel provides the reader with an overview of how cross country travel impacts watchlist plants and plant communities.

Change in class of vehicles: Changing the class of vehicle allowed to use a particular road does not change impacts to watchlist plants/plant communities. These roads already have hardened surfaces that lack vegetation. It is likely that direct impacts to watchlist plants/plant communities occurred when the road was developed. Indirect impacts may still be occurring if the watchlist plants/plant communities have survived within 100 feet of the road. These indirect and cumulative impacts would continue regardless of the type of vehicle using the road. In addition, there are no studies that indicate one type of vehicle spreads weed seed and/or weed plant parts more than another. Therefore, changing the class of vehicle does not make the road more or less susceptible to weed introduction and spread and does not reduce the risk of watchlist plants/plant communities being lost or degraded.

Aquatic/riparian Plant Communities

Summary by indicator measures

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited within aquatic/riparian plant communities.

No Action: Alternative 1 does not prohibit cross country travel on 717,900 acres including 1,400 miles of motorized trails un-authorized for motorized use. Cross country travel is prohibited on 73,500 of the 717,900 acres. Under implementation of Alternative 1 impacts to known occurrences of watchlist plants dependent on aquatic/riparian plant communities would likely increase over time as motorized vehicle use increased. As yet undiscovered watchlist plants and plant communities would be at risk as new motorized trails un-authorized for motorized use were created. Cross country travel would damage at least some watchlist plants and plant communities and it is reasonable to expect that some occurrences would be lost.

Direct impacts could be significant at least at the local, site specific level. Possible direct impacts include killing and/or injuring watchlist plants by running over them. Possible direct impacts also include damaging native vegetation within aquatic/riparian plant communities. Severe and persistent disturbance to aquatic/riparian plant communities could convert them to a different type of plant community. The significance of these direct impacts is dependent on many factors including the amount of disturbance, the plants being impacted, and in some cases, the season when the disturbance takes place. For example, running over a watchlist plant while it is in bloom could negatively impact reproduction - at a minimum. Running over the same plant while it is dormant and underground would not have the same impacts –

especially if the soil health is not reduced. The significance of impacts is also dependent on the number of watchlist plants that occur in a specific location and how many of them are damaged. In addition, the significance of impacts is dependent on the amount and condition of the type of habitat needed by a particular watchlist plant across its range of distribution.

When a watchlist plant is dependent on plant communities that are limited (for example *Sphagnum* moss is usually found in fens and fens are plant communities of limited distribution), impacts could be significant. The type of motorized vehicle is not a factor since all vehicles are known to have adverse impacts to natural resources (Foltz and Meadows 2007). It is impossible to know when or where cross country motorized vehicle use would occur, but since it would not be restricted in Alternative 1, the risk of significant direct and indirect impacts is higher than in the action alternatives.

Implementation of Alternative 1 could indirectly impact watchlist plants and plant communities when cross country motorized vehicles reduce soil health through compaction, increase erosion, change water flows, and/or introduce weeds. Extensive indirect impacts could be significant. Undesirable impacts include eroded soils, hydrologically disrupted wetland ecosystems, general habitat destruction, and degraded water quality (Foltz 2006). The significance of possible indirect impacts is unknown due to the factors listed under the direct impacts section. However, in most cases, recommendations for watchlist plants and plant communities – especially aquatic/riparian plant communities are for protection from indirect impacts. Most TNF watchlist plants and plant communities are considered aquatic/riparian dependent and are limited in distribution. Reductions in the health of the soil and/or changes to the amount or health of water/air/vegetation components of the habitats for watchlist plants prevent those habitats from maintaining and performing their natural prescribed functions (Foltz and Meadows 2007). Refer to section 3.02 of the DEIS for more information regarding soil and water. Allowing unrestricted motorized vehicle use across the forest greatly increases the risk of negative indirect impacts to watchlist plants and plant communities.

Action alternatives: All of the action alternatives prohibit cross country travel. The prohibition of cross country travel also includes prohibiting use on some of the 114 miles of motorized trail un-authorized for motorized use that are located within 100 feet of riparian vegetation. The prohibition of cross county travel also results in fewer perennial and intermittent stream crossings. Therefore, the risk of direct and indirect impacts to aquatic/riparian watchlist plants and plant communities from cross country travel is less than under implementation of the no action alternative. Under implementation of the action alternatives impacts to known occurrences of aquatic/riparian watchlist plants and plant communities would likely be mitigated. As yet undiscovered occurrences of watchlist plants and plant communities would most likely be discovered during motorized trail surveys and mitigations would be developed to reduce negative impacts to them. (Note: Management level 1 and temporary roads proposed in Alternative 5 do not have current botanical surveys.) It is standard practice to reduce/eliminate impacts to aquatic/riparian watchlist plants and plant communities when they are found. Aquatic/riparian plant community impacts would be reduced due to mitigations developed to reduce erosion. Refer to Appendix A (Road Cards) for examples of mitigations that will be applied to site specific motorized trails. Under the action alternatives, the loss/conversion of aquatic/riparian plant communities due to motorized vehicle cross country use would not occur.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trail un-authorized for motorized use proposed to be added to the NFTS within 100 feet of aquatic/riparian plant communities
- Number of proposed perennial and intermittent water crossings
- Watchlist plants and plant communities (associated with aquatic/riparian plant communities) located within 100 feet of proposed additions to the NFTS
- Weed sites located along proposed additions to the NFTS within 100 feet of watchlist plant occurrences and/or watchlist plant communities

No Action: Alternative 1 does not add motorized trails to the NFTS. Alternative 1 does not prohibit cross country travel. Implementation of Alternative 1 could impact watchlist plants directly and indirectly by continuing use of about 728 perennial and intermittent water crossings and 114 miles of motorized trail located within 100 feet of riparian vegetation. Direct and indirect impacts could be significant at least at the local level.

Surveys of about 62 miles of motorized trail un-authorized for motorized use have been completed to date. Aspen plant communities (watchlist plant communities) were found within 30 feet (or less) of TKN-M2, TKS-11, SV-005, SV-P8, and SV-P14. Cheatgrass was found within 100 feet of the TKN-M2 and SV-P14. Implementation of Alternative 1 would continue to impact these aspen plant communities directly and indirectly because motorized trails un-authorized for motorized use would continue to be used under Alternative 1. The significance of these impacts is dependent on many factors including the amount of disturbance. Under implementation of Alternative 1 the risk of significant soil compaction, increased erosion, changed water flows, and/or weed introduction within these occurrences is high. Therefore, over the long term (five plus years), impacts could be significant in that aspen clones could be lost.

Action Alternatives: Tables N-6, N-7 and N-8 display the number of perennial and intermittent water crossings by alternative, and the number of miles of proposed additions to the NFTS located within 100 feet of aquatic/riparian plant communities (riparian vegetation) by alternative. Compared to Alternative 1, all action alternatives would reduce the number of perennial and intermittent water crossings and the miles of motorized trail un-authorized for motorized use within 100 feet of riparian vegetation and thus improve water quality conditions. Of the action alternatives, implementation of Alternative 5 has the greatest number of perennial water crossings and the most miles of additions to the NFTS within 100 feet of riparian vegetation. Therefore, of the action alternatives, Alternative 5 has the greatest risk to aquatic/riparian plant communities. Therefore, of the action alternatives, implementation of Alternative 5 would have the greatest risk of negative impacts to watchlist plants dependent on aquatic/riparian plant communities.

Alternative 2 differs from Alternative 5 in that Alternative 2 proposes Reservoir access and Alternative 5 does not; and Alternative 5 proposes the networks (Cal-Ida, Boca, Mosquito, and French Meadows) and Alternative 2 does not. In addition, Alternative 5 proposes the addition of numerous motorized trails (refer to the alternative descriptions in Chapter 2 for a listing) that are not proposed in Alternative 2. Table N-6 also shows that the action alternatives propose the addition of 127 crossings in

Alternative 5, 35 and 37 crossings in Alternatives 2 and 6 respectively, 18 and 19 crossings in Alternatives 4 and 7 respectively, and no crossings in Alternative 3. Table N-7 shows that the action alternatives propose the addition of 19 miles of motorized trails to the NFTS that are located within 100 feet of riparian vegetation in Alternative 5, 6 and 7 miles in Alternatives 2 and 6 respectively, 3 miles in Alternatives 4 and 7, and no miles in Alternative 3.

Of the action alternatives, Alternatives 3, 4, and 7 have the largest potential improvement in water quality conditions (and the least risk to watchlist plants dependent on aquatic/riparian plant communities) because additions to the NFTS under these alternative would result in the fewest perennial and intermittent water crossings, and fewer miles of motorized trail added to the NFTS within 100 feet of riparian vegetation.

Implementation of Alternative 5 would impact the most aquatic/riparian plant communities (and possibly impact watchlist plants and plant communities that are currently unknown). Alternatives 4 and 7 propose the addition of fewer miles of motorized trails to the NFTS that are located within 100 feet of aquatic/riparian plant communities than implementation of Alternatives 6 and 2. Alternative 1 does not propose the addition of motorized trails to the NFTS, so while it has the least impact relative to this aspect of the alternatives; it has the greatest overall risk to watchlist plants and plant communities through absence of a prohibition on cross country travel, as previously described. Alternative 3 does not propose to add any motorized trails to the NFTS and it prohibits cross country travel. Therefore Alternative 3 provides the most benefits to watchlist plants and aquatic/riparian plant communities.

Table N-6. Number of perennial and intermittent water crossings by alternative[2]

Perennial Stream Crossings	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Existing NFTS roads and motorized trails	670	670	670	670	670	670	670
Private and other jurisdiction roads	630	630	630	630	630	630	630
Cross country travel (motorized trails un-authorized for motorized use)	355	0	0	0	0	0	0
Additions to the NFTS	0	19	0	9	59	18	9
Total Motorized	**1655**	**1319**	**1300**	**1309**	**1359**	**1318**	**1309**
Intermittent Stream Crossings							
Existing NFTS roads and motorized trails	790	790	790	790	790	790	790
Private and other jurisdiction roads	520	520	520	520	520	520	520
Cross country travel (motorized trails un-authorized for motorized use)	373	0	0	0	0	0	0
Additions to the NFTS	0	16	0	9	68	19	10
Total Motorized	**1683**	**1326**	**1309**	**1319**	**1378**	**1329**	**1320**

[2] Crossings include lands under all ownerships.

Table N-7. Miles[3] of motorized use on NFS lands within 100 feet of riparian vegetation by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross country travel (acres)	73,500	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	114	0	0	0	0	0	0
Existing NFTS roads and motorized trails	172	172	172	172	172	172	172
Private/other jurisdiction roads	59	59	59	59	59	59	59
Additions to the NFTS	0	6	0	3	19	7	3
Total Motorized	**345**	**237**	**231**	**234**	**250**	**238**	**234**

[3] Miles are approximate

Table N-8. Motorized trails un-authorized for motorized use that pass through aquatic/riparian plant communities by alternative

Route ID	Alt 2	Alt 3	Alt 4	Alt 5*	Alt 6	Alt 7
SV-P5	Yes	No	No	Yes	Yes	Yes
SV-P6	Yes	No	Yes	Yes	Yes	Yes
SV-P7e	Yes	No	Yes	Yes	Yes	Yes
SV-P7w	Yes	No	Yes	Yes	Yes	Yes
SV-P8	Yes	No	No	Yes	Yes	Yes
SV-P12	Yes	No	No	Yes	Yes	Yes
SV-P14	Yes	No	Yes	Yes	Yes	Yes
SV-P14a	Yes	No	Yes	Yes	Yes	Yes
SV-P15	Yes	No	Yes	Yes	Yes	Yes
TKN-001	Yes	No	No	Yes	No	No
TKN-003	Yes	No	No	Yes	Yes	No
TKN-J5	Yes	No	No	Yes	Yes	Yes
TKN-J9	Yes	No	Yes	Yes	Yes	Yes
TKN-J13	Yes	No	No	Yes	Yes	No
TKN-J14	Yes	No	No	Yes	No	Yes
TKN-M2	Yes	No	No	Yes	Yes	Yes
TKS-6	Yes	No	No	Yes	No	No
TKS-11	Yes	No	No	Yes	Yes	Yes
YRM-M3	Yes	No	No	Yes	Yes	No
YRN-001	Yes	No	No	Yes	Yes	No
YRN-007	Yes	No	No	Yes	Yes	No
YRN-008	Yes	No	No	Yes	Yes	No
YRN-1	Yes	No	No	Yes	Yes	Yes
YRN-5a	Yes	No	No	Yes	Yes	Yes
YRN-5c	Yes	No	No	Yes	Yes	Yes
YRN-M2	Yes	No	No	Yes	No	No
YRN-M3b	Yes	No	No	Yes	Yes	No
YRS-003b	Yes	No	No	Yes	Yes	No
YRS-066	Yes	No	No	Yes	Yes	No
YRS-AF	Yes	No	Yes	Yes	Yes	Yes
YRS-B12	Yes	No	Yes	Yes	Yes	Yes
YRS-F1	Yes	No	No	Yes	Yes	Yes
YRS-F1b	Yes	No	No	Yes	No	No
YRS-F1c	Yes	No	No	Yes	No	No
YRS-SF4	Yes	No	No	Yes	Yes	No
YRS-SF5	Yes	No	Yes	Yes	Yes	Yes
YRS-SF6	Yes	No	Yes	Yes	Yes	Yes
Greenhorn	Yes	No	No	Yes	No	No
Reservoir access	Yes	No	No	No	No	No

*In addition, Alternative 5 proposes the following that also pass through aquatic/riparian plant communities: H19-5, H20-16, H20-2, H21-5-3, H25-11-3, H25-18, H27-19, H293-4-4, H3004-8, H301-6, H329c, H3-4-4, H38, H39-12, H45-4, H54-9, H613-8, H652-5-5, H72-18, H860-40-20-3-30, H889-28, H889-3-18-5, H889-3-30-10, H889-8, H894-5-1, H89-99-10, H96-114, H96-49, N25-13, N25-15-2, N25-18-1, N25-2, N25-20, N25-21, N25-22, N25-2-3, N25-24, N25-26-2, N25-28-2, N25-28-4, N25-29-2, N25-29b, N25-30, N25-32-1, N25-32-4, N25-32-5, N25-4-2, N25-4-4, N25-4-6, N25-6-1, N25-8-1-1, N25-8-2, N25-8-6, N25-8-8, N25-9-1, N261-5-2d, N261-8-15-2, N27-3, N33-6, N33-7, N35-10, N35-11, N35-13, N35-2, N35-20-3, N35-21, N35-23, N35-3-1, N35-3-2, N35-8, N35-9, N39-4, N39-5, N39-5-1, N39-8-1, N42-17, N42-24, N43-14, N43-14-4, N43-16, N44-32, N48-4, N491-3-1, N55-2, N68-22, N860-10-10, N860-15-6, N886-18-10, N886-20-10, N96-108, N96-110-6, N96-114, N96-12c, N96-63-8-2, N96-77, and N96-83.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially affect aquatic/riparian plant communities and the watchlist plants dependent on them as well as the benefits from prohibiting cross country travel and reducing the number of miles of motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid significant long term cumulative impacts by implementing frequent and consistent evaluation of motorized trails, perennial and intermittent water crossings, implementing mitigations to reduce impacts to watchlist plants, and detection/treatment of weeds. This motorized trail evaluation combined with rapid mitigation of resource

damage/weed treatment avoids significant impacts to aquatic/riparian plant communities and the watchlist plants dependent on them in the long term.

Past: Management activities have occurred on TNF system and privately owned lands for over a century. Historic management activities on TNF system lands include: gold mining, gravel mining, hydroelectric development, land clearance, diversions of water for irrigation, land drainage, timber harvest, construction of roads and railroads, urbanization, livestock grazing, ground water abstraction, and others (Kondolf et al. 1996). This long history of disturbance to aquatic/riparian plant communities has contributed to the lack of an undisturbed reference for most aquatic/riparian dependent watchlist plants. Therefore, it is not possible to quantify how these past management activities have impacted them. Historically, springs, creeks, and rivers were altered by diversion of water; meadows and fens were converted to other types of habitats due to human activity that dried them out; aquatic/riparian areas were repeatedly and heavily grazed by domestic livestock; and numerous roads were built in areas that changed the hydrology of those habitats. These activities and others have cumulatively reduced the amount of aquatic/riparian plant communities within TNF watersheds that would be suitable habitat for watchlist plants dependent on them. The amount of habitat reduction is unknown.

In addition, past management has created conditions on the landscape that frequently contribute to cross country travel. For example, skid trails that were created during a fuel reduction/timber harvest project are generally blocked off where they connect to NFTS motorized roads and trails once the project has been implemented. However, in a number of areas motorized vehicle users have removed the barriers blocking the skid trail and/or have gone around the barriers. Continued use of the old skid trail creates a motorized trail that has not been designed for the use, and may be located in an area that is not best suited to that use. Trail planning and design – especially location – are important considerations for limiting disturbances to natural resources (Foltz and Meadows 2007) such as watchlist plants.

Current: Current impacts to aquatic/riparian plant communities come from a variety of management activities including motorized vehicles. Motorized vehicle use within aquatic/riparian plant communities and their zones of influence (RCAs) negatively impacts the soil/vegetation/water in those areas. Use of existing routes while they are wet can cause the formation of ruts/wheel tracks that can channel water altering area hydrology and causing erosion of soil. Vegetation in and adjacent to areas of use is negatively impacted when it is run over and/or covered in dust. Water quality is also negatively impacted when motorized vehicles add sediment and other pollutants to it. (Refer to section 3.02 of the DEIS.) Motorized vehicle use within aquatic/riparian plant communities and their RCAs does not benefit soil, water and native vegetation within those areas. However, the significance of the negative impacts to soil/vegetation/water within specific aquatic/riparian plant communities varies. Refer to Appendix A (Road Cards) for additional information about aquatic/riparian plant communities that are impacted by motorized vehicles.

Other on going projects on the forest that impact aquatic/riparian plant communities include: special uses projects such as utility corridor construction and maintenance that pass through and impact many different types of plant communities including aquatic/riparian; minerals operations that remove native vegetation and recontour the landscape; and livestock grazing projects that allow impacts to aquatic/riparian plant communities as livestock eat the vegetation and punch hoof holes into the soil.

Several aquatic/riparian watchlist plant communities are currently impacted by use of NFTS roads and trails, use of motorized trails un-authorized for motorized use, and cross country use. These impacts are discussed below:

Darlingtonia californica, Drosera rotundifolia, Sphagnum species are all fen dependent watchlist plants that are currently being impacted by cross country travel in Summit and Pat Yore Flat fens (and indirectly by use of NFTS roads). Cross country travel onto the fens has created bare soil by killing the vegetation where the wheel tracks occurred. Summit and Pat Yore fens area also indirectly impacted by use of the NFTS roads located above them. The NFTS roads are channeling water and sediment into the fens and may be changing the acidity of the water (PH) of the fens. Formal monitoring of these fens has not occurred. However, it is known that damage to fens/peatlands from motorized vehicle use alters surface and subsurface flow patterns and can result in areas of bare peat and soil. Areas of exposed peat are at increased risk from drying out and being lost. Wheel tracks can also weaken or destroy the rhizomatous root network of the clonal peat forming plants. Bare ground exposes the organic soils to the atmosphere allowing their decomposition. Functioning fens/peatlands store carbon. Loss of moisture to the fen/peatland can cause the plants that make up these plant communities to die. Peat forming wetlands provide important benefits within TNF watersheds by improving water quality and providing habitat for unique plant communities. Because of the large historical loss of this type of plant community, remaining fens are considered rare. As described in Chapter 2 of the DEIS, forest plan direction for fen management is as follows: “During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and vehicles.”

Damage from motorized vehicle use within these fens has minimally altered surface and subsurface flow patterns, resulted in areas of bare peat and has created bare soil. The cross country use has contributed to the cumulative impacts that fen and fen dependent plants are experiencing. Current damage from cross country travel is not considered significant. However, if cross country use continues in these areas, the fens could be converted to wet meadow complexes without fen plant communities. Loss of fens is considered significant.

Aspen clones and wet meadows are aquatic/riparian watchlist plant communities (special aquatic features). There are several aspen clones and wet meadow complexes that are currently impacted by cross country travel of motorized vehicles. Aspen clones and wet meadow complexes are also impacted by motorized vehicle use of NFTS motorized roads and trails. Motorized vehicles have created ruts in these plant communities that act as drains and/or channels that change the hydrology within the plant community. Direct impacts to these special aquatic features (aspen clones and/or wet meadow complexes) from motorized vehicle use have killed and/or injured individual plants and in some cases introduced weeds.

Reasonably foreseeable: When past and current impacts are added to the impacts of the reasonably foreseeable future actions identified in Table N-5, risks to aquatic/riparian watchlist plants and plant communities increase.

Some current and reasonably foreseeable management actions do not impact aquatic/riparian plant communities while others are expected to have minimal direct impacts. For example, westside fuel reduction/timber harvest/aspen improvement projects routinely establish a 100 foot buffer around

aquatic/riparian plant communities (such as riparian vegetation along streams, fens, springs, and seeps) where no management activities are implemented. Many eastside fuel reduction/timber harvest/aspen improvement projects contain a 50 foot no treatment buffer. Some eastside fuel reduction/timber harvest/aspen improvement projects establish a 25 foot tractor keep out zone near aquatic/riparian communities such as fens where trees can be felled away from fens and removed. For example, Montez and Billabong are both projects with 25 foot tractor keep out zones in aspen clones that are adjacent to fens. The Montez BE finds that "Minimal direct effects to the fen are expected from harvesting conifers to release an aspen stand near the fen because mitigations would be implemented to minimize impacts…Indirect effects of harvesting trees uphill from the fen would be that more water would be available to the fen because conifer trees would no longer be transpiring water into the atmosphere above the fen. The reduction of shade to the site is expected to be minimal and somewhat temporary because trees that provide most of the shade during the summer months would be left in place…An increase in the amount of water would help keep the saturation level high and would maintain an anaerobic system for a longer period during the summer season" (Montez Project Sensitive Plant Biological Evaluation, Susi Urie, Page 8).

Projects other than fuel reduction/timber harvest/aspen improvement also impact aquatic/riparian plant communities. Some projects are designed to improve the health of specific aquatic/riparian plant communities by restoring the hydrology of areas such as the Carmen project. Others are designed to improve the reproduction of aspen clones by removing conifers - such as the Carvin and Brumby projects.

No Action: Implementation of Alternative 1 carries a high risk of cumulative impacts to aquatic/riparian watchlist plants and plant communities. Since (in general terms) no restrictions would be in place to limit where motorized vehicle use could occur, all aquatic/riparian watchlist plants that grow in areas that are accessible by motorized vehicle would be at risk. Since complete surveys for the forest are not available, and an undisturbed reference for aquatic/riparian watchlist plants and plant communities is also lacking, this analysis focuses on cumulative impacts to aquatic/riparian plant communities with discussion of cumulative impacts to individual watchlist plants where cross country travel/motorized vehicle use is known to impact them.

When the impacts of all past, current and reasonably foreseeable management actions are added to the possible impacts of implementing Alternative 1, (especially cross country travel) the potential to significantly impact aquatic/riparian plant communities and the watchlist plants dependent on them is high. Cumulative impacts could be significant over the long term and include conversion of fens and other wetlands to other types of plant communities. Aquatic/riparian plant communities frequently lack the vegetative barriers to keep motorized vehicle use from accessing them and significantly impacting their hydrology.

Implementation of Alternative 1 increases the risk of disturbance within aquatic/riparian plant communities because it allows cross country travel on about 717,900 acres and does not prohibit use of motorized trails un-authorized for motorized use (about 1,400 miles). Cross country travel and use of motorized trails un-authorized for motorized use have contributed to cumulative impacts to fens, aspen clones, and other special aquatic features on TNF system lands. Over the long term, aquatic/riparian

watchlist plants and plant communities that are accessible by motorized vehicles traveling cross country could also be significantly reduced.

Aspen clones were found along TKN-M2, TKS-11, SV-005, SV-P8, and SV-P14. Over the long term, implementation of Alternative 1 could damage the aspen within these areas so much that aspen clones are killed and/or weakened. Weakened aspen are more susceptible to disease and/or insect infestation. Cross country travel could damage or kill other aspen clones also. Since the health of aspen clones within the Sierra Nevada region is of concern, over the long term, impacts could be significant.

Other factors also add to the risk of negative impacts to aquatic/riparian dependent plants from motorized vehicle cross country use. For example, some of the NFTS and motorized trails un-authorized for motorized use end at wet meadows. TKN-J2 ends at a vernal pool. Ending a motorized road or trail at a wetland increases the risk of negative impacts to aquatic/riparian dependent resources such as watchlist plants and plant communities, especially when cross country travel is allowed, as in Alternative 1. For example, YRN-11 is a road that ends at a wet meadow plant community. It does not have barriers to keep users from driving onto the meadow. Placing barriers at the end of YRN-11 (as proposed in the action alternatives – refer to Appendix A - Road Cards) would reduce the risk of cross country travel across this meadow. When motorized vehicle use occurs in plant communities with wet soils, the soils are compacted, the hydrology is changed, and vegetation is killed. Restoration of aquatic/riparian plant communities is often time consuming and expensive. As mentioned above, many watchlist plants are dependent on aquatic/riparian plant communities.

Alternative 1 has the greatest number of perennial and intermittent water crossings, does not prohibit use of motorized trails un-authorized for motorized travel, and does not prohibit cross country travel. Refer to Tables N-6 and N-7. Implementation of Alternative 1 has the greatest risk of introducing and spreading weeds into aquatic/riparian habitats.

Given all of the above information, implementation of Alternative 1 may impact *Androsace occidentalis* var. *simplex*, *Darlingtonia californica*, *Drosera anglica*, *Drosera rotundifolia*, *Juncus marginatus* var. *marginatus*, *Meesia longiseta*, *Mimulus lacinatus*, *Potamogeton filiformis*, *Rhynchospora alba*, *Rhynchospora capitellata*, *Scutellaria galericulata*, *Sphagnum* species, *Utricularia minor*, *Veronica cusickii*, special aquatic features and aspen groves. At this time, impacts to watchlist plants and/or plant communities are not considered significant unless entire plant communities are lost or watchlist plant occurrences are eliminated from specific areas. Based on current information, watchlist plants and plant communities that are aquatic/riparian dependent are not at risk in the short term (5 years or less). The number of fens and other special aquatic features that may be converted to other plant communities due to management actions combined with such variables as climatic variation and future water demands from NFS lands are not fully understood. It is known that implementation of Alternative 1 would continue to impact these limited plant communities by altering their hydrology. It is believed that implementation of Alternative 1 puts these plant communities at risk of being lost over the long term (over 5 years).

Action Alternatives: Implementation of the action alternatives will cumulatively impact aquatic/riparian plant communities and the watchlist plants dependent on them. When the impacts of all past, current and reasonably foreseeable management actions are added to the possible impacts of implementing the various action alternatives, there are differences in the potential amount of impacts to

aquatic/riparian plant communities and the watchlist plants dependent on them. However, those cumulative impacts are not considered significant due to the mitigations listed by route in Appendix A (Road Cards), which include implementing mitigations to reduce/eliminate direct impacts to watchlist plants and plant communities. When watchlist plants and plant communities are discovered during surveys, mitigations are developed to reduce and/or eliminate impacts.

Watchlist plants and plant communities located along proposed routes would be indirectly impacted by motorized vehicle use of the route. Indirect impacts include reduced vigor through being covered in dust and increased risk of weed infestation. Dust covered plants do not reproduce or grow as well as those plants that are not covered in dust. Dust covered plants could be weakened to the point that they can no longer compete effectively with cheatgrass or other vegetation. Over the long term, competition for soil and water due to cheatgrass invasion and weakening of plants due to being covered with dust could kill plants. However, frequent field visits with rapid implementation of mitigations to identify and treat weeds that invade occurrences of watchlist plants and plant communities would reduce the significance of weed invasion. There are currently no mitigations available to reduce dust along motorized routes or to prevent the introduction of weeds along those routes. Therefore, those action alternatives that add the most miles of motorized vehicle trail, and prohibit use on the least miles of motorized trail have a greater risk of indirect impacts to watchlist plants and plant communities. These indirect impacts are not considered significant in the short or long term.

Alternative 5: Implementation of Alternative 5 cumulatively impacts aquatic/riparian plant communities and the watchlist plants dependent on them. Implementation of Alternative 5 has the greatest number of perennial and intermittent water crossings and the most miles of motorized vehicle trail within 100 feet of riparian vegetation of all of the action alternatives. Alternative 5 adds the greatest number of perennial and intermittent water crossings to the NFTS (about 17 percent) and prohibits use on the fewest miles of motorized trail located within 100 feet of riparian vegetation (about 17 percent). Therefore implementation of Alternative 5 has the greatest risk of indirectly impacting aquatic/riparian plant communities and the watchlist plants dependent on them.

About 149 miles of management level 1 and temporary roads are proposed in Alternative 5 that do not have current botanical surveys. Watchlist plants, watchlist plant communities and weeds may exist along these proposed additions to the NFTS and they could be receiving direct and indirect impacts from motorized vehicles. This adds to possible cumulative impacts to watchlist plants and plant communities. Frequent field observations with rapid implementation of mitigations to reduce/eliminate impacts can reduce the significance of those impacts over the short and long term in aspen clones. Implementation of Alternative 5 would continue to impact the aspen clones located along portions of TKN-M2, TKS-11, SV-005, SV-P8 and SV-P14. Motorized vehicle use within these aspen clones could alter soil properties. Shepperd et al. (2006) reported that recreation activities can alter soil properties if continued vehicle passes cause the stripping of small moisture-absorbing roots from large lateral roots. Severe motorized vehicle use could increase runoff from storm events in these aspen clones increasing erosion (Shepperd et al. 2006). Over the long term (more than 10 years), without mitigations, continued motorized vehicle use within these aspen clones could introduce disease, spread weeds so that regeneration is reduced, and increase the risk of loss of these clones.

Alternatives 2 and 6: Implementation of Alternatives 2 and 6 cumulatively impacts aquatic/riparian plant communities and the watchlist plants dependent on them. Those cumulative impacts are not considered significant in the short or long term. Alternatives 2 and 6 propose the addition of fewer miles of motorized trail to the NFTS located within 100 feet of riparian vegetation and have fewer perennial and intermittent crossings than Alternatives 1 and 5. Therefore, the risk of indirect impacts to aquatic/riparian plant communities is less than those discussed under implementation of Alternatives 1 and 5. Alternative 2 differs from Alternative 6 in that Alternative 2 proposes Reservoir access and Alternative 6 does not. Alternatives 2 and 6 reduce perennial and intermittent crossings by about 95 percent and reduce the number of miles of motorized trail un-authorized for motorized use located within 100 feet of riparian vegetation by about 95 percent.

Under implementation of Alternatives 2 and 6, cross country travel by motorized vehicle users is prohibited. Implementation of Alternatives 2 and 6 would continue indirect/cumulative impacts to special aquatic features along TKN-M2; cheatgrass would continue to be spread through motorized vehicle use of TKN-M2; and aspen would continue to be impacted through use of TKS-11, SV-P8, SV-P14, and TKN-M2. Alternative 2 would continue to impact aspen along SV-005. Alternative 6 does not propose SV-005. Implementation of Alternatives 2 and 6 is not expected to produce significant impacts in the short term (5 years or less) to aquatic/riparian plant communities or the watchlist plants dependent on them. Implementation of Alternatives 2 and 6 is not expected to produce significant impacts in the long term due to the implementation of frequent field observations with rapid mitigation of resource problems.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 cumulatively impacts aquatic/riparian plant communities and the watchlist plants dependent on them. Those impacts are not considered significant in the short or long term. Alternatives 4 and 7 add fewer miles to the NFTS within 100 feet of riparian vegetation and have fewer perennial and intermittent crossings than Alternatives 1, 2, 5, and 6. Alternatives 4 and 7 also prohibit use of more miles of motorized trail within 100 feet of riparian vegetation and reduce the number of perennial and intermittent crossings compared to Alternatives 1, 2, 5, and 6. Alternatives 4 and 7 reduce the number of perennial and intermittent water crossings by about 97 percent, and reduce the number of miles of motorized trail located within 100 feet of riparian vegetation by about 97 percent.

Alternative 4 does not propose TKN-M2, TKS-11, SV-005, SV-P8, and SV-P14. Therefore, implementation of Alternative 4 would not continue to indirectly impact aspen along those motorized trails through dust and/or weed invasion. Alternative 7 would continue to indirectly impact aspen along TKS-11, SV-P8, and SV-P14 with dust, soil compaction in the motorized trail tread where the motorized trails go through the aspen clones, and spread cheatgrass and/or other weeds. Alternative 7 does not propose TKN-M2 or SV-005. Cross country travel is prohibited in Alternatives 4 and 7 as compared to Alternative 1. Alternatives 4 and 7 are not expected to produce significant impacts in the short or long term due to the implementation of frequent field observations of resource problems with rapid implementation of mitigations to reduce/eliminate those problems.

Alternative 3: Implementation of Alternative 3 would cumulatively impact aquatic/riparian plant communities and those watchlist plants dependent on them through use of NFTS motorized roads and trails. Since implementation of Alternative 3 does propose additions to the NFTS and prohibits cross

country use, it is not expected to add to direct or indirect impacts to aquatic/riparian plant communities and the watchlist plants dependent on them. Implementation of Alternative 3 would not continue to indirectly impact aspen along TKN-M2, TKS-11, SV-005, SV-P8, and SV-P14 since use of those motorized trails would be prohibited. Implementation of Alternative 3 would not spread cheatgrass along route TKN-M2 through motorized vehicle use. Implementation of Alternative 3 provides the greatest benefit to aquatic/riparian plant communities and those watchlist plants dependent on them.

Implementation of the action alternatives could impact *Androsace occidentalis* var. *simplex*, *Darlingtonia californica*, *Drosera anglica*, *Drosera rotundifolia*, *Juncus marginatus* var. *marginatus*, *Meesia longiseta*, *Mimulus lacinatus*, *Potamogeton filiformis*, *Rhynchospora alba*, *Rhynchospora capitellata*, *Scutellaria galericulata*, *Sphagnum species*, *Utricularia minor*, *Veronica cusickii*, special aquatic features and aspen groves but those impacts are not expected to be significant in the short or long term. Since it is assumed that motorized vehicle users will stay on designated routes regardless of the action alternative selected, and motorized vehicle use does not benefit aquatic/riparian plant communities, the alternative with the least number of miles within aquatic/riparian plant communities is the most beneficial to those plant communities and the resources dependent on them.

Serpentine and/or Copper/Heavy Metal Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited within serpentine/copper/heavy metal plant communities.

No Action: Alternative 1 does not prohibit cross country travel. Under implementation of Alternative 1 as yet undiscovered watchlist plants dependent on serpentine/copper/heavy metal plant communities would be at risk as new motorized trails un-authorized for motorized use were created. It is expected that cross country use would damage at least some watchlist plant occurrences (if they are present on TNF system lands) and it is reasonable to expect that some occurrences would be lost.

Direct and indirect impacts could be significant at least at the local, site specific level and include killing and/or injuring watchlist plants primarily through cross country travel. Cross country use would also damage other native vegetation in these plant communities increasing the risk of erosion. The significance of direct and indirect impacts is dependent on many factors including the amount of disturbance, the watchlist plant being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of watchlist plants that occur in a specific location and how many of them are damaged.

TNF system lands contain about 13,400 acres of serpentine plant community. About 1,660 acres of these plant communities are impacted by NFTS and motorized trails un-authorized for motorized use. No watchlist plants have been found in the surveys of about 62 miles of motorized trail un-authorized for motorized use. The TNF has 35 miles of motorized trail un-authorized for motorized use and 58 miles of NFTS motorized roads and trails located within these plant communities.

Action alternatives: All of the action alternatives prohibit cross country travel on 13,400 acres containing 35 miles of motorized trails un-authorized for motorized use. Therefore, direct/indirect impacts to watchlist plants dependent on serpentine/copper/heavy metal plant communities from cross country travel would not occur. Since motorized trails un-authorized for motorized use are considered an expression of cross country travel, the number of miles with prohibited use by alternative is presented. Alternatives 2 and 5 prohibit use of about 31 miles of motorized trail un-authorized for motorized use or about 89 percent of the motorized trail un-authorized for motorized use located within serpentine plant communities. Alternatives 2 and 5 propose the addition of 4 miles of motorized trail to the NFTS. Alternatives 6 and 7 propose the addition of about 3 miles of motorized trails to the NFTS. Alternative 4 proposes the addition of 2 miles. Alternative 3 prohibits motorized use of all of the motorized trails un-authorized for motorized use located within serpentine/copper/heavy metal plant communities and would provide the greatest benefit to native serpentine vegetation including watchlist plants.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trail un-authorized for motorized use proposed to add to the NFTS that pass through serpentine (ultra mafic) soils. (Areas of copper/heavy metal soils are usually small and not identified as distinct soil mapping units. Therefore, the miles of unsurveyed proposed motorized trails un-authorized for motorized use in copper and heavy metal areas are not known. Areas of copper/heavy metal are identified during on the ground surveys. For this analysis, the watchlist plants with potential habitat in copper/heavy metal areas are represented by miles within serpentine plant communities.)

No Action: No motorized trails would be added to the NFTS under implementation of Alternative 1. Alternative 1 does not prohibit cross country travel. Implementation of Alternative 1 could impact serpentine/copper/heavy metal plant community dependent watchlist occurrences directly and indirectly by continuing use of about 35 miles of motorized trail un-authorized for motorized use and allowing cross country travel within these plant communities.

Refer to Table N-9 which shows the miles of motorized trail within these plant communities by alternative. Implementation of Alternative 1 could also directly and indirectly impact watchlist plants through use of about 58 miles of NFTS motorized roads and trails located within these plant communities. Unknown occurrences of serpentine dependent watchlist plants may occur along NFTS motorized roads and trails. Impacts along NFTS motorized roads and trails could be direct – especially within the 30 foot band along either side of the motorized road or trail, and indirect – primarily from dust and increased risk of weed introduction and spread. Direct and indirect impacts could be significant dependent on the species of plant, amount of disturbance, etc.

Surveys of about 62 miles of motorized trail un-authorized for motorized use have been completed to date. No serpentine/copper/heavy metal dependent watchlist plants were found in those surveys. In addition, no weed occurrences were found within 100 feet of motorized trails within serpentine/copper/heavy metal plant communities during those surveys.

Table N-9. Miles[4] of motorized use within serpentine plant communities by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	48	48	48	48	48	48	48
Private/other jurisdiction roads	12	12	12	12	12	12	12
Cross country travel (acres)	13,400	0	0	0	0	0	0
Motorized trails un-authorized for motorized use (miles)	35	0	0	0	0	0	0
Additions to the NFTS	0	4	0	2	4	3	3
Total Motorized	**94**	**64**	**59**	**62**	**64**	**63**	**63**

Action Alternatives: All action alternatives would reduce the number of miles of motorized trail un-authorized for motorized use in serpentine plant communities. Of the action alternatives, implementation of Alternatives 2 and 5 propose to add the most miles of motorized trail to the NFTS in these plant communities – 4 miles. Therefore, implementation of Alternatives 2 and 5 have the greatest risk of negative impacts to watchlist plants dependent on serpentine/copper/heavy metal plant communities of the action alternatives. However, all Alternative 2 motorized trails will be surveyed in FY 2008 and any watchlist occurrences discovered will have mitigations implemented to reduce/eliminate direct impacts to them. However, surveys of the Management Level 1 and temporary roads proposed under Alternative 5 are not current. Serpentine dependent watchlist plants could occur along these roads that would go undetected. Therefore, the risk of impacts to watchlist plants is less in Alternative 2 than in Alternative 5. Watchlist plant occurrences found in the FY 2008 surveys will be protected from the direct impacts of motorized vehicles, but not indirect impacts. Indirect impacts such as covering them in dust and increased risk of weed introduction and spread would still occur.

Alternatives 6 and 7 both propose the addition of about 3 miles of motorized trail within these plant communities. They do not propose the Management Level 1 and temporary roads proposed under Alternative 5. Alternatives 6 and 7 prohibit cross country travel. Alternative 4 proposes the addition of 2 miles of motorized trail in these plant communities, does not propose many of the Management Level 1 and temporary roads proposed under Alternative 5, and prohibits cross country travel. Alternative 3 does not propose the addition of any motorized trails to the NFTS within serpentine plant communities and therefore provides the greatest benefit to native serpentine vegetation including watchlist plants.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact serpentine/copper/heavy metal plant communities as well as the watchlist plants dependent on them, including the benefits from closing motorized trail un-authorized for motorized use routes are discussed. It is assumed that all of the action alternatives avoid significant long term cumulative impacts by implementing frequent evaluation of routes, implementing mitigations to reduce impacts to watchlist plants/plant communities, and conducting annual weed detection surveys with rapid treatment of weeds. This route evaluation combined with rapid mitigation of resource damage avoids

[4] Miles are approximate

significant impacts to serpentine/copper/heavy metal plant communities and the watchlist plants dependent on them in the short and long term.

Past: Serpentine plant communities in the Sierra Nevada have been reduced in area and/or have had their functions impaired. Gold mining, timber harvest, road construction, recreational uses, and gravel mining are a few of the management activities that have impacted the serpentine plant communities on the TNF. Serpentine habitats are frequently open terrain (Kruckeberg 1984). Therefore they lack vegetation to prevent cross country travel by OHVs. *Allium sanbornii* var. *congdonii*, *Allium sanbornii* var. *sanbornii*, *Chlorogalum grandiflorum*, and *Perideridia bacigalupi* are the watchlist plants that are considered dependent on serpentine/copper/heavy metal habitats. Historic activities have cumulatively reduced the quality of serpentine plant communities that would be suitable for these plants within TNF watersheds. The amount of reduction is unknown.

Current: Current management (2004 on) has added to cumulative impacts to serpentine/copper/heavy metal plant communities primarily through continued mining operations, utility corridor maintenance, and motorized vehicle use. Current management for watchlist plants being negatively impacted by motorized vehicle use has involved blocking the access with wooden and/or rock barriers. This method has not always been effective. This method is most effective when vegetation is available to also help block access. This analysis assumes that users will stay on motorized trails.

Special uses projects such as utility corridor construction and maintenance pass through and impact many different types of plant communities including serpentine/copper/heavy metal. Mining/minerals projects are also known to impact serpentine/copper/heavy metal plant communities – and eliminate significant amounts of vegetation in some areas. Livestock do not usually spend much time in serpentine/copper/heavy metal plant communities due to the lack of forage and canopy to provide shade.

Reasonably foreseeable: Serpentine plant communities are cumulatively impacted when past impacts and the impacts of implementing the alternatives are added to the impacts of those actions identified in Table N-5.

Generally, fuel reduction/timber harvest activities are not implemented on serpentine/copper/heavy metal soils due to the lack of vegetation in those plant communities. However, disturbance adjacent to these plant communities could change the hydrology of the serpentine/copper/heavy metal plant communities (in the short term), cause increased erosion and introduce weeds. These impacts could be locally and regionally significant over the long term since serpentine/copper/heavy metal plant communities are limited in distribution and are known to have a high number of endemic plants. None of the fuel reduction/timber harvest projects displayed in Table N-5 are known to be located immediately adjacent to serpentine/copper/heavy metal plant communities.

Projects designed to improve the health of specific aquatic/riparian plant communities by restoring the hydrology of areas such as the Carmen project and others designed to improve the reproduction of aspen clones by removing conifers - such as the Carvin and Brumby projects do not significantly impact serpentine/copper/heavy metals plant communities.

No Action: Implementation of Alternative 1 carries a high risk of cumulative impacts to watchlist plants dependent on serpentine/copper/heavy metal plant communities. Since (in general terms) no restrictions would be in place to limit where motorized vehicle use could occur, all serpentine/copper/

heavy metal plant community dependent watchlist plants would be at risk because these areas are accessible by motorized vehicles. Since complete surveys for the forest are not available, and an undisturbed reference for serpentine/copper/heavy metal plant community dependent watchlist plants is lacking; this analysis focuses on cumulative impacts to serpentine/copper/heavy metal plant communities versus individual species.

Alternative 1 has the most miles of motorized vehicle roads/trails/areas within serpentine/copper/heavy metal plant communities (93 miles of NFTS motorized roads and trails, and un-authorized for public use routes) and allows cross country travel. When the impacts of all past, current and reasonably foreseeable management actions are added to the possible impacts of cross country travel, implementation of Alternative 1 has the potential to significantly impact serpentine/copper/heavy metal plant communities and the watchlist plants dependent on them – over the long term (5 years plus). Implementation of Alternative 1 may impact *Allium sanbornii* var. *congdonii*, *Allium sanbornii* var. *sanbornii*, *Chlorogalum grandiflorum*, and *Perideridia bacigalupi* but those impacts are not considered significant at this time unless entire occurrences are negatively impacted. Since vegetative cover on serpentine plant communities is generally sparse, cross country travel could negatively impact entire occurrences if they exist in the unsurveyed potential habitat. Over the long term, with cross country travel and other continued disturbances, some of the serpentine plant communities may lose significant amounts of vegetation and experience increased erosion. This could be locally significant and may be regionally significant over the long term since serpentine plant communities/areas of copper/heavy metals are limited in distribution and are known to have a high number of endemic plants.

Action alternatives: Compared to Alternative 1, all action alternatives would reduce the number of motorized trail un-authorized for motorized use route miles open for motorized vehicles in serpentine/copper/heavy metal plant communities, and would not allow cross county travel. However, implementation of the action alternatives could cumulatively impact watchlist plants dependent on serpentine/copper/heavy metal plant communities.

None of the reasonably foreseeable actions listed in Table N-5 are expected to significantly impact serpentine/copper/heavy metal plant communities because the reasonably foreseeable projects listed are not located within or immediately adjacent to serpentine plant communities. Refer to the discussion of impacts to serpentine plant communities under the no action alternative. The action alternatives propose 8 motorized trails that pass through serpentine soils. Two of the 8 are routes proposed under Alternative 5 only. One is a route that is proposed in all of the action alternatives except Alternative 3. The other routes are identified as: ARM-2, ARM-3r, YRN-509, YRN-7, and YRN-M2. Surveys of ARM-2, YRN-509, and YRM-2 are complete.

Alternatives 2 and 5: Cumulative impacts from implementations of Alternatives 2 and 5 are not considered significant. Of the action alternatives, implementation of Alternatives 2 and 5 propose the most miles and prohibit use of the fewest miles of motorized trail un-authorized for motorized use in these plant communities. Therefore, implementation of Alternatives 2 and 5 have the greatest risk of cumulatively impacting watchlist plants dependent on serpentine/copper/heavy metal plant communities of the action alternatives. The risk of cumulative impacts is higher in Alternative 5 than in Alternative 2 because Alternative 2 does not propose many of the Management Level 1 and temporary roads proposed

under Alternative 5. Therefore, the risk of cumulatively impacting occurrences of watchlist plants dependent on these plant communities (should they occur in the unsurveyed habitat) is less in Alternative 2 than in Alternative 5. All serpentine/cooper/heavy metal dependent watchlist plants will have mitigations implemented to reduce and/or eliminate impacts from motorized vehicles when they are discovered. Occurrences could go undetected under implementation of Alternative 5 along roads without current surveys.

Alternatives 6 and 7: Cumulative impacts from implementation of Alternatives 6 and 7 are not considered significant. Alternatives 6 and 7 both propose the addition of about 3 miles of motorized trail to the NFTS within these plant communities, do not propose many of the Management Level 1 and temporary roads proposed under Alternative 5, and prohibit cross country travel. Alternative 6 and 7 prohibit use of about 31 miles of motorized trail un-authorized for motorized use within these plant communities. Watchlist plant occurrences could be indirectly impacted, but would have mitigations implemented to reduce/eliminate direct impacts to them under implementation of Alternatives 6 and 7 (should they occur in the unsurveyed habitat). Implementation of Alternatives 6 and 7 may also indirectly and cumulatively impact *Allium sanbornii* var. *congdonii*, *Allium sanbornii* var. *sanbornii*, *Chlorogalum grandiflorum*, and *Perideridia bacigalupi* but those impacts are not considered significant at this time unless entire occurrences are negatively impacted.

Alternatives 3 and 4: Cumulative impacts from implementation of Alternatives 3 and 4 are not considered significant. Alternative 4 proposes the addition of 3 miles of route to the NFTS and prohibits cross country use in these plant communities. Alternative 4 proposes ARM-3r. Alternative 3 does not propose the addition of any motorized trails to the NFTS and prohibit motorized use on all motorized trails un-authorized for motorized use. Implementation of Alternatives 3 and 4 may impact *Allium sanbornii* var. *congdonii*, *Allium sanbornii* var. *sanbornii*, *Chlorogalum grandiflorum* and *Perideridia bacigalupi* but those impacts are not considered significant in the short or long term unless entire occurrences are eliminated.

Implementation of the action alternatives may indirectly and cumulatively impact *Allium sanbornii* var. *congdonii*, *Allium sanbornii* var. *sanbornii*, *Chlorogalum grandiflorum*, and *Perideridia bacigalupi* but those impacts are not considered significant at this time unless entire occurrences are negatively impacted.

Older Forest Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited within older forests.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact older forest plant communities. At this time the TNF does not have any watchlist plants or plant communities dependent on older forests. Therefore, implementation of Alternative 1 would not impact watchlist plants or plant communities located within older forests. Alternative 1 does not prohibit cross country travel on 330,200 acres which includes 627 miles of motorized trail un-authorized for motorized use.

There are about 353,631 acres of older forest on TNF system lands which 29,900 acres or about 9 percent are currently impacted by motorized vehicle use. (Motorized vehicle use is already prohibited on about 23,431 acres of older forest.) This acreage number was obtained using about 100 feet on either side of NFTS motorized roads and trails, and the motorized trails un-authorized for motorized use that pass through vegetation mapped as CWHR 4 and above on NFS lands. The significance of nine percent disturbance is unknown.

Action alternatives: All of the action alternatives prohibit cross country travel. Therefore, direct/indirect impacts to older forest plant communities from cross country travel would not occur. Implementation of the action alternatives would not impact watchlist plants or plant communities. Refer to Table N-10. Alternative 5 prohibits motorized use of 486 of the 627 miles of motorized trail un-authorized for motorized use located within older forest plant communities or about 78 percent. Alternative 2 prohibits use of about 591 miles of motorized trail un-authorized for motorized use in older forest plant communities or about 94 percent. Alternative 6 prohibits motorized use of 594 miles or about 95 percent. Alternatives 4 and 7 prohibit motorized use of about 97 percent of the motorized trail un-authorized for motorized use in older forest plant communities. Alternative 3 prohibits motorized use of 100 percent of the motorized trails un-authorized for motorized use within older forest plant communities.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trail un-authorized for motorized use proposed to be added to the NFTS within older forest plant communities. [The miles of proposed additions to the NFTS that pass through older forests (CWHR 4 and above) is the indicator used to analyze impacts to unsurveyed older forest habitats. Table N-10 displays the number of miles proposed for addition to the NFTS in older forest plant communities by alternative.]

Table N-10. Miles[5] of motorized use within older forest plant communities by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	1,088	1,088	1,088	1,088	1,088	1,088	1,088
Private/other jurisdiction roads	220	220	220	220	220	220	220
Cross country travel (acres)	330,200	0	0	0	0	0	0
Motorized trails un-authorized for motorized use (miles)	627	0	0	0	0	0	0
Additions to the NFTS	0	36	0	17	141	33	22
Subtotal Motorized	**1934**	**1344**	**1308**	**1325**	**1449**	**1341**	**1330**

No Action: Alternative 1 does not add any motorized trails to the NFTS. Implementation of Alternative 1 could impact older forest plant communities directly and indirectly by continuing use of motorized trails un-authorized for motorized use within older forest plant communities. Refer to Table N-10 which shows the miles of motorized trails un-authorized for motorized use within these plant communities by alternative. Implementation of Alternative 1 could also directly impact older forest plant

[5] Miles are approximate

communities through use of about 1088 miles of NFTS roads and trails located within these plant communities. Direct and indirect impacts to watchlist plants and plant communities are not expected.

Surveys of about 62 miles of the motorized trails un-authorized for motorized use have been completed to date. No watchlist plants, plant communities or weeds were found in older forests in those surveys.

Action Alternatives: Implementation of Alternative 5 adds the most miles to the NFTS in these plant communities – 141 miles. Therefore, implementation of Alternative 5 has the greatest risk of negative impacts to older forest plant communities of the action alternatives. However, none of the action alternatives would impact watchlist plants or plant communities in older forests. Alternative 2 proposes to add 36 miles of motorized trails to the NFTS within older forest plant communities. Alternative 6 would add 33 miles, Alternative 7 – 22 miles, and Alternative 4 – 17 miles. Alternative 3 does not propose the addition of any motorized trails to the NFTS within older forest plant communities.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact older forest plant communities and the benefits from prohibiting the use of motorized trails un-authorized for motorized use are discussed.

Past: Many older forest plant communities in the Sierra Nevada have been directly removed or have had their functions impaired. Late-successional older forests of middle elevations (westside mixed conifer, red fir, white fir, eastside mixed conifer, and eastside pine types) at present constitute 7 to 30 percent of the forest cover, depending on forest type (Sierra Nevada Ecosystem Project 1996). It is reasonable to expect that the native plant (and animal) species dependent on older forest plant communities have also experienced a decline in range and population viability since pre-settlement times. Past management activities have cumulatively reduced the amount of older forest within TNF watersheds. The amount of reduction is unknown. Motorized vehicle use has added to the cumulative impacts to older forest plant communities.

Current: In this analysis, older forest is described as occurring in the red fir/upper montane forest and mixed-conifer forest. Other vegetation types exist that also have older trees, but mixed conifer and red fir are the primary types of older forest analyzed in this document. For more information about old forests, refer to the SNFPA (2001).

As mentioned previously, there are about 353,630 acres of older forest on TNF system lands, of which 29,900 acres or about 9 percent are currently impacted by use of NFTS motorized roads and trails, and the motorized trails un-authorized for motorized use. This acreage number was obtained using about 100 feet on either side of the NFTS motorized roads and trails and the motorized trails un-authorized for motorized use that pass through vegetation mapped as CWHR 4 and above on NFS lands. The significance of this percentage is unknown. Refer to the wildlife biological evaluation located in Appendix L of the DEIS for a discussion of cumulative effects to older forest dependent animal species.

Special uses projects such as utility corridor construction and maintenance, mining operations, and livestock grazing are all ongoing projects that impact older forest plant communities.

Reasonably foreseeable: Over the long term, with continued disturbance, older forest plant communities will continue to be fragmented through implementation of current and reasonably foreseeable management actions. In general terms, motorized vehicle use of NFTS roads and trails creates linear disturbances. As mentioned previously, there are 1,088 miles of NFTS motorized roads and trails on TNF lands. The impacts of linear disturbances within older forest plant communities are not known. The fuel reduction/timber harvest activities identified in Table N-5 do impact older forests but must retain some older forest characteristics due to SNFPA direction for maintenance of specific canopies and retention of larger trees. Reasonably foreseeable project other than fuel reduction/timber harvest have little impact older forest plant communities.

No action: Implementation of Alternative 1 cumulatively impacts older forest plant communities. Cumulative impacts occur when past and current impacts and the impacts of implementing Alternative 1 are added to the impacts of those actions identified in Table N-5. However, watchlist plants and plant communities would not be impacted. Alternative 1 does not prohibit cross country travel on 330,200 acres including 627 miles of motorized trail un-authorized for motorized use route located in older forest plant communities. Older forests are not considered sparsely vegetated and the ability to drive across the terrain is somewhat limited. However, surveys to date have shown that motorcycles are not limited in their ability to drive cross country through older forest plant communities. Refer to the project files and the survey records of specific routes.

One of the biggest impacts of disturbance of any kind is the introduction and spread of weeds. Refer to Appendix M (Weed Risk Assessment) of the DEIS for more discussion of how weeds are introduced and spread within older forest plant communities. Over the long term, weeds that are introduced into older forests could spread to other areas. However, motorized trail un-authorized for motorized use routes formed from cross country travel within older forests have a canopy closure that may reduce the establishment of weeds. This is unproven at this time and is dependent on such factors as the width of the route and whether sunlight reaches the edges of the route or wheel tracks.

Action alternatives: All action alternatives would reduce the number of miles of motorized trail un-authorized for motorized use open for motorized vehicles in older forest plant communities. Past management activities have cumulatively reduced the amount of older forest plant communities within TNF watersheds and use of NFTS motorized roads and trails add to those cumulative impacts. The significance of additional impacts to older forest plant communities from use of NFTS motorized roads and trails to cumulative effects is unknown and is not being analyzed in this document other than the acknowledgement that use of NFTS motorized roads and trails contributes to cumulative effects. None of the reasonably foreseeable actions listed in Table N-5 are expected to significantly impact older forest plant communities on their own because the reasonably foreseeable projects listed are not located within older forest plant communities and/or will retain the largest trees, large down wood, and will not significantly reduce canopy closure.

Alternative 5: Implementation of Alternative 5 cumulatively impacts older forest plant communities. Implementation of Alternative 5 has the greatest number of miles of motorized trails un-authorized for motorized use within older forest plant communities (141 miles) of all of the action alternatives. Surveys of NFTS Management Level 1 and temporary roads proposed in Alternative 5 are not considered current.

Alternative 5 prohibits the use of the fewest miles of motorized trail un-authorized for motorized use located within older forests – about 78 percent. Therefore implementation of Alternative 5 has the greatest risk of negatively impacting older forest plant communities.

Alternatives 2 and 6: Implementation of Alternatives 2 and 6 could cumulatively impact older forests but those impacts are not considered significant even when added to past, current, and reasonably foreseeable future management actions. The risk of negative impacts to older forest plant communities due to implementation of Alternatives 2 and 6 is less than under implementation of Alternative 1 due to the prohibition of cross country travel. As described above, Alternative 2 proposes the addition of 36 miles of motorized trail un-authorized for motorized use to the NFTS. Alternative 6 proposes 33 miles. Both alternatives prohibit use of about 95 percent of the motorized trail un-authorized for motorized use located within older forest plant communities.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 could cumulatively impact older forests but those impacts are not considered significant even when added to past, current, and reasonably foreseeable future management actions. The risk of negative impacts due to implementation of Alternatives 4 and 7 is less than under implementation of Alternative 1 due to the prohibition of cross country travel. As described above, Alternative 4 proposes the addition of 17 miles of motorized trail un-authorized for motorized use route and Alternative 7 proposes 22 miles. Both alternatives prohibit use on about 97 percent of the motorized trails un-authorized for motorized use located within older forest plant communities.

Alternative 3: Implementation of Alternative 3 could cumulatively impact older forests. Alternative 3 does not propose additions to the NFTS and prohibits cross country travel. Alternative 3 prohibits use of 100 percent of the motorized trails un-authorized for motorized use located within older forest plant communities. Implementation of Alternative 3 adds to cumulative impacts to older forest plant communities through use of the NFTS within those plant communities.

Oak Woodland Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited within oak woodlands.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact oak woodland plant communities and the watchlist plants that may occur within them. Alternative 1 does not prohibit cross country travel on 13,500 acres of oak woodland (which contains 19 miles of motorized trail un-authorized for motorized use). Under implementation of Alternative 1 as yet undiscovered watchlist plant occurrences would be at risk as new motorized trails un-authorized for motorized use were created. It is expected that cross country use would damage at least some watchlist plant occurrences (if they are present on TNF system lands) and it is reasonable to expect that some occurrences would be lost. Oak woodland plant communities are considered fairly open terrain.

There are about 13,886 acres of oak woodland on TNF system lands, with about 22 miles of NFTS motorized roads and trails, and 19 miles of motorized trail un-authorized for motorized use located within them. Cross country travel by motorized vehicle is already prohibited on 386 acres of oak woodland.

Direct impacts to watchlist plants from implementation of Alternative 1 could be significant at least at the local, site specific level. Cross country use could kill and/or injure watchlist plants directly and indirectly through soil changes and the introduction and spread of weeds. Cross country use would also damage other native vegetation in these plant communities, increasing the risk of erosion. The significance of direct impacts is dependent on many factors including the amount of disturbance, the watchlist plants being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of watchlist plants that occur in a specific location and how many of them are damaged. Currently there are no watchlist plants on the TNF list that are oak woodland plant community dependent. However, several of the watchlist plants on the TNF list could grow in oak woodlands.

Heavy cross country impacts within oak woodland plant communities containing watchlist plants would be considered significant. It is impossible to know when or where cross country motorized vehicle use would occur, so these disturbances are difficult to quantify. Since Alternative 1 allows cross county travel, the risk of significant impacts to watchlist plants that may occur within unsurveyed potential habitats is higher than in the action alternatives. Reducing and/or eliminating impacts to watchlist plants are considered effective methods of reducing cumulative impacts to them. However, flag and avoid is not a practical mitigation when cross country travel is allowed. Allowing unrestricted motorized vehicle use across the forest greatly increases the risk of negative indirect impacts to watchlist plants.

Action alternatives: All of the action alternatives prohibit cross country travel. Therefore, direct impacts to watchlist plants within oak woodland plant communities from cross country travel would not occur. Refer to Table N-11. Alternative 5 prohibits use on 17 of the 19 miles (90 percent) of motorized trail un-authorized for motorized use routes located within oak woodland plant communities. All of the other action alternatives (including Alternative 3) prohibit use on about 19 miles of motorized trail un-authorized for motorized use in oak woodlands.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trails proposed to be added to the NFTS within oak woodland plant communities.

No Action: Alternative 1 does not add motorized trails to the NFTS.

Surveys of about 62 miles of motorized trail un-authorized for motorized use have been completed to date. No watchlist plants or new weed occurrences were found in oak woodlands during those surveys.

Table N-11. Miles[6] of motorized use within oak woodland plant communities by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	22	22	22	22	22	22	22
Private/other jurisdiction roads	19	19	19	19	19	19	19
Cross country travel (acres)	13,500	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	19	0	0	0	0	0	0
Additions to NFTS	0	<1	0	<1	2	<1	<1
Subtotal Motorized	**60**	**41**	**41**	**41**	**43**	**41**	**41**

Action Alternatives: All action alternatives reduce the number of miles of motorized trail un-authorized for motorized use in oak woodland plant communities. Refer to Table N-11 which shows the miles of motorized trail proposed for addition to the NFTS within these plant communities by alternative. None of the action alternatives add significant numbers of miles of motorized trail to the NFTS. Alternative 5 proposes the most miles of motorized trail in these plant communities – 2 miles. Therefore, of the action alternatives, implementation of Alternative 5 has the greatest risk of negative indirect impacts to watchlist plants that may occur within oak woodland plant communities. Possible impacts would be primarily indirect impacts from dust and increased weed introduction and spread. In addition, surveys of Management Level 1 and temporary roads proposed under Alternative 5 (but not under other alternatives) are not current and there is a risk that watchlist plants could be impacted if they occur along them. Alternatives 2, 4, 6, and 7 all add less than one mile of motorized trail un-authorized for motorized use to the NFTS. This is less than one percent of the motorized trails un-authorized for motorized use located within oak woodlands. Alternative 3 does not propose the addition of any motorized trails and would not directly impact watchlist plants or plant communities.

Watchlist plant occurrences found in the FY 2008 surveys will be protected (impacts will be reduced and/or eliminated) from the direct impacts of motorized vehicles. Indirect impacts such as covering them in dust and increased risk of weed introduction and spread would still occur. However, if watchlist plants occur within 30 or 100 feet of the motorized trails without current surveys proposed in Alternative 5 (refer to Chapter 2 of the DEIS for a listing) they will remain undetected and will continue to be directly and indirectly impacted.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact oak woodland plant communities and the watchlist plants that may occur within them, as well as the benefits from prohibiting use of motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by frequently evaluating motorized trails, implementing mitigations to reduce impacts to watchlist plants, and identifying and treating weeds. This motorized trail evaluation combined with rapid mitigation of

[6] Miles are approximate

resource damage avoids significant impacts to oak woodlands plant communities and watchlist plants dependent on them, in the short and long term.

Past: As identified previously, California's oak woodlands have experienced extensive historic disturbance. No other ecosystem in the Sierra Nevada has experienced more human influence over a longer time period than the oak woodlands (Anderson in SNFPA 2001). The amount of oak woodland plant communities and their health has been reduced across the State.

Current: Motorized vehicles impact TNF oak woodlands by: introducing and spreading weeds, damaging native vegetation, increasing soil erosion, and fragmenting habitats. Refer to Table N-11 for the number of miles of proposed additions to the NFTS in oak woodlands by alternative. Other on going projects on the forest that impact oak woodlands include: special uses projects such as utility corridor construction and maintenance that pass through and impact oak woodlands; minerals operations that remove native vegetation and recontour the landscape; and livestock grazing projects. The TNF does not have any watchlist plants that are entirely dependent on oak woodlands. However, watchlist plants could occur in oak woodlands including *Erigeron petrophilus* var. *sierrensis*.

Reasonably foreseeable: When the past and current impacts are added to the impacts of the reasonably foreseeable future actions identified in Table N-5, risks to oak woodlands increase. Some of the oak woodland plant communities managed by the TNF are located in steep inner gorges. The TNF has some oak tree species that occur within mixed conifer plant communities - but mixed conifer plant communities are not considered oak woodlands. Even though mixed conifer plant communities are not oak woodlands, the oaks that occur within them are considered valuable resources. Therefore, some of the fuel reduction/timber harvest activities identified in Table N-5 retain some oaks within mixed conifer plant communities and remove conifers allowing oaks to receive more light and nutrients – for example the Canyon Forest Health project. However, very few fuel reduction activities and no timber harvest activities occur in oak woodlands on the TNF. The biggest impact of disturbance of any kind within oak woodlands is the risk of introduction and spread of weeds.

No action: Implementation of Alternative 1 allows cross country travel within TNF oak woodland plant communities and carries the greatest risk of negative impacts to watchlist plants located within those plant communities. There are no known occurrences of watchlist plants located within oak woodlands on TNF system lands. However, there is a high risk of weed infestation in these lower elevations. Cross country travel would spread weeds. Refer to Appendix M (Weed Risk Assessment) for more information about weed infestation. In summary, weeds can displace watchlist plants if the weeds become established and spread within occurrences. Weed introduction and spread within watchlist plant occurrences is considered a significant long term impact. Therefore, when the impacts of all past, current and reasonably foreseeable management actions are added together, the possible impacts of cross country travel and use of motorized trail un-authorized for motorized use within oak woodlands has the potential to significantly impact watchlist plants over the long term (over 5 years).

Action alternatives: All action alternatives reduce the number of miles of motorized trails un-authorized for motorized use in oak woodlands. However, implementation of the action alternatives could cumulatively impact watchlist plants located within oak woodlands even though surveys to date (about 62 miles) have not detected any watchlist plants in them. However, past management activities have

cumulatively reduced the amount of oak woodland within TNF watersheds. Motorized vehicle use adds to the cumulative impacts to oak woodland plant communities, but the significance of those impacts is unknown. Refer to the discussion of impacts to oak woodland plant communities under the no action alternative.

Alternative 5: Implementation of Alternative 5 has less risk of negative impacts to watchlist plants within oak woodlands primarily because it prohibits cross country travel. Of the action alternatives, implementation of Alternative 5 carries the highest risk of negative impacts to oak woodland plant communities since it has the most miles of proposed additions to the NFTS. Alternative 5 proposes the addition of 8 motorized trails for a total addition of 2 miles. However, compared to Alternative 1, Alternative 5 reduces cumulative impacts to oak woodland plant communities by prohibiting motorized use of about 90 percent of motorized trail un-authorized for motorized use in these plant communities and prohibiting cross country travel. Surveys of Management Level 1 and temporary roads proposed for addition to the NFTS in Alternative 5 are not current. Therefore, implementation of Alternative 5 could directly and indirectly impact watchlist plants and plant communities.

Alternatives 2, 3, 4, 6, and 7: These action alternatives propose the addition of less than one mile of motorized trail within oak woodlands and prohibit motorized use of close to 100 percent of the total motorized trails un-authorized for motorized use. This is not considered a significant addition to cumulative impacts to oak woodlands or the watchlist plants that may be growing there. The less than one mile of motorized trail proposed for addition to the NFTS will be surveyed in FY 2008 and if watchlist plants are found, they will have mitigations implemented to reduce and/or eliminate direct impacts. Indirect impacts could still occur from dust and increased risk of weed introduction and spread.

Forest edges and openings

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited within forest edges and openings.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact the watchlist plants dependent on forest edges and openings. Over the long term (5 years plus) those impacts could be significant. Alternative 1 does not prohibit cross country travel. Forest edges and openings plant communities are generally accessible to motorized vehicles. Under implementation of Alternative 1 known and as yet undiscovered watchlist plant occurrences would be at risk as new motorized trails were created. It is expected that long term cross country use could damage at least some watchlist plant occurrences and it is reasonable to expect that some occurrences would be lost.

There are about 498,700 acres of forest edges and openings on TNF system lands, with about 1708 miles of NFTS motorized roads and trails and 925 miles of motorized trail un-authorized for motorized use located within them.

Direct impacts to watchlist plants from cross country use could be significant at least at the local, site specific level. The significance of direct and indirect impacts is dependent on many factors including the amount of disturbance, the watchlist plants being impacted, and in some cases, the season when the

disturbance takes place. The significance of impacts is also dependent on the number of watchlist plants that occur in a specific location and how many of them are damaged.

Cross country impacts within forest edges and openings containing watchlist plants would be considered significant if those disturbances were heavy. However, the significance of impacts is dependent on a variety of factors including the watchlist plant species, timing of the disturbances, and other factors. It is impossible to know when or where cross country motorized vehicle use would occur, so these disturbances are difficult to quantify. Since Alternative 1 does not prohibit cross county travel, the risk of significant impacts to watchlist plants is higher than in the action alternatives. Reducing and/or eliminating impacts to watchlist plants through flag and avoid methods is not a practical mitigation when cross country travel is allowed. Allowing unrestricted motorized vehicle use across the forest greatly increases the risk of negative impacts to watchlist plants.

Action alternatives: All action alternatives prohibit cross country travel on 498,700 acres of forested edge and opening plant communities. Therefore, direct impacts to watchlist plants within forest edges and openings from cross country travel would not occur. Refer to Table N-12.

Table N-12. Miles of motorized use within forested edge and opening plant communities[7] by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	1,708	1,708	1,708	1,708	1,708	1,708	1,708
Private/other jurisdiction roads	289	289	289	289	289	289	289
Cross country travel (acres)	498,700	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	925	0	0	0	0	0	0
Additions to the NFTS	0	43	0	16	191	45	26
Subtotal Motorized	**2922**	**2040**	**1997**	**2013**	**2188**	**2042**	**2023**

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trail un-authorized for motorized use proposed to be added to the NFTS within forest edges and openings. (Note: there is overlap between these plant communities and aquatic/riparian, serpentine, older forest, and oak woodland plant communities. Therefore the number of miles of motorized trail un-authorized for motorized use present in forest edge and openings plant communities contains some of the miles of motorized trail un-authorized for motorized use shown in the other plant communities and the totals from all plant communities do not add up to 1,400 miles.)

No Action: Alternative 1 does not add motorized trails to the NFTS.

Surveys of about 62 miles of motorized trail un-authorized for motorized use have been completed to date. No watchlist plants or new weed occurrences were found in forest edges and openings during those surveys.

[7] Forested plant communities are those that are not considered older forest, oak woodland, aquatic/riparian, high elevation opening/rocky area, and serpentine. Miles represent routes that pass within 100 feet of forested plant communities. Miles are approximate and NFS lands only.

Action Alternatives: Refer to Table N-12 which shows the miles of motorized trail proposed within these plant communities by alternative. Alternative 5 adds 191 miles to the NFTS or about 21 percent of the motorized trails un-authorized for motorized use in forest edges and openings. Alternatives 2 and 6 add 43 and 45 respectively or about 5 percent. Alternatives 4 and 7 add 16 and 26 miles respectively-about 2 and 3 percent of the motorized trails un-authorized for motorized use. Alternative 3 does not add any motorized trails to the NFTS within forest edges and openings and would not directly or indirectly impact watchlist plants through motorized vehicle use of additions to the NFTS.

Watchlist plant occurrences found in the FY 2008 surveys will have direct motorized vehicle impacts reduced and/or eliminated through implementation of mitigations for them. Indirect impacts such as covering them in dust and increased risk of weed introduction and spread would still occur. However, if watchlist plants occur within 30 or 100 feet of Management Level 1 and temporary roads proposed in Alternative 5 they will remain undetected and will continue to be directly and indirectly impacted. The significance of impacts to watchlist plants varies by such factors as the type of plant, amount of disturbance, and location.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact forest edges and openings and the watchlist plants that may occur within them, as well as the benefits from prohibiting use of motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by implementing frequent evaluation of motorized trails, implementing mitigations to reduce impacts to watchlist plants, and rapid detection/treatment of weeds. This motorized trail evaluation combined with rapid mitigation of resource damage avoids significant impacts to forest edges and openings and watchlist plants in the short and long term.

Past: Plants that are dependent on openings and edges within forested plant communities are not considered habitat specific and the habitats are not considered limited. Management activities have occurred on TNF system and privately owned lands for over a century. This long history of disturbance has contributed to the lack of an undisturbed reference for most plants. Therefore, it is not possible to quantify how these past management activities have impacted watchlist plants/plant communities. In addition, past management has created conditions on the landscape that frequently contribute to cross country travel through the creation of skid trails and temporary roads. For example, temporary roads that were created during timber harvest projects are generally blocked off where they connect to NFTS motorized roads and trails once the project has been implemented. The temporary road may not be decommissioned because future silvicultural projects are planned. In a number of areas motorized vehicle users have removed the barriers blocking the temporary road and/or have gone around the barriers. Continued use of the temporary road creates a motorized route that has not been designed for motorized use over the long term. Past management activities have cumulatively added to the amount of forest edge and opening habitats but it is unknown if the edge and opening habitats created were suitable for:

Androsace occidentalis var. *simplex*, *Erigeron petrophyllus* var. *sierrensis*, and *Lilium humboldtii* ssp. *humboldtii*.

Current: Openings and forest edges are constantly being created naturally as trees and other vegetation dies, and lost when shrubs and other vegetation grow into them. Forest edge and opening habitats along roads/trails/areas have frequently become invaded by weeds. Most of the known weed occurrences on the TNF are associated with roads, trails, and landings. Motorized vehicle use is known to increase the risk of weed introduction and spread into new areas, reduce native plant cover, increase erosion, reduce photosynthetic ability of native plants by covering vegetation with dust, change water flow patterns across the landscape, and compact soil. Refer to Appendices J (Sensitive Plant BE) and M (Weed Risk Assessment). *Lilium humboldtii* ssp. *humboldtii* is currently being impacted primarily indirectly from use of lower elevation NFTS motorized roads and trails. Impacts to known occurrences include introduction and spread of weeds. Since this is a spring flowering bulb plant, impacts from dust are not considered significant.

Reasonably foreseeable: Forest edge and opening habitats are cumulatively impacted when past and current impacts are added to the reasonably foreseeable future actions identified in Table N-5. The lower elevation forest edge and opening habitats located along NFTS motorized roads and trails have frequently received weed seed from motorized vehicle use. All of the projects identified on Table N-5 will disturb existing forest edge and openings and/or create new ones. All of the ground disturbing projects identified in Table N-5 will or have already received botanical surveys to identify presence or absence of watchlist plants. Where watchlist plants are or where found, mitigations are implemented to reduce and/or eliminate impacts to them.

No action: Alternative 1 does not prohibit cross country travel and carries the greatest risk of negative direct and indirect impacts to watchlist plants and plant communities. In addition, impacts to known occurrences would occur. Impacts could be significant dependent on such factors as the type of watchlist plant being impacted, the number of individuals being impacted, and the severity of the disturbance. If motorized vehicle use impacted a watchlist plant occurrence to the point that it might not remain viable in an area and the loss of that plant in that particular area would substantially influence the risks to the entire species, the motorized vehicle use would have significant impacts to that species. As noted above, it is impossible to know when or where cross country motorized vehicle use would occur but since it would not be restricted in the no action alternative, the risk of negative impacts is higher. Since (in general terms) no restrictions would be in place to limit where motorized vehicle use could occur, all watchlist plant that can be accessed by motorized vehicles would be at increased risk. Cumulative impacts could be significant. Over the long term, cross country motorized vehicle use could kill significant numbers of watchlist plants and the occurrences could be lost. In addition, there is a high risk that introduction of weeds could eventually eliminate watchlist occurrences.

Implementation of Alternative 1 could impact the watchlist plants: *Androsace occidentalis* var. *simplex*, *Erigeron petrophyllus* var. *sierrensis* and *Lilium humboldtii* ssp. *humboldtii*. Impacts to watchlist plants are not considered significant unless entire occurrences are lost.

Action alternatives: Surveys of about 62 miles of proposed additions to the NFTS have not identified any new occurrences of watchlist plants growing in forest edge and opening plant communities.

If any watchlist plant occurrences are found in the FY 2008 surveys, direct impacts to them (from motorized vehicle use) will be reduced or eliminated. However, indirect impacts from dust and increased risk of weed introduction and spread could still occur. Since these types of plant communities have a high likelihood of having been disturbed in the more recent past, there is a high risk of weeds being present. Many of the proposed additions to the NFTS that pass through these plant communities pass through plantations of various ages.

Alternative 5: Implementation of Alternative 5 has the highest risk of indirect and cumulative impacts to forest edge/opening dependent watchlist plants (of the action alternatives) since it proposes the addition of the greatest number of motorized trails to the NFTS. However, implementation of Alternative 5 has less risk of indirect/cumulative impacts to watchlist plants dependent on forest edges/openings than Alternative 1 because it does not allow cross country travel. Impacts are not considered significant over the short term (5 years or less). Over the long term, the risk of weeds being introduced and spread along the 191 miles of proposed motorized trail un-authorized for motorized use and 1,708 miles of NFTS motorized roads and trails, is high. However, it is assumed that routine evaluation of motorized trails will occur by personnel who can identify weed species while the infestation is small in size and easily treated.

Alternatives 2 and 6: Implementation of Alternatives 2 and 6 could indirectly/cumulatively impact watchlist plants dependent on forest edge and opening habitats but those impacts are not considered significant. Alternatives 2 and 6 prohibit use on about 95 percent of the motorized trails un-authorized for motorized use in forest edge and opening plant communities and prohibit cross country travel. If watchlist plant occurrences are found along motorized trails that have not been surveyed, mitigations will be developed to reduce and/or eliminate direct impacts to them.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 could indirectly and cumulatively impact forest edge and opening plant communities but those cumulative impacts are not considered significant. Alternatives 4 and 7 propose the addition of fewer miles of motorized trail to the NFTS than Alternatives 1, 2, 5, and 6. Alternatives 4 and 7 propose the addition of 16 and 26 miles of motorized trail un-authorized for motorized use or about 2 and 3 percent of the motorized trails un-authorized for motorized use within forest edge and opening plant communities. Alternatives 4 and 7 also have a lower risk of introduction and spread of weeds than Alternatives 1, 2, 5, and 6.

Alternative 3: Implementation of Alternative 3 adds to the indirect and cumulative impacts of forest edge and opening plant communities and the watchlist plants dependent on them, but those impacts are not considered significant. Alternative 3 does not add motorized trails to the NFTS. Alternative 3 prohibits cross country use. Implementation of Alternative 3 would prohibit use of all 925 miles of motorized trail un-authorized for motorized use but motorized vehicle use would continue on 1,708 miles of NFTS motorized road and trail. This alternative has the lowest risk of weed introduction and spread which is a benefit for all watchlist plants.

Implementation of the action alternatives could impact the watchlist plants: *Androsace occidentalis* var. *simplex*, *Erigeron petrophyllus* var. *sierrensis* and *Lilium humboldtii* ssp. *humboldtii*. Impacts to watchlist plants are not considered significant unless entire occurrences are lost.

High elevation openings and rocky areas

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited within high elevation openings and rocky areas.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact the watchlist plants dependent on high elevation openings and rocky areas. Cross country travel on 28,800 acres containing 36 miles of motorized trail un-authorized for motorized use would continue. Over the long term (over 5 years) those impacts could be significant. High elevation openings and rocky areas are generally considered accessible to motorized vehicles. Under implementation of Alternative 1 known and as yet undiscovered watchlist plant occurrences would be at risk of impacts from motorized vehicles. Long term cross country use could damage at least some watchlist plant occurrences and it is reasonable to expect that some occurrences would be lost.

There are about 43,240 acres of high elevation openings and rocky areas on TNF system lands, with about 79 miles of NFTS motorized roads and trails and 36 miles of motorized trail un-authorized for motorized use located within them.

Direct impacts to watchlist plants from cross country use could be significant at least at the local, site specific level. The significance of direct and indirect impacts is dependent on many factors including the amount of disturbance, the watchlist plants being impacted, and in some cases, the season when the disturbance takes place. The significance of impacts is also dependent on the number of plants that occur in a specific location and how many of them are damaged.

Cross country impacts within high elevation openings and rocky areas containing watchlist plants could be considered significant. These areas are considered highly erosive with harsh growing conditions.

Action alternatives: All action alternatives prohibit cross country travel on 28,800 acres containing 36 miles of motorized trail un-authorized for motorized use and would reduce the number of miles of motorized trail un-authorized for motorized use. Direct/indirect impacts to watchlist plants within high elevation openings and rocky areas from cross country travel would not occur. Refer to Table N-13.

Table N-13. Miles of motorized use within high elevation opening and rocky areas by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	79	79	79	79	79	79	79
Private/other jurisdiction roads	26	26	26	26	26	26	26
Cross country travel (acres)	28,800	0	0	0	0	0	0
Motorized trails un-authorized for motorized use	36	0	0	0	0	0	0
Additions to the NFTS	0	3	0	0	3	3	2
Total Motorized	**141**	**108**	**105**	**105**	**108**	**108**	**107**

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trail un-authorized for motorized use proposed to be added to the NFTS within high elevation openings and rocky areas.

No Action: Alternative 1 does not add motorized trails to the NFTS. Alternative 1 does not prohibit cross country travel.

Action Alternatives: Table N-13 shows the miles of motorized trail proposed for addition to the NFTS within these plant communities by alternative. Alternatives 2, 5 and 6 add 3 miles of motorized trail to the NFTS or about 8 percent of the motorized trails un-authorized for motorized use in high elevation openings and rocky areas. Alternative 7 adds 2 miles – about 6 percent. Alternatives 3 and 4 do not add miles in high elevation openings and rocky areas and would not directly or indirectly impact watchlist plants in those areas.

Watchlist plant occurrences found in the FY 2008 surveys will have direct motorized vehicle impacts reduced and/or eliminated through implementation of mitigations for them. Indirect impacts such as covering them in dust and increased risk of weed introduction and spread would still occur. However, if watchlist plants may occur within 30 or 100 feet of Management Level 1 and temporary roads proposed in Alternative 5 since these roads do not have current surveys. These occurrences could remain undetected and would continue to be directly and indirectly impacted. The significance of impacts to watchlist plants varies by such factors as type of plant, amount of disturbance, and location.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact high elevation openings and rocky areas and the watchlist plants that may occur within them, as well as the benefits from prohibiting the use of motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by frequently evaluating motorized trails, implementing mitigations to reduce impacts to watchlist plants and conducting early detection and treatment of weeds. Frequent motorized trail evaluation combined with rapid mitigation of resource damage avoids significant impacts to high elevation opening and rocky area plant communities and watchlist plants in the short and long term.

Past: These plant communities are located at 6,000 feet and above and are generally areas with shallow soil. They can be found within forested areas or on ridges above forested areas. Historic management activities have altered high elevation opening and rocky area habitats in a number of ways. These areas were grazed by livestock, timber was removed, roads and trails were built through them, and some of them were impacted by mining activities. Since the plant communities that occur at these sites have adapted to generally highly erosive and shallow soils, with harsh conditions and short growing seasons; those areas heavily disturbed may remain unvegetated. Heavy snow years and unchecked erosion can limit plant establishment and stop the vegetative recovery process or push it back by several decades (Willard et al. 2007). Some of these openings and rocky areas have become infested with weeds such as

Klamath weed. Historic management activities have cumulatively reduced the amount and reduced the habitat quality for: *Claytonia megarhiza* and *Tonestus eximius*. It is believed that the *Asplenium trichomanes-ramosum* occurrence located on the TNF is a disjunct occurrence and probably does not occur any where else on the TNF except in the limestone caves where it is currently known to occur. Historic management activities probably did not impact limestone caves on the TNF.

Current: Current management activities in high elevation openings and rocky areas are primarily recreation related. Other on going projects on the forest that impact high elevation openings and rocky areas include: vehicle use of NFTS motorized roads and trails; special uses projects such as utility corridor construction and maintenance that pass through and impact many different types of plant communities including high elevation openings and rocky areas; minerals operations that remove native vegetation and recontour the landscape; and livestock grazing projects. None of these ongoing projects impacts these plant communities significantly in the short term (5 years or less). However, they do increase the risk of weed introduction and spread especially over the long term.

Reasonably foreseeable: High elevation openings and rocky areas are cumulatively impacted when past and current impacts are added to the reasonably foreseeable future impacts. However, none of the actions identified in Table N-5 are implemented in high elevation openings or rocky areas.

No action: Implementation of Alternative 1 adds to the cumulative impacts to watchlist plants dependent on high elevation openings and rocky areas through cross country travel on 28,800 acres containing 36 miles of motorized trail un-authorized for motorized use in these plant communities. Over the long term, continued and increased cross country motorized vehicle use within watchlist plant occurrences will eventually kill significant numbers of plants. Implementation of Alternative 1 may impact *Claytonia megarhiza* and *Tonestus eximius* significantly over the long term (over 5 years) if motorized vehicle use eliminates entire occurrences through cross country travel. It is believed that the *Asplenium trichomanes-ramosum* occurrence located on the TNF is a disjunct occurrence and probably does not occur any where else on the TNF except in the limestone caves where it is currently known to occur. These limestone cave areas are inaccessible by motorized vehicles. The occurrences of Claytonia megarhiza on TNF system lands are north of Mount Lola and are believed to be inaccessible to motorized vehicles. Tonestus eximius has not been found on the TNF. Impacts to either plant could be significant.

Therefore, implementation of Alternative 1 could impact *Claytonia megarhiza* and *Tonestus eximius*. Implementation of Alternative 1 would not impact *Asplenium trichomanes-ramosum*.

Action alternatives: Implementation of the action alternatives could cumulatively impact watchlist plants dependent on high elevation openings and rocky areas. Those impacts are not considered significant. In the past, motorized vehicle use was not expected to occur in these habitats because they are generally steep and highly erosive, rock outcrops, and/or very high elevation rocky openings. However, current technology has increased the ability of motorized vehicles to travel in these kinds of habitats. When motorized vehicle use occurs near or within the habitat itself, damage to the habitat can be severe. The plants dependent on these habitats do not appear to compete well with other vegetation. Therefore, weed introduction and/or spread could kill them over the long term. These plant communities are already subject to natural erosion and have a short growing period. Any disturbance increases the risk of erosion and could cause significant impacts to the soil and water components of the habitat. There are 11

motorized trails un-authorized for motorized use (all or part) located in high elevation (6,000 feet plus) openings/rocky areas on NFS lands. These 11 routes include: H652-5-5, TKN-J4, TKN-J5, TKS-11, YRN-11, YRS-003b, YRS-F1, YRS-F1b, YRS-F1c, YRS-G3, and YRS-G3w. Mitigations would also be developed for watchlist plant occurrences found in the FY 2008 surveys.

Alternatives 2, 5, and 6: Cumulative impacts from implementation of Alternatives 2, 5, or 6 are not considered significant. These alternatives propose the addition of about 3 miles of motorized trail to the NFTS. Alternatives 2, 5, and 6 prohibit use of about 33 miles of the 36 miles of motorized trail un-authorized for motorized use in these plant communities or about 92 percent of them. Implementation of Alternatives 2, 5, and 6 carries less risk of negative impacts to watchlist plants dependent on high elevation opening/rocky area plant communities than Alternative 1. However, of the action alternatives, implementation of Alternatives 2, 5, and 6 have the highest risk of negative indirect impacts to watchlist plants dependent on high elevation openings and rocky areas since they propose the addition of the most miles to the NFTS. Indirect impacts include impacts from dust and increased weed risk. Of the action alternatives, implementation of Alternatives 2, 5, and 6 have the highest risk of introducing and spreading weeds into high elevation openings and rocky areas. Of the action alternatives, implementation of Alternatives 2, 5, and 6 also add the greatest amount to the cumulative impacts to watchlist plants dependent on these plant communities, but those impacts are not considered significant in the short and long term.

Alternative 7: Cumulative impacts from implementation of Alternative 7 are not considered significant. This alternative prohibits cross country travel, therefore there is less risk to watchlist plants dependent on high elevation opening/rocky area plant communities than in Alternative 1. This alternative proposes the addition of about 2 miles of motorized trail to the NFTS. Conversely, it prohibits use on 34 of the 36 miles of motorized trail un-authorized for motorized use in these plant communities or about 94 percent of them. There is less risk of indirect impacts to watchlist plants dependent on high elevation opening/rocky area plant communities than in Alternatives 2, 5, and 6 because there are fewer miles proposed for addition to the NFTS and therefore less dust and weed risk.

Alternatives 3 and 4: Implementation of Alternatives 3 or 4 adds to the cumulative impacts of high elevation openings and rocky areas the least. Alternatives 3 and 4 prohibit cross country travel. Alternatives 3 and 4 do not propose the addition of any motorized trails to the NFTS. Alternatives 3 and 4 prohibit use on all 36 miles of motorized trail un-authorized for motorized use within these plant communities.

Therefore, implementation of the action alternatives could impact *Claytonia megarhiza* and *Tonestus eximius*, but not significantly. Implementation of the action alternatives would not impact *Asplenium trichomanes-ramosum*.

Noxious Weeds and Watchlist Plants/Plant Communities

1. Prohibition of cross country travel

Indicator(s) used to measure effects:

- Acres where cross country travel is prohibited.

No Action: Implementation of Alternative 1 would directly, indirectly, and cumulatively impact watchlist plants in the short and long term by increasing the risk of weed introduction and spread on TNF system lands. Implementation of Alternative 1 carries the highest risk of introduction and spread of aggressive, non-native plants (weeds) since it allows motorized vehicle use on the most miles of motorized trail un-authorized for motorized use and it allows cross country travel on most of the forest (except closed areas such as areas on the American River Ranger District). Motorized vehicles could access more NFS lands and potentially spread weeds to all accessible watchlist plant occurrences. Under implementation of Alternative 1, the number of motorized trails un-authorized for motorized use would increase through cross country use.

Motorized trails un-authorized for motorized use that have weed infestations have a high risk of spreading weeds to new areas. Surveys to date have identified several motorized trails that are infested with weeds. Refer to Table N-4. The motorized trails displayed in Table N-4 have the highest short and long term risk of weed spread. However, different weeds have different ecological impacts. Table N-4 also provides an indication of the ecological impact of the type of weed that infests the motorized trail. Under implementation of Alternative 1, all of the motorized trails identified in Table N-4 would continue to be used and that use would spread weeds. Refer to Appendix M (Weed Risk Assessment). Possible effects are discussed by weed species below:

Cheatgrass: Cheatgrass exists and will continue to spread on both sides of the forest. It will remain patchy in occurrence on the westside of the forest and will not cover large areas unless all vegetation is removed from infested areas, such as in a large wildfire. On the eastside of the forest, vehicles will continue to spread seed of this non-native grass. Cheatgrass eventually takes over plant communities such as sagebrush/bitterbrush if those plant communities experience continued disturbance. This is especially true after wildfire events. Motorized vehicle use across the landscape increases the risk of cheatgrass seed dispersal. Cheatgrass infestation also increases the risk of wildfire ignition. Increased wildfires in sagebrush/bitterbrush plant communities could lead to habitat conversion. Watchlist plants located in areas where there is cheatgrass could be lost over the long term (5 years plus). Motorized trails known to have cheatgrass infestations within 100 feet of the trail include: ARM-5, TKN-J9, TKN-M1 and TKN-M2. No watchlist plants were found along ARM-5, TKN-J9, and TKN-M1. Aspen was found along TKN-M2.

Musk thistle: Musk thistle will continue to spread along motorized trails and across landscapes located on the eastside of the forest. The areas most likely to experience musk thistle infestation include those where bare ground is formed, native vegetation is reduced, and a seed source is near. Motorized vehicles spread thistle seeds in the soil and mud attached to tires and vehicles. The bare soil areas created adjacent to motorized trails provide areas where thistle seeds can readily germinate and grow. Motorized trails known to have musk thistle infestations within 100 feet of the trail include: SV-P14 and TKN-J13. There are no known occurrences of watchlist plants along TKN-J13. Aspen was found along SV-P14. However, motorized vehicle use of these trails would spread musk thistle to other areas and over the long term may spread musk thistle to areas with watchlist plants. Use of SV-P14 would spread musk thistle to other areas in the short and long term.

Bull thistle: Bull thistle will continue to spread on both sides of the forest. The areas most likely to experience bull thistle infestation include those where bare ground is formed, native vegetation is reduced, and a seed source is near. Vehicles create bare soil and eliminate native vegetation within and adjacent to wheel tracks. Cross country use and use of motorized trails un-authorized for motorized use will spread this weed to new areas. Over the long term, bull thistle may be spread to watchlist plant occurrences. Bull thistle is known to occur along TKS-M9 and YRS-SF6. There are no known occurrences of watchlist plant along these motorized trails. However, there is a long term risk of spreading bull thistle from TKS-M9 and YRS-SF6 to areas of watchlist plants.

Klamath weed: Klamath weed will continue to spread on both sides of the forest. Occurrences will remain patchy and will be located primarily along the sides of motorized trails. Klamath weed seedlings are not strong competitors so reducing other vegetation benefits them. Therefore, it is expected that they will remain in disturbed areas. However, it is also expected that existing biological control agents will control this weed so it does not become widespread. Klamath weed is known to occur along route YRN-M3b. There are no known watchlist plant occurrences along YRN-M3b. However, there is a long term risk of spreading Klamath weed from YRN-M3b to areas of watchlist plants.

Tumble mustard: Tumble mustard will continue to spread via seeds. Vehicles will spread the seeds by moving them from place-to-place in the soil or mud on tires. Vehicles will also create bare soil conditions allowing this weed to more readily become established once it is introduced. Continued disturbance in an area where this mustard occurs will favor spread of the mustard versus establishment of native plants. Tumble mustard was found along 35-4-P in an old landing growing with cheatgrass. There are no known watchlist plants or plant communities in this area. However, the tumble mustard is very dense in the old landing.

Wooly mullein: Wooly mullein will continue to spread via seeds. Vehicles will spread seeds by moving them from place-to-place in soil or mud on tires. Vehicles will create bare soil areas that will help this weed become established. Continued disturbance will create new areas for it to move into. Wooly mullein is known to occur within 100 feet of TKN-J9. There are no known watchlist plant occurrences along TKN-J9. However, there is a long term risk of spreading wooly mullein from TKN-J9 to areas of watchlist plants.

Action alternatives: All of the action alternatives prohibit cross country travel which reduces the risk of introduction and spread of weeds by reducing the amount of NFS lands available for motorized travel. Therefore, the risk of direct/indirect impacts to watchlist plants from weed introduction and spread is less under the action alternatives in the short and long term compared to the no action alternative. Weeds will continue to spread on the forest, but it is believed the rate of spread will be slower than under the no action alternative primarily due to prohibiting use of some motorized trails un-authorized for motorized use and prohibiting cross country travel.

2. Additions to the National Forest Transportation System (NFTS)

Indicator(s) used to measure effects:

- Miles of motorized trail un-authorized for motorized use proposed to be added to the NFTS with weed occurrences with 100 feet.

- Watchlist plant and/or plant communities within 100 feet of proposed additions to the NFTS that have weed occurrences within 100 feet.

No Action: Alternative 1 does not prohibit cross country travel or add motorized trails to the NFTS. Implementation of Alternative 1 could impact watchlist plants and plant communities directly and indirectly over the long term by continuing use of those motorized trails un-authorized for motorized use routes and allowing cross country travel. Direct and indirect impacts could be significant at least at the local level.

Action Alternatives: Surveys to date have located weed occurrences within 100 feet of the following motorized trails: ARM-5, SV-P14, TKN-J9, TKN-J13, TKN-M1, TKN-M2, TKS-M9, YRM-M3, YRM-M4, YRN-008, YRN-M3b, YRS-SF6, and 25-4-P. Those action alternatives that propose these motorized trails have a high risk of introducing weeds into watchlist plant occurrences and plant communities over the long term. Aspen clones were found along TKN-M2, TKS-11, SV-005, SV-P8, and SV-P14. Motorized vehicle use of TKN-M2 and SV-P14 increases the risk of weeds being introduced and spreading within these aspen clones since those motorized trails already have weed occurrences along them.

Alternatives 2, 5, and 6 propose the addition of all of the motorized trails un-authorized for motorized use to the NFTS that are known to have weed occurrences (except Alternative 2 does not propose 35-4-P). Therefore, implementation of Alternatives 2, 5, and 6 have a high risk of introducing cheatgrass into the aspen clones located along TKN-M2 and SV-P14, and musk thistle into the aspen along SV-P14 in the short and long term. Alternatives 2, 5, and 6 have a high risk of introducing weeds into watchlist plant occurrences in other areas over the long term.

Alternative 7 proposes the addition of 9 of the 14 motorized trails known to have weed occurrences. Alternative 7 does not propose the addition of TKN-M2 to the NFTS but it does propose SV-P14. Implementation of Alternative 7 has a high risk of introducing musk thistle and cheatgrass into the aspen clone located along SV-P14 in the short and long term. Implementation of Alternative 7 has a high risk of introducing weeds into other watchlist plant occurrences over the long term.

Alternative 4 proposes the addition of 7 of the 14 motorized trails known to have weed occurrences. Alternative 4 does not propose the addition of TKN-M2, YRM-M3, YRM-M4, YRN-008, YRN-509, YRN-M3b, or 35-4-P to the NFTS. Of the motorized trails known to have aspen clones, Alternative 4 proposes only SV-P14. Therefore, implementation of Alternative 4 has a high risk of introducing musk thistle and/or cheatgrass into the aspen clone along SV-P14 in the short and long term through motorized vehicle use of SV-P14. Implementation of Alternative 4 has a high risk of introducing weeds into other watchlist plant and plant community occurrences over the long term.

Alternative 3 does not propose the addition of any of the 14 motorized trails un-authorized for motorized use known to have weed occurrences. Implementation of Alternative 3 could still spread weeds to watchlist plant occurrences and plant communities over the long term through motorized use of the NFTS. However, since Alternative 3 prohibits cross country travel and does not add any motorized trails to the NFTS, it is believed that the rate of weed spread would be slower. This is unproven.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact TNF system lands and the watchlist plants that may occur within them, as well as the benefits from closing motorized trail un-authorized for motorized use routes are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by frequently evaluating motorized trails, implementing mitigations to reduce impacts to watchlist plants and plant communities and conducting early detection and treatment of weeds. Frequent motorized trail evaluation to detect weeds combined with rapid treatment of those weeds avoids significant impacts to TNF system lands and watchlist plants in the short and long term.

Past: Most of the TNF is considered relatively weed free. This relatively weed free state may indicate that a source of weed seed was not available when TNF native plant communities were disturbed in the last century. This is unknown but appears to be a reasonable assumption based on literature that documents the progression of various weed species across California and the nation. It is also possible that weeds have persisted at low levels in some areas for decades before spreading rapidly when favorable conditions developed (Shepperd et al 2006). Many of the weeds found in California forests today were introduced intentionally or unintentionally by European settlers beginning in the 18th century (Bossard et al 2000). The lack of weed infestation in previously disturbed areas may also indicate less access onto the TNF by motorized vehicles. It is widely recognized that motorized vehicle use has increased over the last decade. It is also widely recognized that motorized use helps to spread weeds from place to place both by creating habitat along routes and by carrying seed/weed plant parts on vehicles. However weeds were introduced, it is known that they are spreading across California. Jepson (1925) listed 292 non-native plants (weeds) in California. By the end of the 20th century the estimate for non-native plants in California has risen to 1,045 (Randall and others 1998 in Shepperd et al 2006).

Current: In general terms, most weed occurrences on the TNF are located along State/County/Federal/NFTS roads. Weeds degrade NFS lands (including habitats for watchlist plants) by directly competing with native plants and causing their displacement. The number and types of weed infestations known on the TNF are displayed in Appendix M (Weed Risk Assessment) included by reference. Weeds are known to occur along NFTS motorized roads and trails, and the motorized trails un-authorized for motorized use. Ongoing management actions such as utility corridor maintenance, mining operations, and livestock grazing continue to spread weeds from place to place across the forest. As noted in other sections of this document, there are weed infestations competing with watchlist plants or plant communities for soil, water and nutrients in several locations. Watchlist plant communities with known weed infestations (and/or weed occurrences within 100 feet) include occurrences of aspen with cheatgrass and musk thistle. Weeds do not occur within all occurrences of watchlist plants or plant communities, but where they do occur, the watchlist plants and plant communities are at risk of being lost over the long term if the weeds are allowed to spread.

Motorized vehicle use of NFTS motorized roads and trails is also an ongoing activity that is known to negatively impact watchlist plants or plant communities through the introduction of weeds. Motorized vehicle use of NFTS roads and trails removes native vegetation, creating bare soil conditions. Dust from

use of native surface NFTS motorized roads and trails decreases native vegetation cover by reducing rates of photosynthesis, leaf conductance, transpiration, and water-use efficiency. Dust from motorized vehicle use has also been shown to increase temperatures of leaves and stems and decrease leaf surface areas (Munger et al 2003) negatively impacting plant vigor. Reduced native plant vigor increases the chance that weeds can become established.

Reasonably foreseeable: Implementation of those projects identified in Table N-5 may introduce weed seed and/or weed plant parts into new areas even though most management actions on the TNF require the washing of equipment that operates off roads if it is coming from a weed infested area, and the use of certified weed free plant materials for erosion control (when needed). However, all of the projects listed in Table N-5 involve travel on NFTS motorized roads and could introduce weed seed into new areas from their vehicles. Ground disturbance favors weed spread if the weeds are already on or near the area being disturbed. It is reasonably foreseeable that weeds will continue to spread on the TNF and will be introduced into watchlist plant or plant community occurrences over the long term.

No action: Implementation of Alternative 1 adds to the cumulative risk of weeds being introduced and spreading into watchlist plants or plant communities. As identified in the weed risk assessment for this project (Appendix M), implementation of Alternative 1 has a high risk of introducing weeds into new areas and spreading weeds from areas that are already infested with weeds. Implementation of Alternative 1 allows cross country use and does not prohibit use of motorized trail un-authorized for motorized use. Therefore, it has the greatest risk of negative impacts to TNF native plant communities and the watchlist plants dependent on them, of any of the alternatives. Implementation of Alternative 1 carries the highest risk of weed introduction into watchlist plant occurrences and plant communities since it allows motorized vehicle use on the greatest amount of NFS land.

Action alternatives: Motorized vehicle use provides a continuous source of weed seed introduction and also provides disturbed areas within and adjacent to the motorized vehicle roads/trails/areas. Refer to the weed risk assessment located in Appendix M and the discussion under the no action alternative for more information. All of the action alternatives prohibit cross country use. Therefore, all of the action alternatives have less risk of introducing weeds into watchlist plant occurrences and plant communities than Alternative 1.

Alternative 5: Of the action alternatives, implementation of Alternative 5 has the greatest risk of weed introduction and spread and therefore the greatest risk of negative impacts to watchlist plants and plant communities since it proposes the addition of the most miles of motorized trail un-authorized for motorized use to the NFTS. Alternative 5 adds about 283 of the 1,400 miles of motorized trail un-authorized for motorized use – or about 22 percent. In addition, many of the Management Level 1 and temporary roads proposed in Alternative 5 do not have current botanical surveys. Therefore, these roads may have weed occurrences that would go undetected, allowing them to spread and grow in size. It is unknown whether the Management Level 1 and temporary roads proposed in Alternative 5 have occurrences of watchlist plants, watchlist plant communities, or weeds. However, implementation of Alternative 5 has a high risk of impacting watchlist plants and plant communities over the long term through the spread of weeds. Since implementation of Alternative 5 prohibits cross country travel, and it

has less risk of spreading weeds into watchlist plant occurrences and/or watchlist plant communities over the long term than implementation of Alternative 1.

Alternatives 2 and 6: Alternatives 2 and 6 have a greater risk of spreading weeds into watchlist plant occurrences and/or watchlist plant communities over the long term than Alternatives 3, 4, and 7, but not as great a risk as Alternatives 1 and 5. Alternative 2 proposes the addition of 73 of the 1,400 miles of motorized trail un-authorized for motorized use or about 6 percent. Alternative 6 proposes the addition of 70 miles or about 5 percent. In addition, Alternative 2 adds shoreline access on dry soils in the Prosser, Boca and Stampede Reservoir areas. Reservoir shoreline areas are known to have weed occurrences when the water level is low. For example, Canada thistle is known to occur along the low water line of French Meadows reservoir and musk thistle, wooly mullein, and bull thistle are known to occur along the Boca reservoir low water line. When these weed occurrences are covered with water, many of the weed seeds are killed. However, some of the weed seed floats to new areas. Any motorized vehicle use in the areas where the weeds are located will spread the weeds to new areas. Alternative 2 also proposes the addition of Eureka Diggings and Greenhorn areas. These are generally unvegetated areas where vehicles are not restricted to motorized trails. These unvegetated areas provide sites where weeds can readily become established without competition from native vegetation. Established weed sites can spread weed seed to new areas as vehicles go from infested sites to other areas. Therefore, the risk of spreading weeds into watchlist plant occurrences and/or watchlist plant communities is higher in Alternative 2 than in Alternative 6, primarily because Alternative 2 has more area open for motorized vehicle use.

Alternatives 4 and 7: Implementation of Alternatives 4 and 7 have a lower risk of spreading weeds into watchlist plant occurrences and/or watchlist plant communities than implementation of Alternatives 1, 2, 5, and 6. Alternative 4 proposes the addition of 31 miles of motorized trail un-authorized for motorized use to the NFTS or about 2 percent of the 1,400 miles. Alternative 7 proposes the addition of about 45 miles or about 3 percent. The long term risk of negative impacts to watchlist plants and/or watchlist plant communities from weed introduction and spread is lower because these alternatives propose the addition of fewer miles of motorized trails to the NFTS and prohibit cross country travel.

Alternative 3: Alternative 3 has the least short and long term risk of weed introduction and spread into watchlist plant occurrences and/or watchlist plant communities because it does not propose the addition of motorized trails un-authorized for motorized use to the NFTS, it prohibits use of 1,400 miles of motorized trail un-authorized for motorized use, and prohibits cross country travel.

Plant Biodiversity and Plant Community Fragmentation

1. Prohibition of cross country travel

Indicator used to measure effects:

- Acres where cross country travel is prohibited within inventoried roadless areas. (Refer to section 3.09 of the DEIS for more information about inventoried roadless areas on the TNF.)

No action: Alternative 1 does not add motorized trails to the NFTS. Alternative 1 allows cross country travel. Under implementation of Alternative 1, 54 miles of motorized trail un-authorized for motorized use located within inventoried roadless areas would be available for motorized vehicle use and

accessible areas within those inventoried roadless areas would be available for cross country travel. This increases the risk of weed introduction and spread within these areas - increasing the risk to native plant biodiversity and fragmentation of the native plant communities. Impacts could be significant over the long term.

Inventoried roadless areas are considered some of the largest unroaded native plant communities on the TNF (except for Granite Chief Wilderness). Since inventoried roadless areas have not been surveyed, impacts to native plant biodiversity and fragmentation of native plant communities are assessed versus impacts to specific watchlist plants and/or watchlist plant communities. Watchlist plants and plant communities add to native plant diversity and are considered important components of the native plant communities where they are located.

Action alternatives: All of the action alternatives prohibit cross country travel. Therefore there is less long term risk to native plant diversity and less risk of fragmentation impacts to native plant communities located within inventoried roadless areas under implementation of the action alternatives (compared to the no action alternative). Of the action alternatives, Alternative 5 prohibits use of the fewest miles of motorized trail un-authorized for motorized use within these areas and has the highest long term risk to native plant diversity and greatest risk of fragmentation impacts to native plant communities located within inventoried roadless. Alternative 5 would prohibit use of 38 miles of motorized trail un-authorized for motorized use within these areas or about 70 percent of the 54 miles. Alternative 2 would prohibit use of about 45 miles of motorized trail un-authorized for motorized use or about 83 percent; Alternative 6 would prohibit use of about 46 miles or about 85 percent, Alternative 7 would prohibit use of about 47 miles or about 87 percent, and Alternatives 3 and 4 prohibit use of all 54 miles of motorized trail un-authorized for motorized use located within inventoried roadless areas. Alternatives 3 and 4 have the lowest risk to native plant diversity and least risk of fragmentation impacts to native plant communities located within inventoried roadless areas.

2. Additions to the National Forest Transportation System (NFTS)

Indicator used to measure effects:

- Miles of motorized trail un-authorized for motorized use proposed for addition to the NFTS that are located within inventoried roadless areas.

No action: Alternative 1 does not propose the addition of any motorized trails to the NFTS, but also does not prohibit cross country travel on 109,100 acres including 54 miles of motorized trails un-authorized for motorized use located within inventoried roadless areas. Alternative 1 has the highest long term risk to native plant diversity and greatest risk of fragmentation impacts to native plant communities located within inventoried roadless of all the alternatives.

Action alternatives: All of the action alternatives would reduce the number of miles of open for motorized vehicles in inventoried roadless areas (compared to the No Action Alternative). Of the action alternatives, Alternative 5 proposes the addition of the greatest number of miles of motorized trails un-authorized for motorized use located in inventoried roadless areas – about 16 miles. Sixteen miles of motorized trail is about 30 percent of the existing miles within these areas. Of the action alternatives, Alternative 5 has the highest long term risk to native plant diversity and greatest risk of fragmentation

impacts to native plant communities located within inventoried roadless areas. Refer to Table N-14 which displays the number of miles of motorized trail un-authorized for motorized use proposed for addition to the NFTS by alternative in inventoried roadless areas. Alternative 2 adds 9 miles, Alternative 6 adds 8 miles, and Alternative 7 adds seven miles, which is 17 to 13 percent of the miles of motorized trail un-authorized for motorized use within these areas. Alternatives 3 and 4 do not add miles of motorized trail to the NFTS within inventoried roadless areas. Alternatives 3 and 4 have the lowest risk to native plant diversity and least risk of fragmentation impacts to native plant communities located within inventoried roadless areas.

Large blocks of land such as inventoried roadless areas are especially important areas for maintaining native plant and plant community diversity (Loomis et al. 2000). Inventoried roadless areas provide a natural benchmark or control to judge the effects of human development on natural systems and to understand relatively undisturbed ecological processes. In addition, naturally functioning ecosystems (plant communities) such as those often found in inventoried roadless areas provide many valuable services including watershed protection, carbon storage, nutrient cycling, pest control, pollination, and fish and wildlife habitat (ibid).

Table N-14. Miles of motorized use within inventoried roadless areas by alternative

Alternative	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Existing NFTS roads and motorized trails	129	129	129	129	129	129	129
Private/other jurisdiction roads	23	23	23	23	23	23	23
Cross country travel (acres)	109,100	0	0	0	0	0	0
Motorized trails un-authorized for motorized use (miles)	54	0	0	0	0	0	0
Additions to the NFTS	0	9	0	0	16	8	7
Subtotal Motorized	**206**	**161**	**152**	**152**	**168**	**160**	**159**

Watchlist plants located along motorized trails un-authorized for motorized use are more likely to be exposed to disruption by human activities and to experience problems with weeds. Adding motorized trails to the NFTS within inventoried roadless areas increases the risk that watchlist plants and/or plant communities will be lost and/or have the plant community where they are located fragmented by the motorized vehicle use and weeds. Once these motorized trails are shown on maps, they could receive increased use. Additional use could increase the risk of weed seed being introduced into the inventoried roadless area. Early detection of new weed introductions would be difficult since these areas are remote and generally accessible only by specialized 4 wheel drive/motorcycle equipment. TNF personnel trained in weed identification rarely travel them. This means that weeds could be introduced and go undetected for long periods of time. Infestations of weeds into these relatively weed free areas could negatively impact watchlist plants and plant communities. Over the long term, watchlist plants and/or plant communities could be displaced and/or severely impacted by weeds.

3. Cumulative effects including reasonably foreseeable

The spatial boundary of the cumulative effects analysis area is the TNF.

Indicator(s) used to measure effects: Past/present/reasonably foreseeable future actions that could potentially impact inventoried roadless areas and the watchlist plants and/or plant communities that may occur within them, as well as the benefits from prohibiting use of motorized trails un-authorized for motorized use are discussed. It is assumed that all of the action alternatives avoid long term cumulative impacts by frequently evaluating motorized trails, implementing mitigations to reduce impacts to watchlist plants and/or plant communities, and conducting early detection and treatment of weeds. Frequent motorized trail evaluation to detect weeds combined with rapid treatment of those weeds avoids significant impacts to TNF system lands and watchlist plant and plant communities in the short and long term.

Past: Past actions that have impacted the inventoried roadless areas on the TNF include all of the past actions identified under the different plant communities in this report. Inventoried roadless areas were not identified until the late 1970's during the Roadless Area Review and Evaluation (RARE I and RARE II). The character and amount of roads, private land, and motorized trails varies greatly by roadless area. Refer to section 3.09 of the DEIS for more information.

Current: Current management activities that occur within TNF inventoried roadless areas include use of NFTS motorized roads and trails, activities on private land that are adjacent to NFS lands, livestock grazing and minerals operations. The amount of use of NFTS motorized roads and trails, the types of private land activities, the amount and location of livestock grazing, and the minerals operations also vary by inventoried roadless area. For example, the following motorized trails un-authorized for motorized use are proposed for addition to the NFTS in the West Yuba inventoried roadless area: YRN-M3b, YRN-M3a, YRN-7, and YRN-M2. All of these motorized trails except YRN-7 were pioneered by miners to access mining claims. The East Yuba inventoried roadless area also has active mining operations. YRN-001, YRN-M1, YRN-11, YRN 5a and 5c, YRN-9, YRN-007, and YRN-4 are all motorized trails un-authorized for motorized use proposed for addition to the NFTS within the East Yuba roadless area. Of these motorized trails, YRN-M1, YRN-007, and YRN-4 were pioneered by miners. YRN-11, YRN 5a and 5c, YRN-9 and probably YRN-001 were pioneered by users. Motorized trails un-authorized for motorized use that miners use to access their mining claims will remain available for their use regardless of the alternative selected. Refer to section 3.09 of the DEIS for more information about each roadless area.

Reasonably foreseeable: Implementation of those projects identified in Table N-5 would not impact inventoried roadless areas. None of those projects are located within inventoried roadless areas.

No action: Implementing Alternative 1 has a greater risk of negative impacts to native plant diversity and a greater risk of negative impacts to native plant communities (and therefore the watchlist plants dependent on them) located within inventoried roadless areas than the action alternatives. Alternative 1 has a higher risk of these negative impacts to plant diversity and connectivity primarily due to allowing cross country travel and allowing motorized use on all 54 miles of motorized trail un-authorized for motorized use within roadless areas.

Motorized vehicle disturbance within inventoried roadless areas can reduce native plant biodiversity. Loss of native plant biodiversity is dependent on the intensity of motorized vehicle use, but even a single vehicle pass can destroy or disrupt many types of plant communities. Plants with shallow root systems may be especially vulnerable (Wilshire 1983, Lacey et al. 1997). This loss of native vegetation increases

the risk of soil loss due to wind and water erosion. Soil loss increases the decomposition of organic matter, weakens soil aggregate stability and can result in the formation of inorganic surface crusts. Inorganic surface crusts increase water runoff, inhibit germination and emergence of seedlings, and reduce water penetration into the soil. Natural soil stabilizers such as organic (lichen, fungal and algal) soil crusts are highly vulnerable to cross country motorized vehicle use. All of these impacts contribute to native plant community degradation and fragmentation.

Motorized vehicle use can fragment native plant communities. Plant community fragmentation is an issue for at least some watchlist plants. Those watchlist plants with specific pollination and habitat requirements are the most vulnerable to habitat fragmentation impacts. Motorized trails are frequently identified as the cause of habitat fragmentation. Cross country motorized vehicle use has been shown to have the same fragmentation effects as motorized vehicle routes. Cross country motorized vehicle use has been shown to reduce perennial and annual plant cover, reduce plant density, and overall above-ground vegetative biomass (Hall 1989). In general terms, the degree of plant loss depends on the intensity of motorized vehicle use.

The density of NFTS motorized roads and trails in the various roadless areas is described in section 3.09. Under Alternative 1, cross country use in roadless areas could create high road and trail density over the long term with negative cumulative impacts to native plant communities. Several areas on the TNF have a high density of motorized roads and trails – however none of the watersheds within inventoried roadless areas are considered high risk watersheds. Refer to section 3.02 (Soils and Watershed Resources) of the DEIS.

The inventoried roadless areas on the TNF are considered relatively free of motorized vehicle routes and are assumed to provide quality habitat for native plants/fungi. Since complete botanical surveys of inventoried roadless areas and other areas of the forest are not available, these assumptions are unproven. However, it is reasonable to expect relatively undisturbed large geographic areas to provide quality habitat for native plants/fungi.

It is expected that inventoried roadless areas on the TNF provide important biological strongholds for native plants and communities just as they do across the nation. Watchlist and other native plants in TNF inventoried roadless areas are less likely to be exposed to disruption by human activities such as collection, trampling, and other disturbance. This lower level of disruption may make roadless areas important references for understanding the natural composition and dynamics of native plant communities.

TNF inventoried roadless areas are less likely to experience problems with nonnative invasive plants (weeds) and are more likely to be able to maintain intact native plant communities. Native plants benefit within inventoried roadless areas by having reduced risk of future habitat degradation and disturbance, and conservation of existing biological strongholds. Implementation of the no action alternative would not provide these benefits to native plants.

Native plant communities are at increased risk of adverse cumulative effects from increased population growth and associated land uses, land conversions, and nonnative plant (weed) invasions. Therefore, the value of relatively unfragmented blocks of land such as inventoried roadless areas to watchlist plants and plant communities is likely to increase as habitat loss and habitat degradation

increase in scope and magnitude. Native plant community degradation, and from the invasion and/or encroachment of non-native plant and animal species are increasing.

Action alternatives: All of the action alternatives reduce impacts to native plants and plant communities by prohibiting cross country travel and reducing the number of miles of motorized trail un-authorized for motorized use within inventoried roadless areas. The action alternatives that propose the addition of the most miles of motorized trail un-authorized for motorized use to the NFTS within inventoried roadless areas have the greatest risk of negatively impacting native plant biodiversity and fragmenting native plant communities (and the watchlist plants and plant communities within them). The risk to native plants is closely tied to the high risk of introducing weeds into large blocks of land that are currently considered weed free.

Alternative 5: Of the action alternatives, implementation of Alternative 5 has the greatest risk of negative impacts to native plant diversity and has a greater risk of negative impacts to native plant communities through fragmentation. Of the action alternatives, Alternative 5 proposes the addition of the greatest number of miles of motorized trail un-authorized for motorized use located in inventoried roadless areas – about 16 miles. Sixteen miles of motorized trail is about 30 percent of the existing miles of motorized trail un-authorized for motorized use within these areas. Implementation of Alternative 5 has a high risk of weed introduction and spread within inventoried roadless areas. The significance of these impacts is hard to quantify. However, the risk is believed to be a long term risk (over five years) since motorized vehicle use of motorized trails un-authorized for motorized use in these areas is currently considered low.

Alternatives 2, 6 and 7: Implementation of Alternatives 2, 6 and 7 have more risk of negative impacts to native plant diversity and native plant community fragmentation caused by weed introduction and spread than Alternatives 3 and 4, but not as much as Alternatives 1 and 5. Alternative 2 adds 9 miles, Alternative 6 adds 8 miles, and Alternative 7 adds seven miles, of motorized trail un-authorized for motorized use to the NFTS. These additions range from 13 to 17 percent of the miles of motorized trails un-authorized for motorized use within these areas. Conversely, Alternative 2 would prohibit use on about 45 miles of motorized trail un-authorized for motorized use or about 83 percent; Alternative 6 would prohibit use on about 46 miles or about 85 percent, Alternative 7 would prohibit use on about 47 miles or about 87 percent.

Alternatives 3 and 4: Implementation of Alternatives 3 and 4 have the least risk of negative impacts to native plant biodiversity and fragmentation of native plant communities within roadless areas through introduction and spread of weeds. Alternative 3 and 4 do not propose additions to the NFTS within inventoried roadless areas. Alternatives 3 and 4 prohibit use on all motorized trails un-authorized for motorized use located within roadless areas. Implementation of Alternatives 3 and 4 will benefit watchlist plants (if they occur there)/native plant diversity/native plant community connectivity by reducing the risk of weed introduction and spread by motorized vehicles.

The value of large blocks of land such as inventoried roadless areas in conserving watchlist plants and/or watchlist plant communities is likely to increase as native plant communities are lost and/or degraded throughout the Sierra Nevada region through development, climatic change, weed and non-native animal infestation.

Recommendations

The following recommendations are made to reduce impacts to watchlist plants and plant communities:

- Use only certified weed-free products for erosion control (if needed) to avoid possible adverse impacts to watchlist plants and plant communities.
- Ensure that all equipment used to maintain routes and/or implement mitigations are weed free.
- Follow the TNF seeding guidelines
- Survey all proposed additions to the NFTS
- Develop mitigations to reduce/eliminate impacts to any watchlist plants and/or plant communities found along motorized trails un-authorized for motorized use

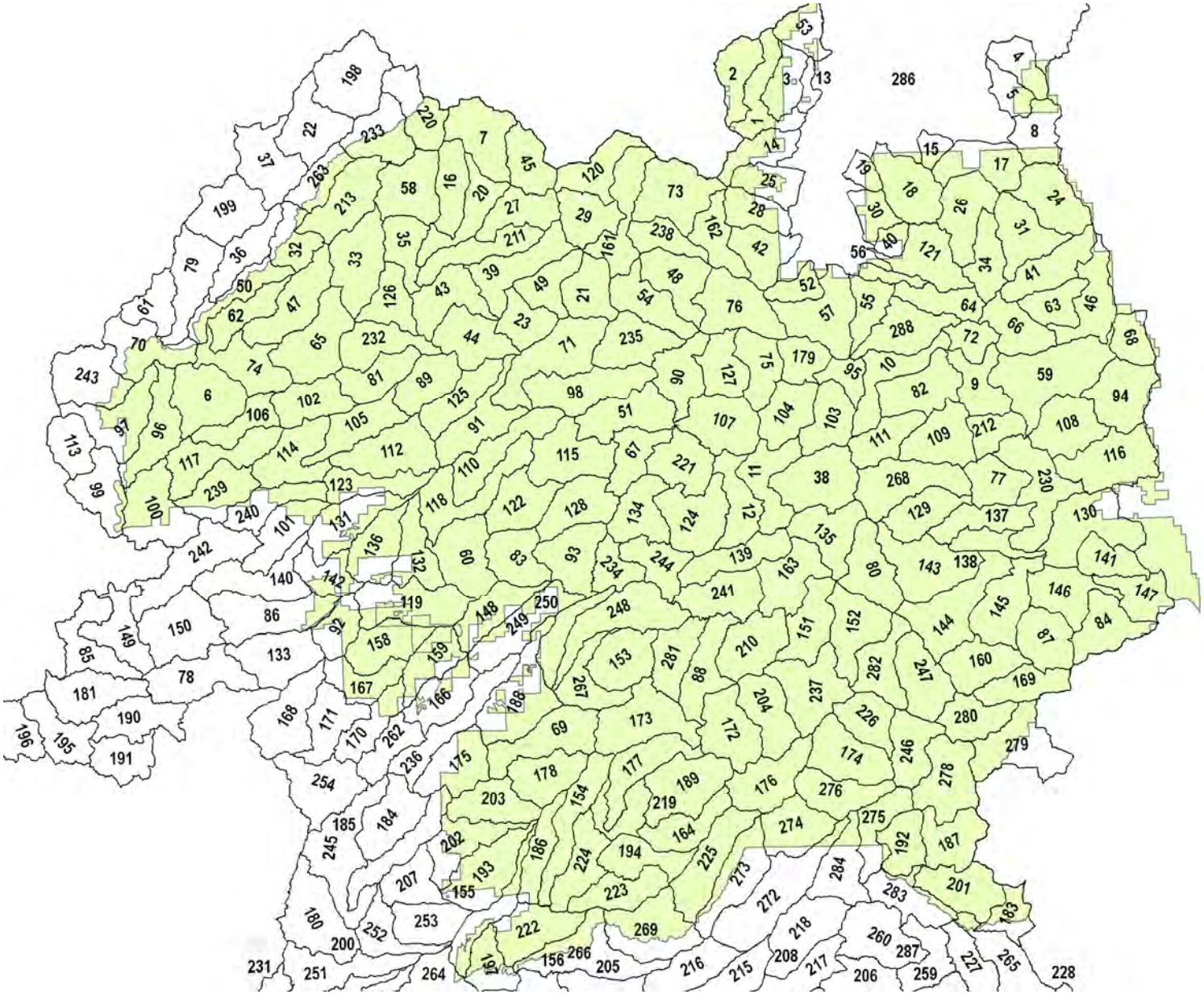
Project File

The project file contains the following information that was used in the evaluation of affects to watchlist plants and plant communities. They are located in the project files and Supervisor's Office files and are included within this report by reference.

- Best management practices (BMPs) for road and trail maintenance and reconstruction
- Soil, vegetation, watchlist plant occurrence, and project maps
- References
- TNF survey records

Appendix O

Watershed Map



MAP LEGEND							
Map Number	**HUC 7 Number**	**Map Number**	**HUC 7 Number**	**Map Number**	**HUC 7 Number**	**Map Number**	**HUC 7 Number**
1	18020123020503	**31**	18020123020103	**61**	18020125020301	**91**	18020125030301
2	18020123020501	**32**	18020125020105	**62**	18020125010506	**92**	18020125060102
3	18020123020502	**33**	18020125010502	**63**	16050102020402	**93**	18020125040302
4	18020123020601	**34**	18020123020104	**64**	18020123020302	**94**	16050102020501
5	18020123020602	**35**	18020125010408	**65**	18020125010504	**95**	16050102020104
6	18020125020305	**36**	18020125020106	**66**	16050102020401	**96**	18020125020306
7	18020125010401	**37**	18020125020203	**67**	18020125040402	**97**	18020125020304
8	18020123020603	**38**	18020125040201	**68**	16050102020404	**98**	18020125030202
9	16050102020205	**39**	18020125010304	**69**	18020128050303	**99**	18020125020308
10	16050102020201	**40**	18020123020203	**70**	18020125020302	**100**	18020125030506
11	18020125040202	**41**	18020123020101	**71**	18020125030203	**101**	18020125040701
12	18020125040203	**42**	18020123020402	**72**	16050102020202	**102**	18020125030402
13	18020123020604	**43**	18020125010306	**73**	18020125010202	**103**	16050102020103
14	18020123020405	**44**	18020125010305	**74**	18020125010507	**104**	16050102020101
15	18020123020207	**45**	18020125010404	**75**	18020125030102	**105**	18020125030502
16	18020125010403	**46**	16050102020403	**76**	18020125010101	**106**	18020125030403
17	18020123020106	**47**	18020125010505	**77**	16050102010303	**107**	18020125030101
18	18020123020206	**48**	18020125010102	**78**	18020125060202	**108**	16050102020502
19	18020123020205	**49**	18020125010302	**79**	18020125020205	**109**	16050102020301
20	18020125010402	**50**	18020125020107	**80**	18020125040101	**110**	18020125040501
21	18020125010301	**51**	18020125040403	**81**	18020125030401	**111**	16050102020203
22	18020125020202	**52**	18020123020401	**82**	16050102020204	**112**	18020125030304
23	18020125010303	**53**	18020123020605	**83**	18020125040304	**113**	18020125020307
24	18020123020102	**54**	18020125010103	**84**	16050102010403	**114**	18020125030503
25	18020123020404	**55**	18020123020304	**85**	18020125040804	**115**	18020125040404
26	18020123020105	**56**	18020123020201	**86**	18020125040702	**116**	16050102020503
27	18020125010405	**57**	18020123020303	**87**	16050102010401	**117**	18020125030404
28	18020123020403	**58**	18020125010407	**88**	18020128050204	**118**	18020125040502
29	18020125010205	**59**	16050102020405	**89**	18020125030501	**119**	18020125060101
30	18020123020204	**60**	18020125040503	**90**	18020125030104	**120**	18020125010204

MAP LEGEND							
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122	18020125040405	**152**	18020128050103	**182**	18020128060301	**212**	16050102020302
123	18020125030303	**153**	18020128050402	**183**	18020128020103	**213**	18020125020104
124	18020125040204	**154**	18020128030204	**184**	18020128050503	**214**	18020128020401
125	18020125030302	**155**	18020128040102	**185**	18020128050504	**215**	18020128020503
126	18020125010501	**156**	18020128020606	**186**	18020128030205	**216**	18020128020502
127	18020125030103	**157**	18020128040202	**187**	18020128020202	**217**	18020128020602
128	18020125040303	**158**	18020126010301	**188**	18020128050405	**218**	18020128020601
129	16050102010302	**159**	18020126010202	**189**	18020128030101	**219**	18020128030104
130	16050102010306	**160**	16050102010104	**190**	18020125060301	**220**	18020125020101
131	18020125040603	**161**	18020125010206	**191**	18020125060302	**221**	18020125040401
132	18020125040601	**162**	18020125010201	**192**	18020128020203	**222**	18020128030206
133	18020125060201	**163**	18020125040103	**193**	18020128060103	**223**	18020128030203
134	18020125040205	**164**	18020128030102	**194**	18020128030202	**224**	18020128030201
135	18020125040102	**165**	18020128020101	**195**	18020125060303	**225**	18020128010202
136	18020125040602	**166**	18020126010102	**196**	18020125060304	**226**	18020128010102
137	16050102010304	**167**	18020126010302	**197**	18020128040101	**227**	18020128020104
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139	18020125040105	**169**	16050102010103	**199**	18020125020204	**229**	18020128040204
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141	16050102010405	**171**	18020126010304	**201**	18020128020204	**231**	18020128060203
142	18020125040604	**172**	18020128050202	**202**	18020128060102	**232**	18020125010503
143	16050102010201	**173**	18020128050301	**203**	18020128060101	**233**	18020125020102
144	16050102010202	**174**	18020128010103	**204**	18020128050201	**234**	18020125040301
145	16050102010105	**175**	18020128050501	**205**	18020128020504	**235**	18020125030201
146	16050102010402	**176**	18020128010201	**206**	18020128020303	**236**	18020128050502
147	16050102010404	**177**	18020128030103	**207**	18020128060104	**237**	18020128050105
148	18020126010201	**178**	18020128050302	**208**	18020128020305	**238**	18020125010203
149	18020125040803	**179**	16050102020102	**209**	18020128040201	**239**	18020125030505
150	18020125040801	**180**	18020128060201	**210**	18020128050203	**240**	18020125030504

MAP LEGEND			
Map Number	**HUC 7 Number**	**Map Number**	**HUC 7 Number**
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242	18020125040802	**272**	18020128020501
243	18020125020303	**273**	18020128010106
244	18020125040106	**274**	18020128010105
245	18020128050505	**275**	18020128020206
246	18020128010101	**276**	18020128010104
247	18020128050101	**277**	18020128060302
248	18020128050401	**278**	18020128020201
249	18020126010101	**279**	16050102010101
250	18020128050404	**280**	16050102010102
251	18020128060202	**281**	18020128050205
252	18020128060106	**282**	18020128050102
253	18020128060105	**283**	18020128020205
254	18020126010401	**284**	18020128020207
255	18020128020402	**285**	18020128060303
256	18020128020605	**286**	18020123020606
257	18020128020604	**287**	18020128020304
258	18020128020603	**288**	18020123020301
259	18020128020301		
260	18020128020302		
261	18020128040103		
262	18020126010103		
263	18020125020103		
264	18020128040104		
265	18020128020105		
266	18020128010204		
267	18020128050403		
268	16050102010301		
269	18020128010203		
270	18020128060305		

Appendix P: Map Index

The following map index is designed to help readers locate information on the Alternative Maps, including the specific:

- Forest Plan Management Area Seasonal Restrictions
- Existing Forest Order Closures
- Unauthorized Routes Proposed to be Added to the National Forest System
- Existing National Forest System Roads with Proposed Changes to the Class of Vehicle and/or Season of Use Permitted

Forest Plan Seasonal Restrictions: Seasonal restrictions in all of the Alternatives were included based on Forest Plan Direction. Seasonal closures as specified in the 1990 Tahoe Forest Plan would be continued. The following are the map locations for the seasonal restrictions specified in the Forest Plan. These seasonal restrictions apply to all Motorized Trails and native surface Maintenance Level 2 Roads within the specified Management Areas.

Table P-1. Management Area Map Index

Management Area Number	Management Area Name	Seasonal Restriction	Location on Alternative Maps
12	Antelope	May 1 to November 1	C-7, C-8, B-8, B-9, C-9
23	Pendola	May 1 November 1 south of the Long Point Road	D-1, D-2, E-1, E-2, D-2
24	Oregon	May 1 to November 1 in Plum Valley, Lohman Ridge, and Studhorse Canyon	D-3, E-3, D-2, E-2
42	South Yuba	May 1 to November 1 southwest of Bloody Run Creek and the Graniteville Road.	E-5, F-5, E-2, F-2, E-3, F-3, E-4, F-4, F-6
59	Casa Loma	May 1 to November 1 on key winter deer range	H-4
65	Chalk	May 1 to November 1 in Burlington Ridge area and Greenhorn Road.	G-3, G-4, H-3, H-4, F-3, F-4, G-5
84	Humbug-Sailor	May 1 to November 1 on key winter deer range	I-4, I-5, H-4, H-5, H-6, H-7
102	End of the World	December 31 to September 15 in deer holding area.	I-6, J-6, J-5
106	Big Oak	May 1 to November 1	I-5, J-5
108	Little Oak	November 1 to May 1 to November 1 on key winter deer range	J-5, J-4

Forest Order Seasonal Restrictions: Seasonal restrictions were included based on current Forest Orders in all Alternatives. Seasonal closures as contained in existing Forest Orders would be continued. The following is the location on the Alternative Maps of seasonal restrictions contained within existing Forest Orders on the Tahoe National Forest that would continue in all alternatives.

Table P-2. Existing Forest Order Map Index

Forest Order Name	Forest Order Number	Road Number or Location of Closure	Location on Alternative Maps
Boca Reclamation Zone Restricted Use Area	17-95-200	Area Closure	E-10
Boca Special Closure	19-96-209	Area	E-10
Boca Townsite & Overlook accessible Trails	17-95-193	Area Closure	E-10, F-10
Forest Development Trails	17-98-222	14E11, 14E250, 14E11	F-7
Forest Development Trails	17-97-215	15E23, 15E06	H-8, G-8
Old Foresthill Ranger District	17-98-223	10E03, 13E26, 11E26, 12E19, 12E18, 12E27, 13E25	H-4, H-5, H-6, I-4,J-6, G-5, G-6
Old Foresthill Ranger District	17-98-223	ATV's on, 16E04, 16E10	H-6, H-7, H-8, I-5, I-6, I-7, J-4, J-5
Omega Road closure.	17-95-181	29-1, 29-2, 29-3	G-4, F-4
Palisades Creek Special Closure	17-95-194	1.40E+15	G-7
Pole Creek Special Closure	17-96-208	Area Closure	G-9
Road Closure, Garden Valley Road	17-00-230	125-13	E-1
Special Closure (Bullards Bar Reservoir)	17-00-229	Area Closure	E-1
Stampede Island Closure	17-95-198	Area Closure	D-9
Upper Omega Road Closure	17-95-182	20-11, 20-14, 20-15-1, 20-16	F-4, F-5, G-4

Table P-3 shows the location on the Alternative maps of the unauthorized roads, trails and areas proposed for inclusion in the National Forest System under the various alternatives.

Table P-3. Map Index of Unauthorized Routes proposed for Inclusion in National Forest System

Name of Proposed Addition to National Forest System	Location on Alternative Maps
Boca, Prosser, and Stampede Reservoir Areas	D-9, D-10, E-9, E-10, F-9
Eureka Diggins Area	C-3
Greenhorn Area	G-3, H-3
0025-009	D2
0491-003	D2
25-9-3_p	D2
25-9_p	C2
25-9_p	D2
35-3_p	D2
35-4-1_p	D2
35-4_p	D2
39-9_p	D2
491-3-1_p	D2
491-3-2_p	D2
491-3_p	D2
666	I5
666	I6
ARM-12	H4
ARM-13	H6
ARM-2	I4
ARM-3r	I4
ARM-4	I4
ARM-5	H4
ARM-5	I4
ARM-7	H5
ARM-9	I4
ARN-001	G6
ARS-M4	I5
D_03-4_a	I8
D_03-4_b	I8
D_03-4_c	I8
D_03-4_d	I8
D_03-4_e	I8
D_09-5_a	B5
D_09_a	B6
D_10E02_a	C3

Name of Proposed Addition to National Forest System	Location on Alternative Maps
D_10E18_a	E4
D_11E02_a	C4
D_11E02_b	C4
D_11e03_a	B4
D_11e03_a	C4
D_11E03_b	B4
D_11E03_c	B4
D_11E03_d	B4
D_11E10_a	C4
D_11E10_b	B4
D_11E20_a	B4
D_11E67_a	B4
D_11E67_b	B4
D_11E71_a	B4
D_11E71_b	B4
D_11MM718	D3
D_12E33_a	C5
D_12E66_a	B5
D_12E66_b	B5
D_12E66_c	B5
D_12E66_d	B5
D_12E67_a	B5
D_12E67_b	B5
D_12E67_c	B5
D_12E67_d	B5
D_12E68_a	B5
D_13-14a	H6
D_13-14b	H6
D_13a	H5
D_13b	H5
D_13c	H6
D_13E10_a	F6
D_13E17	I6
D_14_a	F5
D_14_b	F5
D_14_c	F5
D_14_d	F5
D_14E33_a	G7

Name of Proposed Addition to National Forest System	Location on Alternative Maps
D_14E33_b	G7
D_14E38_a	F7
D_16-46-2	I6
D_18-14_a	F5
D_18-19_a	E5
D_18-19_b	E5
D_18-19_c	E5
D_18-6_a	F5
D_18_a	F5
D_18_b	F5
D_20-12_a	G4
D_20-16_a	F5
D_21-4_a	E4
D_25-15_a	C3
D_25-c	C3
D_25_a	C3
D_25_b	C3
D_25_d	C3
D_270-6-8a	D10
D_34_a	D2
D_34_b	D2
D_35-17_a	C3
D_35_a	D2
D_35_b	D2
D_41-20-_a	D5
D_41-20-_b	D5
D_450-101a	E9
D_450-101b	E9
D_450-101c	E9
D_49-27_a	D2
D_491-6_a	D2
D_491-6_b	D2
D_654-4-a	F6
D_654-4_a	F6
D_66	H5
D_66-18	H5
D_72_a	D10
D_72_b	D10
D_72_c	D10
D_72_d	D10
D_721-2_a	B5
D_738-4_a	F4

Name of Proposed Addition to National Forest System	Location on Alternative Maps
D_738-4_b	F4
D_738-4_c	F4
D_738-4_d	F4
D_738-4_e	F4
D_738-4_f	F4
D_738-4_g	F4
D_843-35_a	E5
D_843-37_a	E6
D_843-37_b	E5
D_843-37_c	E5
D_843-9_a	E4
D_85-10-5a	F7
D_85-13-1a	F7
D_85-2-_a	F6
D_85_a	F6
D_85_b	F6
D_85_c	F6
D_860-10_a	D10
D_860-10_b	D10
D_860-5_a	D10
D_860-5_b	D10
D_860-5_c	D10
D_860-5_d	D10
D_88	H7
D_88-13a	I5
D_88-13b	I5
D_88-39	H6
D_886-10_a	E9
D_886-18_a	E9
D_886-18_b	E9
D_889-14-a	E9
D_889-25-a	D10
D_88b	H6
D_88c	H6
D_93_a	C5
D_93_b	C5
D_96	I6
D_96-46-10	I6
D_96-54	I6
D_98_a	D5
D_N-843_a	E5
D_N-843_b	E5

Name of Proposed Addition to National Forest System	Location on Alternative Maps
D_N_843_a	E5
D_P-6001_a	G7
D_P-6001_b	G7
D_P-6001_c	H7
D_S-295_a	E3
D_S-295_b	E3
D_S-295_c	E3
D_S-300_a	D3
D_S-300_b	D3
D_S-301_a	D4
D_S-304_a	D3
D_S-514_a	C4
D_S-860_a	D10
D_Y-122_a	E1
D_Y-122_b	E1
D_Y-125_a	E1
Faucherie	E5
Faucherie	E6
H1-2	F9
H11E10	B4
H11E10	C4
H12-28-20-10	C7
H12-28-20-10-15	C7
H12-45-35	D7
H12-45-80	D7
H13-17-10	I5
H14E08	E7
H14E29	G7
H14E35	J4
H16N73	G9
H16N73	H9
H16N73m	G9
H16N73m	H9
H18-12	F5
H18-12-2	F5
H180-1	E1
H180-1	E2
H182	A9
H182	B9
H18N49Y	F1
H19-22-14	G5
H19-5	G6

Name of Proposed Addition to National Forest System	Location on Alternative Maps
H191-30	E3
H20-16	F4
H20-16-2-7	F5
H20-2	G3
H20-2-1	G3
H20-3-5-2-3	F3
H20-3-5-2-4	F3
H20-8-5	F4
H21-5-3	E4
H24-6-14	G3
H25-11-3	C3
H25-11-3	D3
H25-18	C3
H25-18-4	C3
H25-29-3-1	B3
H26-19	I4
H26-6-10	H4
H26-6-12	H4
H261-10-4	E9
H261-8	E10
H261-8c	E9
H27-16	C3
H27-17	C3
H27-19	D3
H270-4-6	D10
H29-11	F4
H293	E2
H293-19	D3
H293-4-18	E2
H293-4-4	E2
H3-4-4	I8
H3004-10	J4
H3004-8	J4
H301-6	D4
H3127-10-2	I4
H329	H4
H329b	H4
H329c	H4
H329d	H4
H34-4	D2
H34-8-3	D2
H35-20-1	C3

Name of Proposed Addition to National Forest System	Location on Alternative Maps
H36-3-1	F3
H38	G6
H39-12	D2
H44-22-7	I5
H45-2	G5
H45-4	G5
H47-1-3	D1
H49-16	E1
H50-12	F4
H50-12-3-1	F4
H54-2-2	C6
H54-9	C5
H613-8	F2
H652-5-5	F6
H652-5-5	G6
H72-18	E10
H823-1-1	B5
H833	E3
H833	F3
H833-10	E3
H843-49b	E4
H860-40-20-3-30	C9
H88-13	I5
H88-44	H6
H88-45	H6
H88-45-5	H6
H889-28	E9
H889-3-18-5	E10
H889-3-30-10	E10
H889-3-30-5	E10
H889-8	E9
H89-99-10	B6
H894-5-1	E10
H9-5	B5
H93-3-1	C5
H96-114	H7
H96-49	I6
N25-1-1	D2
N25-13	C3
N25-14	C3
N25-15-1	C3
N25-15-2	C3

Name of Proposed Addition to National Forest System	Location on Alternative Maps
N25-16	C3
N25-17-1	C3
N25-18-1	C3
N25-19-1	C3
N25-2	D2
N25-2-1	D2
N25-2-3	D2
N25-20	C3
N25-21	C3
N25-22	C3
N25-24	C3
N25-26-2	C3
N25-27	C3
N25-28-1	B3
N25-28-1	C3
N25-28-2	B3
N25-28-2	C3
N25-28-4	C3
N25-29-2	B3
N25-29b	B3
N25-3	D2
N25-30	B3
N25-31	B3
N25-32-1	B3
N25-32-4	B3
N25-32-5	B3
N25-32-6	B3
N25-4-10	D2
N25-4-2	D2
N25-4-2-2	D2
N25-4-3	D2
N25-4-4	D2
N25-4-4-1	D2
N25-4-6	D2
N25-5	D2
N25-6-1	D2
N25-7	D2
N25-8-1-1	D2
N25-8-10	D3
N25-8-2	D2
N25-8-3	D2
N25-8-4	D2

Name of Proposed Addition to National Forest System	Location on Alternative Maps
N25-8-6	D2
N25-8-8	D2
N25-8-9	D3
N25-9-1	D2
N25-9-2	D2
N261-3	E9
N261-8-15-2	E10
N27	D2
N27-1	D2
N27-10	C3
N27-2	D3
N27-3	D3
N27-4	D3
N27-5	D3
N27-6-2	D3
N27-9	C3
N270-4-6	D10
N270-6-6	D10
N270-8-5	D10
N33-22-4	I5
N33-28	I5
N33-32	I5
N33-36-2	I5
N33-41	I5
N33-41	I6
N33-42	I6
N33-44	I6
N33-45-2-2	I5
N33-45-6	I5
N33-49	I6
N33-50	I6
N33-52	I6
N33-56	I6
N33-58-12	I5
N33-58-14	I5
N33-58-16	I5
N33-58-16	J5
N33-58-18	J5
N33-58-4	I6
N33-58-7	I5
N33-6	J5
N33-7	I5

Name of Proposed Addition to National Forest System	Location on Alternative Maps
N33-7	J5
N33-8	I5
N33-8	J5
N344-22-4	I5
N344-22-4	I6
N35-1	D2
N35-10	C2
N35-11	C2
N35-12	C2
N35-13	C3
N35-14	C2
N35-14	C3
N35-16	C3
N35-17f	C3
N35-2	D2
N35-20-3	C3
N35-20-4	C3
N35-21	C3
N35-22	C3
N35-23	C3
N35-24	C3
N35-26	C2
N35-26	C3
N35-3-1	D2
N35-3-2	D2
N35-6	C2
N35-6	D2
N35-7	C2
N35-7	D2
N35-8	C2
N35-9	C2
N35-9	C3
N39-12	D2
N39-12-1	D2
N39-4	D2
N39-5	D2
N39-5-1	D2
N39-5-2	D2
N39-5-3	D2
N39-5-4	D2
N39-6	D2
N39-7	D2

Name of Proposed Addition to National Forest System	Location on Alternative Maps
N39-8-1	D2
N42-10-4	H7
N42-12	H7
N42-12	I7
N42-14	H7
N42-16	I7
N42-17	H7
N42-17	I7
N42-2	I7
N42-24	I7
N42-26	I7
N43-1-1	I6
N43-12-6	I6
N43-14	I6
N43-14-4	I6
N43-16	I6
N43-6-2	I6
N44-22-6	I5
N44-22-6	I6
N44-22-8-1	I5
N44-22-9-6	I5
N44-29	I6
N44-32	I6
N44-4	I6
N44-46-2	I6
N44-48-2-2	I6
N44-58	I6
N450-10-50-10	D9
N450-10-50-10	E9
N450-10-70	D9
N450-10-70	E9
N48-12	I7
N48-14-4	I7
N48-14-6	I7
N48-4	I7
N48-8-4	I7
N48-8-8	I7
N491-1	D2
N491-3-1	D2
N51	H7
N55-1	C2
N55-2	C2

Name of Proposed Addition to National Forest System	Location on Alternative Maps
N68-22	H7
N68-8	I7
N72-12	E10
N72-12-1	E10
N72-2-2	E10
N72-8a	E10
N860-10-10	D10
N860-15-4	D10
N860-15-6	D10
N860-15-6	D9
N860-15-6c	D10
N860-15-8	D9
N860-20-1	D9
N886-1-5	E9
N886-10-20-10	E9
N886-10-4	E9
N886-14-10	E9
N886-14-5	E9
N886-18-10	E9
N886-18-5	E9
N886-20-10	E9
N886-20-12	E9
N886-23-5-1	E9
N886e-10-5	E9
N889-14-27	E9
N889-3-30-10	E10
N890-14-5	E9
N894-2-11	E10
N96-100	H7
N96-102	H7
N96-106	H7
N96-108	H7
N96-110-6	H7
N96-114	H7
N96-12c	I5
N96-12c	J5
N96-15	J5
N96-22	J5
N96-23	J6
N96-24-6	I6
N96-26-2	I6
N96-26-8	I6

Name of Proposed Addition to National Forest System	Location on Alternative Maps
N96-29-2	I6
N96-29-2	J6
N96-34-2-6	I6
N96-34-2-8	I6
N96-34-3	I6
N96-34-6	I6
N96-34-8	I6
N96-34-9	I6
N96-63-8	I7
N96-63-8-2	I7
N96-71	I7
N96-73	I7
N96-75	I7
N96-77	I7
N96-83	I7
N96-90	H7
N96-96	H7
SV-002	D6
SV-002	D7
SV-004	E7
SV-005	E7
SV-007	B7
SV-M1	D10
SV-P10	D8
SV-P11	D8
SV-P12	C9
SV-P13	C9
SV-P14	C10
SV-P14a	C10
SV-P14a	C9
SV-P15	B9
SV-P17	C8
SV-P18	D10
SV-P5	D6
SV-P6	D7
SV-P7e	D7
SV-P7w	D7
SV-P8	D8
TKN-001	E8
TKN-003	E9
TKN-004	E7
TKN-J10	D10

Name of Proposed Addition to National Forest System	Location on Alternative Maps
TKN-J11	D10
TKN-J12	D10
TKN-J12	D9
TKN-J13	D9
TKN-J14	E9
TKN-J14	F9
TKN-J2	E10
TKN-J3	E10
TKN-J3n	E10
TKN-J4	F7
TKN-J4	F8
TKN-J5	F7
TKN-J5	F8
TKN-J6	F8
TKN-J7	E10
TKN-J9	D10
TKN-M1	E9
TKN-M1	F9
TKN-M2	E9
TKN-P3	E9
TKN-Q1	E9
TKS-11	J8
TKS-3	G7
TKS-6	G7
TKS-7	I8
TKS-8	I9
TKS-M9	F9
TKS-M9	G9
YRM-M3	D2
YRM-M4	E3
YRN-001	B4
YRN-004	C5
YRN-005	C5
YRN-007	C4
YRN-007	C5
YRN-008	D2
YRN-1	C5
YRN-11	B4
YRN-2	C5
YRN-3	C5
YRN-4	C4
YRN-509	C3

Name of Proposed Addition to National Forest System	Location on Alternative Maps
YRN-5a	B4
YRN-5c	B4
YRN-7	B3
YRN-9	B5
YRN-M2	B4
YRN-M3b	B3
YRN-M3b	C3
YRS-003b	E6
YRS-066	F4
YRS-066	G4
YRS-066w	F4
YRS-066w	G4
YRS-AF	F6
YRS-B10	G4
YRS-B12	G4
YRS-B5	G4
YRS-B7	G4
YRS-BrC	G4
YRS-F1	F6
YRS-F1b	F6
YRS-F1c	E6
YRS-F1c	F6
YRS-G3	F6
YRS-G3w	F6
YRS-SF4	F5
YRS-SF5	F4
YRS-SF5	F5
YRS-SF5	G4
YRS-SF5	G5
YRS-SF6	F4
YRS-SF6	G4
YRS-SF6b	F4
YRS-SF6b	G4

Table P-4 shows the location on the Alternative maps of the existing National Forest Roads with proposed changes to the Class of Vehicle.

Table P-4. Map Index of Existing National Forest System Roads with Proposed Changes to Class of Vehicle and/or Season of Use

Road Number	Road Name	Location on Alternative Map(s)	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
49-47	Union Flat CG	C4, D4		X			X	X	
93	Gold Valley	C4, C5		X			X		
25	Cal-Ida	B3, C3		X			X		
27	Fiddle Creek	C3, D2, D3		X			X		
34	Jouberts	D2, D3, E2		X			X		
35	Eureka	C3		X			X		
93-02	Monarch	C5		X			X	X	
93-03	Pauley Creek	C5		X			X	X	
93-04	Pauley Creek Spur	C4, C5		X			X		
98	Banner Mine	D4, D5		X			X		
654-02	Indian Spring CG	F6		X			X	X	
654-03	Indian Spring Staging	F6		X			X	X	
14	Grouse Ridge	F5		X			X	X	
14-01	Fall Creek	F5		X			X	X	
14-07	Grouse Ridge CG	F5		X			X	X	
17	Carr Lindsey	E5, F5		X			X	X	
18	Bowman	F5, G5		X			X	X	
18-06	Blue Lake	F5		X			X	X	
20-12	Burlington Ridge	G3, G4		X			X	X	
20-12-01	Skillman CG	F4		X			X	X	
20-12-03	Towle Mill	G4		X			X	X	
20-16	Diamond Creek	F4, F5		X			X	X	
21	Washington Gaston	E4, F4		X			X		
29	Omega	F5, G4		X			X		
29-02	Alpha	F4		X			X	X	
32	Chalk Bluff	G4		X			X	X	
41	Pinoli Ridge	D5, D6, E5		X			X		
85	Rattlesnake	F6, F7, G6		X			X		
85-13	Lola Montez Lake	F7		X			X	X	
424-06	Lower Greenhorn	G3		X			X	X	
843-37	Faucherie Lake	E5, E6		X		X	X	X	X
01	Jackass Point	F9, G9		X			X	X	
03	Barker Pass	10.9		X			X	X	
3-4	Niehaus	I8, I9		X			X	X	
04	Bear Valley	C8, C9		X			X		
05	Treasure Mtn.	D7, D8		X			X	X	
06	Sawtooth	F9, G9		X			X		

Road Number	Road Name	Location on Alternative Map(s)	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
07-40	Lake of Woods	D7		X			X	X	
08	Pole Creek	G9		X			X	X	
09	Haskell Peak	B5, B6, C5, C6		X			X		
11	Sagehen	E8		X			X	X	
11-4	Sagehen SP	E8		X			X	X	
11-4-2	Sagehen CG	E8		X			X	X	
12	Yuba - Weber	C6, D6, D7		X			X		
12-2	Yuba Pass CG	C6		X			X	X	
12-99	South Bonta	D7		X			X	X	
15	Nichols Mill	C7, D7		X			X		
28	Church Creek	B5, B6		X			X	X	
41	Pinoli Ridge	D5, D6, E5		X			X	X	
49-53	South Fork State Tract	C6		X			X	X	
49-54	Carvin Creek Tract	C6		X			X	X	
49-56	Haskell Creek Tract	C6		X			X	X	
52	Chapman Calpine	B6, B7, C7		X			X	X	
54	Williams Creek	C5, C6		X			X	X	
70	Pass Creek Loop	D6		X			X	X	
70-80	East Meadows CG & Spurs	D6		X			X	X	
71	Carman Valley	A6, B6, B7		X			X	X	
72	Verdi Peak	D10, E10		X			X	X	
72-2	Verdi Peak Spur	E10		X			X	X	
76	Austin Meadows	D5, E5, E6		X			X	X	
86	Meadow Lake	D7, E7		X			X		
88	Bald Ridge	C6, D6		X			X	X	
89-55	Rice Canyon	D8		X			X	X	
89-88	Old 71	D8		X			X	X	
261-4	Logger CG and spurs	E9		X			X	X	
541-10	Cold Canyon	D8		X			X		
780-12	Carpenter Valley	E8, F8		X			X		
16	Canyon View Loop	I6, J6		X			X	X	
19	Texas Hill Mears	G5, G6		X			X	X	
24	Brimstone	I4		X			X	X	
19-16	Hellester	G5, H5		X			X	X	
44	Cavanah Deep	I6		X			X		
44-22	Last Chance	I5, I6		X			X		
45	Monumental Creek	G5, G6		X			X	X	
57	Red Star	I6, J6		X			X	X	
93	Packer Saddle	C5		X			X	X	
68	Coyote Spring	H7		X			X	X	

Road Number	Road Name	Location on Alternative Map(s)	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
33	Peavine & spur	I5, I6, J5		**X**			**X**	**X**	
88-11	Mitchell Mine	I5		**X**			**X**	**X**	
88-30	Secret House	H6		**X**			**X**	**X**	
10-16	Sugar Pine OHV Staging Area	I4		**X**			**X**	**X**	
88-14	China Wall OHV Staging Area	H5		**X**			**X**	**X**	
43-24	Robinson Flat Campground	H6		**X**			**X**	**X**	
43-24-01	Robinson Flat Campground	H6		**X**			**X**	**X**	
43-24-01-01	Robinson Flat Campground	H6		**X**			**X**	**X**	
43-24-01-02	Robinson Flat Campground	H6		**X**			**X**	**X**	
96	Mosquito Ridge	J4		**X**			**X**	**X**	
43	Robison Flat	H6		**X**			**X**	**X**	
96-91	Ahart CG	H7		**X**			**X**	**X**	

Appendix Q: Wildlife Cumulative Effects

The following information regarding historic and reasonably foreseeable actions on Forest Service as well as private lands was used to estimate the cumulative effects on wildlife habitat and populations.

Table Q-1. Future Proposed Forest Service Vegetation Management Projects Potentially Affecting Wildlife Habitat

Project Name	Description	Acres
East Fork Thinning Project EA	Evaluate effects of thinning overcrowded forest	1400
Last Chance Thinning Project EA	Analyze effects of thinning to improve tree health and reduce fuels	2815
Mears Thinning Project CE	Thin, salvage and sanitize overcrowded, dead and dying trees	603
Brumby Thinning, Group Selection and Aspen Restoration EA	Mech. Thin approx. 530 ac., group select harvest 30 ac., aspen restoration 3ac.	563
Dinkum Thinning, Group Selection and Aspen Restoration EA	Mech. Thin approx. 229 ac., group select harvest 72 ac., aspen restoration 7ac.	308
Jumpbuck Aspen Restoration CE	Selectively remove conifers to restore aspen stands	135
Kangaroo Thinning, Group Selection and Aspen Restoration Project EA	Mech. Thin approx. 44 ac., group select harvest 47 ac., restore aspen on 7 ac.	98
Montez Project EA	Thinning and follow-up treatments to reduce fuels + improve forest health	180
Phoenix Project EIS	Thinning and follow-up treatments to reduce fuels + improve forest health	5058
Tucker DFPZ Thinning and Group Selection Project EA	Thin approx. 22 ac., group select harvest 31 ac.	53
Sagehen Project EA	Implement SPLAT treatment network in Sagehen Watershed to improve forest health + habitats. Pursue research opportunities	800
Canyon Forest Health Project EA	Forest health, veg. mgmt, fuels reduction, road decommissioning	1000
Carvin Aspen Enhancement CE	remove conifers to release aspen	10
	Subtotal	**13,013**

Table Q-2. Cumulative Effects on Wildlife Habitat and Populations from Historic Wildfires

Wildfire History													
Fire Name	**Year Burned**	**NFS Acres**	**NFS Acres Burned**	**Acres High Severity**	**Acres Moderate Severity**	**Acres Low Severity**	**Number Spotted Owl PACs Affected**	**Spotted Owl PAC Acres Burned**	**HRCA Acres Burned**	**Number Goshawk PACs Burned**	**Goshawk PAC Acres Burned**	**CWHR 4M,4D, 5M, 5D & 6 Burned**	**Acres Salvage Logged**
Gap	2001	2446	1373				0	0	0	1	12		950
Harding	2005	2270	2269	1054	823	392	0	0	0		0	471	0
Pendola	1999	7726	2014	2014			1	200		0	0		1493
Star	2001	16,546	9319	3700			7	1120	2145	4	686	2126	3104
Bassetts	2006		2637	784	321	676	1	232	27	1	180	1277	200
Cottonwood	1994	40,000	40,000	28,000	9600	2400	1	317	N/A	2	418		20,246
Crystal	1994	7310	6682	4982	1007	711	0	0	0	0	0		3955
	Subtotal	**76,298**	**64,294**	**40,534**	**11,751**	**4179**	**10**	**1869**	**2172**	**8**	**1296**	**3874**	**29,948**

Table Q-3. Cumulative Effects on Wildlife Habitat and Populations from Forest Service Vegetation Management Projects

NEPA Document	Year NEPA Completed	Treatment Type	Acres Treated	Number of Spotted Owl Territories Affected	Spotted Owl PAC Acres Treated	HRCA Acres Treated	Number of Goshawk PACs Affected	Goshawk PAC Acres Treated
Bassetts Fire Salvage	3/21/2007	Fire Salvage	200	1	0	28	1	0
Gap Fire Restoration	6/10/2002	Fire Salvage		0	0	0	1	12
Red Ant EA	6/28/2007	Commercial Thin	528	1	0	171	0	0
South Yuba Canal EIS	11/20/2006	Commercial Thin	398	7	151	190	3	50
Relief/Grouse	2/28/2006	Commercial Thin	1273	2	46	134	2	138
Ruby Thinning/Fuels EA	2/28/2006	Commercial Thin	1379	5	0	341	2	2
Moonbird EA	1/29/2004	Commercial Thin	1217	4	64	503	0	0
Washington	6/24/2004	Commercial Thin	667	2	0	154	0	0
Steephollow	?/?/2004	Commercial Thin	978	6	121	704	3	154
Big Reservoir	?/?/2004	Commercial Thin		1	0	0	0	0
Whiskey Fuel Reduction/Sailor Loma	6/17/2005-2/9/2005	Commercial Thin	1128	1	0	0	0	0
Dolly HRCA Thinning	2/28/2006	Commercial Thin	167	1	4	98	1	16
End of the World		Commercial Thin		1	0	0	0	0
Giant		Commercial Thin	184	1	0	0	0	0
Mad Skunk	6/18/2002	Commercial Thin		0	0	0	0	0
Blue Canyon Fuels Reduction	8/29/2003	Commercial Thin	552	2	86	157	1	86
Scraps	7/11/2001	Commercial Thin	237	0	0	0	1	10
Borda	8/7/2003	Commercial Thin	2254	2	0	15	1	0
Liberty	2/7/2001	Commercial Thin	1107	0	0	0	0	0
Billabong Aspen	7/12/2007	Aspen Restoration	88	0	0	0	0	0
Walkabout Group	7/16/2007	Group Selection	302	0	0	0	0	0
Alder Creek	4/25/2006	Mech. Thin	273	0	0	0	1	33
		Grand Total	**12,932**	**37**	**472**	**2495**	**17**	**501**

Table Q-4. Cumulative Effects on Wildlife Habitat and Populations from Private Land Vegetation Management Projects

Harvest Method/ Prescription	Year	Acres
Fire Salvage	2000	606
Fire Salvage Total		**606**
Clearcut	1960	78
Clearcut	1961	364
Clearcut	1962	6
Clearcut	1972	4
Clearcut	1975	35
Clearcut	1978	35
Clearcut	1980	30
Clearcut	1981	9
Clearcut	1982	332
Clearcut	1983	200
Clearcut	1984	323
Clearcut	1985	537
Clearcut	1986	383
Clearcut	1987	420
Clearcut	1988	253
Clearcut	1989	120
Clearcut	1990	407
Clearcut	1991	176
Clearcut	1992	137
Clearcut	1993	68
Clearcut	1994	487
Clearcut	1995	353
Clearcut	1996	448
Clearcut	1997	477
Clearcut	1998	431
Clearcut	1999	628
Clearcut	2000	244
Clearcut	2001	296
Clearcut	2003	215
Clearcut	2004	190
Clearcut	2005	72
Clearcut	2006	430
Clearcut	2007	290
Clearcut Total		**8479**
Group Selection	2006	94
	2007	201
Group Selection Total		**294**

Harvest Method/ Prescription	Year	Acres
Fire Salvage/CC	1989	20
Fire Salvage/CC	2001	3984
Fire Salvage/CC	2002	300
Fire Salvage/CC	2007	39
Fire Salvage/CC Total		4476
Plantation	1960	1225
Plantation	1960	82
Plantation Total		**1306**
Salvage	1990	127
Salvage	1996	67
Salvage	1997	98
Salvage	1998	508
Salvage Total		**799**
Salvage/CC	1998	63
Salvage/CC Total		**63**
Sanitation	0	67
Sanitation	1985	4
Sanitation	1994	248
Sanitation	1995	608
Sanitation	1997	73
Sanitation	1998	72
Sanitation	1999	9
Sanitation	2003	189
Sanitation Total		**1272**
Seedtree	1986	11
Seedtree	1995	8
Seedtree Total		**19**

Harvest Method/ Prescription	Year	Acres
Shelterwood	1984	193
Shelterwood	1985	22
Shelterwood	1986	106
Shelterwood	1987	122
Shelterwood	1989	284
Shelterwood	1990	87
Shelterwood	1991	32
Shelterwood	1992	78
Shelterwood	1993	305
Shelterwood	1994	137
Shelterwood	1995	73
Shelterwood	1996	206
Shelterwood	1997	90
Shelterwood	1998	228
Shelterwood	1999	23
Shelterwood	2000	5
Shelterwood	2001	181
Shelterwood	2004	53
Shelterwood	2005	67
Shelterwood Total		**2432**

Harvest Method/ Prescription	Year	Acres
Thin	1975	150
Thin	1978	477
Thin	1980	1186
Thin	1981	283
Thin	1982	1456
Thin	1983	107
Thin	1984	1802
Thin	1985	2095
Thin	1986	1321
Thin	1987	2673
Thin	1988	2763
Thin	1989	1361
Thin	1990	5573
Thin	1991	2343
Thin	1992	3193
Thin	1993	1539
Thin	1994	3930
Thin	1995	6331
Thin	1996	5639
Thin	1997	4439
Thin	1998	4253
Thin	1999	2007
Thin	2000	1382
Thin	2001	2085
Thin	2002	1696
Thin	2003	1652
Thin	2004	2053
Thin	2005	2277
Thin	2006	1718
Thin	2007	986
Thin Total		**69,195**
Urban	1960	775
Urban Total		**775**

Appendix R: Riparian Conservation Objectives

Background Information

The Sierra Nevada Forest Plan Amendment (SNFPA), Final Supplemental Environmental Impact Statement Record of Decision (USDA Forest Service 2004a) describes management goals and strategies for aquatic, riparian, and meadow ecosystems. The aquatic, riparian, and meadow ecosystem strategy contains a set of land allocations, specifically riparian conservation areas and critical aquatic refuges, that delineate aquatic, riparian, and meadow habitats, which are to be managed consistent with the following Riparian Conservation Objectives (RCOs) and associated Standards and Guidelines.

In order to achieve the element described above, the SNFPA Record of Decision (ROD) requires that a site-specific analysis be conducted in order to determine the type and extent of activities that can occur within Riparian Conservation Areas (RCAs) adjacent to aquatic features. Specifically, the ROD contains Standards and Guidelines that must be met for activities within RCAs. This analysis examines how the Tahoe National Forest (TNF) Motorized Travel Management EIS meets the Standards and Guidelines for each Riparian Conservation Objective.

Riparian Conservation Objective (RCO) Standards and Guidelines

The RCOs provide a checklist for evaluating whether a proposed activity is consistent with the desired conditions described in the Aquatic Management Strategy. Each Standard and Guidelines and how they are met by the TNF Motorized Travel Management project are described below.

Standard and Guideline # 91

Designate riparian conservation area (RCA) widths as described in Part B of this appendix. The RCA widths displayed in Part B may be adjusted at the project level if a landscape analysis has been completed and a site-specific RCO analysis demonstrates a need for different widths.

Consistency Determination: This project designated riparian conservation area (RCA) widths as described in Part B of Appendix A in the 2004 Sierra Nevada Framework. No adjustments were made to those widths. Table R-1 displays the widths used in designating the widths for RCAs in this project.

Table R-1. Riparian Conservation Areas (RCAs) as designated by the Sierra Nevada Forest Plan Amendment Record of Decision (SNFPROD) of 2004

Aquatic feature	Riparian Conservation Area
Perennial stream.	300 feet on each side of the stream, measured from the bank full edge of the stream
Seasonally flowing streams	150 feet on each side of the stream, measured from the bank full edge of the stream
Special aquatic features (includes lakes, wet meadows, bogs, fens, wetlands, vernal pools, and springs).	300 feet from the edge of the features or riparian vegetation, whichever width is greater.
Perennial streams with riparian conditions extending more than 150 feet from the edge of the streambank or seasonally flow streams extending more than 50 feet from the edge of the streambank.	300 feet from the edge of the features or riparian vegetation, whichever width is greater.
Streams in inner gorge.	Top of inner gorge. (The inner gorge is defined by stream adjacent slopes greater than 70 percent gradient.)

Standard and Guideline #92

Evaluate new proposed management activities within CARs and RCAs during environmental analysis to determine consistency with the riparian conservation objectives at the project level and the AMS goals for the landscape. Ensure that appropriate mitigation measures are enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species.

Consistency Determination: The following management activities within CARs and RCAs were evaluated to determine their consistency with the riparian conservation objectives as part of this project;

- Prohibiting cross country travel
- Motorized trail additions to the National Forest Transportation System (NFTS)
- Changes in class of vehicle and/or season of use on existing NFTS roads

The results of this evaluation are described in this Appendix below for each of the individual riparian conservation objectives. Additional information is also presented in Chapters 3.02 (Soil and Watershed), 3.03 (Terrestrial & Aquatic Species), 3.06 (Plant Communities) and Appendix A (Road Cards).

Appropriate mitigation measures were enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species. These mitigation measures are specified in Appendix A and in Chapter 2 (The Alternatives) of this EIS. Table R-2 displays these mitigation measures.

Table R-2. Mitigation Measures enacted to (1) minimize the risk of activity-related sediment entering aquatic systems and (2) minimize impacts to habitat for aquatic- or riparian-dependent plant and animal species

Route ID	Mitigation Measure
Eureka Diggings	The portion of the open area south of the road will be fenced and signed to prohibit OHV use to protect the seasonal wetlands/vernal pools.
SV-005	Place barriers at trail edge between the trail and the seep to reduce further impacts to this wetland.
SV-P14	Place boulders or other barriers on both sides of the route where it passes through the aspen clone to reduce impacts to the aspen.

Route ID	Mitigation Measure
TKN-J11	Place barriers to keep motorized use off the *Ivesia sericoleuca* in Hoke Valley and to keep vehicles out of the meadow.
TKN-J2	Place barriers around the vernal pool/seasonal wetland so that damage from motorized use is reduced/eliminated.
TKN-J5	Redirect water flow from the seep/spring at the beginning of the route and from overland flow down a portion of the route to Castle Creek – to the meadow.
TKN-J5	Place barriers and signs in the areas adjacent to Castle Creek to keep users from reducing vegetative cover adjacent to Castle Creek.
TKN-J5	Place barriers so that turn arounds, camping, and parking do not occur within 100 feet of Castle Creek to reduce impacts to the *Bruchia bolanderi* occurrence.
TKN-J5	Ensure that the crossing of Castle Creek is not widened during high flows to reduce impacts to the rare moss – *Bruchia bolanderi* - field check the route annually.
TKN-M2	Place boulders on either side of the route to make sure vehicles stay on the route where it passes through the aspen.
TKS-11	Construct drainage structures to reduce impacts to adjacent wetlands.
TKS-11	Place barriers at the edges of the route where the route passes through the aspen clone/wet meadow complex to reduce impacts to those resources.
TKS-11	Remove the outhouse located within the RCA.
YRN-11	Place barriers at the end of the route between the route and the wet meadow to reduce impacts to the wet meadow complex.
YRN-5A	Reduce riparian vegetation impacts by moving the route into the trees.
YRN-5C	Reroute YRN-5c so it does not go through the meadow.
YRS-F1	Place barriers between the lakeshore and the route at the waterfall site to reduce impacts to riparian vegetation from motorized vehicles.
YRS-SF5	Place barriers between the route and the spur going into the wetland.
YRS-SF5	Restore the wetland by raking out the ruts and placing woody debris over the ruts.
YRS-SF5	Place barriers between the route and the spur going down to the pond/peatland.
YRS-SF6	Fix the slump into the drainage to reduce impacts to riparian vegetation.
H45-2	Place barriers between riparian vegetation and the route to reduce impacts to riparian vegetation.
0491-003	Barriers need to be placed to prevent the expansion of the spurs into sensitive areas, such as meadows and riparian conservation areas.
SV-005	Existing waterbars do not divert all runoff from the route because they are spaced too widely. Appropriately spaced water breaks will be installed along this route. Place boulder on either side of route to keep vehicles out of seep.
SV-P8	Repair existing waterbars.
SV-P8	Additional waterbars installed near end of route to divert runoff from the route before sediment reaches the Little Truckee River.
TKS-6	Drainage structures (waterbars) as well as crossing protection installed.
TKS-6	Repair existing gullies.
YRN-2	The northern-most crossing will need a hardened crossing on the right bank to minimize impacts.
YRN-509	Place drainage control above gully and fill in gully at beginning of route.
YRN-7	Additional water bars should be installed near the top of the route to control runoff.
YRS-SF4	Drainage structures needed.
YRS-SF4	A washed-out culvert needs to be replaced with a low water crossing.
YRS-SF5	Minor re-routes needed to keep trail away from the creek and prevent erosion. Some waterbars needed. Repair gullies.
YRS-SF6	A 60-foot section along the portion of this route that parallels Hwy 20 has up to a 10% grade and high erosion potential. This section needs drainage control and waterbars.

Route ID	Mitigation Measure
ARM-13	Drainage control work is needed on one short (approximately 300 feet) segment of this trail in the form of water bars.
ARM-2	Waterbars should be placed to control drainage.
ARM-3r	Water bars are needed.
ARM-5	The 300-foot segment at the southern end of this route has an 8% slope and is experiencing sheet erosion. Installation and maintenance of waterbars is needed to mitigate this impact.
SV-004	Install water bars
SV-P13	Additional water bars installed on 300' segment of 10% slope.
SV-P14	Additional drainage structures or culvert installed along 40' segment where ephemeral stream follows route. Place water bars to prevent water from using route as drain channel.
SV-P14A	Additional water bar should be installed near west end of route.
SV-P14A	Install water bar at eastern end.
SV-P5	At first crossing need to divert intermittent channel off route.
SV-P5	The second crossing is a perennial crossing. The sediment at the perennial crossing is primarily tire wash and redistribution of fines within the channel. This crossing could use some additional gravel on both approaches to reduce the channel widening and sedimentation into this tributary to Haypress Creek.
SV-P7W	A water bar is needed on the northern segment.
TKN-003	Additional water bar on 175' segment installed to divert runoff from route.
TKN-J10	Water breaks installed to divert stream channel from route.
TKN-J10	Reconstruct dips.
TKN-J12	Channel widening at one intermittent crossing and water is flowing down route. Route is a minor chronic sediment source and is in a 303d listed watershed. Water bars are needed to channel water away from trail.
TKN-J13	Multiple routes traverse the area. 6”-12” ruts are present. Trail is in 303d watershed. Waterbars are needed to divert water off of trail.
TKN-J4	Drainage control structures need to be installed to mitigate these impacts.
TKN-J5	Mitigate seep at beginning of route.
TKN-J5	While the perennial crossing at the beginning of the route is currently stable, need to ensure it’s not widened during high flows.
TKN-J5	Need to out slope eastern end.
TKN-J5	In steeper areas, additional waterbars should be installed to divert runoff from the route.
TKN-J6	Block motor vehicle access to shore.
TKN-J9	Waterbars should be installed at all three crossings to mitigate erosion and sedimentation impacts.
TKN-M1	Additional water bar should be installed on 100' segment of 18% gradient to minimize widening of route.
TKN-Q1	Drainage structures needed along northern 50-foot segment of route.
TKS-11	Drainage structures need to be installed.
TKS-11	Second crossing may need hardening.
TKS-11	Place barriers to close spur to campsite.
TKS-11	Remove outhouse and fill pit.
YRM-M3	Water bars need to be placed to control rill erosion and to restore proper drainage function.
YRN-004	Waterbars installed to mitigate the erosion impacts.
YRN-007	Install waterbars to control erosion at the stream crossing, and reconstruct existing waterbars along the steep beginning section of the route.
YRN-008	Block end of route.
YRN-1	Install drainage structures needed.
YRN-1	Close hill climb on Road 93-2.

Route ID	Mitigation Measure
YRN-1	Repair gullies associated with hill climb on Road 93-2.
YRN-11	Place barriers at end of route to prevent encroachment into meadow
YRN-2	Placement of properly-spaced waterbars is required to mitigate these impacts.
YRN-M2	Mitigation measures in the form of drainage structures, crossing protection, and debris slide treatments, are necessary.
YRN-M3B	Mitigation measures in the form of drainage structures, crossing protection, and debris slide treatments, are necessary.
YRS-003B	Mitigation measures in the form of drainage structures, crossing protection, and debris slide treatments, are necessary.
YRS-066	Drainage control structures needed.
YRS-AF	Mitigate impacts by pulling back motorized use and camping 100'.
YRS-B5	Drainage structures.
YRS-F1	Old vehicle parts in creek need to be removed.—
YRS-F1	Close spurs.
YRS-F1	Water bars needed at bottom of Section 4.
YRS-G3	Drainage structures needed.
YRS-SF6b	This route has two stream crossings near the Omega Road. The lower of the two crossings has rill erosion entering into its culvert, and a headcut at the lower end of the crossing is eroding the road base into the stream. Below this crossing, the route picks up gradient (5-10%) and shows continuous rill erosion, approximately 3 feet wide and 1,000 feet long. This section needs drainage control and waterbars to mitigate these impacts.
Boca Reservoir	Bald eagle seasonal closure area on north side of Boca (Jan 1-Aug 31).

Standard and Guideline #93

Identify existing uses and activities in CARs and RCAs during landscape analysis. At the time of permit reissuance, evaluate and consider actions needed for consistency with RCOs.

Consistency Determination: This Standard and Guideline is not applicable since there are no permit reissuances associated with the project.

Standard and Guideline #94

As part of project-level analysis, conduct peer reviews for projects that propose ground-disturbing activities in more than 25 percent of the RCA or more than 15 percent of a CAR.

Consistency Determination: No peer review was required for this project since all of the action alternatives reduce the amount of ground disturbance within RCAs and CARs. Table R-2 displays the number of roads and motorized trails within 100 feet of riparian vegetation as well as the native surface road and motorized trail route density within riparian conservation areas.

Table R-3. Ground disturbing activity reductions within RCAs

Alternative	Alt 1 (No Action)	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross country travel within 100' of riparian vegetation	73,500	0	0	0	0	0	0
Native surface road and motorized trail density within RCAs (miles/sq. mi.)	1.7	1.4	1.2	1.2	1.5	1.4	1.2
Native surface roads and motorized trails within RCAs (miles)	674	551	472	478	584	522	481

RCO #1 Standard and Guideline #95

For waters designated as "Water Quality Limited" (Clean Water Act Section 303(d)), participate in the development of Total Maximum Daily Loads (TMDLs) and TMDL Implementation Plans. Execute applicable elements of completed TMDL Implementation Plans

Consistency Determination: Table R-3 displays those waters designated as "Water Quality Limited" (Clean Water Act Section 303(d)) on or adjacent to the Tahoe National Forest. The Forest Service actively participated in and supported the development of Total Maximum Daily Loads (TMDLs) and TMDL Implementation Plans. Of those impaired water bodies listed in the Table, only the Truckee River has an implementation plan. The Forest Service briefed the Lahontan Regional Water Quality Control Board on the consistency of this project with the Implementation Plan on May 14, 2008. All of the action alternatives are fully consistent with the Implementation Plan since based on the following criteria as presented to the Water Board;

- All of the action alternatives reduce sediment
- All of the action alternatives reduce the number of motorized native surface stream crossings
- All of the action alternatives reduce native surface road and motorized trails route density within Riparian Conservation Areas (RCAs)
- All of the action alternatives prohibit cross country travel
- Identify restoration needs are identified in the project record
- All of the action alternatives specify mitigation measures in Appendix A (Road Cards) where needed for reducing sedimentation and siltation.

Table R-4. Impaired water bodies on or adjacent to the Tahoe National Forest

Water Body Name	Pollutant/Stressor	Source	Area Affected
Humbug Creek	Copper, Mercury, Zinc, Sedimentation/Siltation	Resource extraction abandoned mines	9 miles
Kanaka Creek	Arsenic	Resource extraction abandoned mines	1 mile
Donner Lake	Priority Organics	Source Unknown	960 acres
Stampede Reservoir (recommended for delisting)	Pesticide (lindane)	Source Unknown	3,444 acres
Squaw Creek	Sedimentation/Siltation	Construction/Land development, Other Urban Runoff, Hydro modification, Drainage/Filling of Wetlands, Highway Maintenance And Runoff, Natural Sources, Recreational Activities, Nonpoint Source	8 miles
Truckee River	Sedimentation/Siltation	Source Unknown	106 miles

RCO #1 Standard and Guideline #96

Ensure that management activities do not adversely affect water temperatures necessary for local aquatic- and riparian-dependent species assemblages.

Consistency Determination: Water temperatures necessary for local aquatic and riparian dependent species assemblages can be adversely affected by roads and motorized trails. The adverse effects are primarily a result of shade reduction and stream crossings. The following criteria are used for establishing consistency with this Standard and Guideline.

1. Cross country travel within 100 feet of riparian vegetation,
2. Number of roads and motorized trails within100 feet of riparian vegetation,
3. The density of native surface roads and motorized trails within RCAs and
4. The number of stream crossings.

All of the action alternatives reduce the amount of adverse effects associated with each of these criteria. Therefore all of the action alternatives are consistent with this Standard and Guideline. Table R-4 summarizes the changes in these criteria by alternative. Additional information is presented in Chapters 3.02 (Soil and Watershed Resources), 3.03 (Terrestrial and Aquatic Species) and 3.06 (Plant Communities).

Table R-4. Primary factors affecting water temperatures necessary for local aquatic and riparian dependent species assemblages by alternative

Alternative	Alt 1 (No Action)	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Cross country travel within 100' of riparian vegeation (acres)	73,500	0	0	0	0	0	0
Roads and motorized trailes within 100' of riparian vegetation (miles)	345	237	231	234	250	238	234
Native surface road and motorized trail density within RCAs (miles/sq. mile)	1.7	1.4	1.2	1.2	1.5	1.4	1.2
Number of motorized stream crossings:							
Perennial Streams (number)	1655	1319	1300	1309	1359	1318	1309
Ephemeral Streams (number)	1683	1326	1309	1319	1378	1329	1320

RCO #1 Standard and Guideline #97

Limit pesticide applications to cases where project level analysis indicates that pesticide applications are consistent with riparian conservation objectives.

Consistency Determination: No pesticide applications are associated with this project.

RCO #1 Standard and Guideline #98

Within 500 feet of known occupied sites for the California red-legged frog, Cascades frog, Yosemite toad, foothill yellow-legged frog, mountain yellow-legged frog, and northern leopard frog, design pesticide applications to avoid adverse effects to individuals and their habitats.

Consistency Determination: No pesticide applications are associated with this project.

RCO #1 - Standard and Guideline #99

Prohibit storage of fuels and other toxic materials within RCAs *and* CARs *except at designated administrative sites and sites covered by a Special Use Authorization. Prohibit refueling within* RCAs *and* CARs *unless there are no other alternatives. Ensure that spill plans are reviewed and up-to-date.*

Consistency Determination: There is no decision regarding storage of fuels or other toxic materials being made with this project.

RCO #2 - Standard and Guideline #100

Maintain and restore the hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features by identifying roads and trails that intercept, divert, or disrupt natural surface and subsurface water flow paths. Implement corrective actions where necessary to restore connectivity.

Consistency Determination: Hydrologic connectivity refers to the ease of movement, or rates of exchange, with which water, energy, nutrients, and organisms pass from one area to another, unhindered in the absence of impediments, such as dams, diversions, roads and bridges, large habitat openings, and recreational developments. As ecosystems become fragmented and disconnected, the scale and rate at which essential processes, such as nutrient and energy cycling and gene flow, operate become restricted. The following are the criteria used for determining consistency.

1. Native surface road and motorized trail density in RCAs
2. Stream crossing density in RCAs
3. Number of wet meadows being impacted
4. Mitigation Measures required for adding motorized trails to the NFTS
5. Identification and prioritization of corrective actions

Densities of native surface and trails within Riparian Conservation Areas (RCAs) serve as a relative measure of watershed connectivity. The greater the density of native surface roads and trails open to motorized vehicles within RCAs, the greater the potential risk to watershed connectivity. All of the action alternatives reduce the densities of native surface and trails within RCAs and therefore maintains and restores hydrologic connectivity.

Another common measure of hydrologically connected routes is stream crossing densities. Many road-stream crossings have the potential to divert stream flow if drainage structures plug or fail. The number of crossings with diversion potential on the Tahoe National Forest is not known, so for the purpose of this analysis, all crossings are assumed to have diversion potential. The likelihood of diversions is therefore related to the numbers and densities of stream crossings. All of the action alternatives maintain and restore hydrologic connectivity by reducing the stream crossing density in RCAs.

The condition of wet meadows is one of the components of the Riparian Conservation Objectives. Motorized roads and trails can adversely impact wet meadows. There are currently 235 wet meadows intersected motorized roads and trails on National Forest System lands. All of the action alternatives have a net reduction in the number of wet meadows intersected by motorized roads and trails.

OHV monitoring and field surveys conducted from 2003 through the 2007 field season identified sites associated with existing National Forest System roads and trails in need of restoration or rehabilitation. Additional needs on both system and unauthorized routes were identified during Travel Management surveys. These sites are being prioritized and scheduled for restoration or rehabilitation as funding permits.

Table R-5. Factors affecting hydrologic connectivity of streams, meadows, wetlands, and other special aquatic features

Alternative	**Alt 1** (No Action)	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**	**Alt 7**
Native surface road and motorized trail density within RCAs (miles/sq. mile)	1.7	1.4	1.2	1.2	1.5	1.4	1.2
Stream Crossing Density (number of crossings per square mile of RCAs)	7.5	6.6	5.4	5.5	6.9	6.1	5.5
Number of wet meadows intersected by roads and motorized trails.	81	7	0	1	9	5	3
Watershed corrective actions required as mitigation measures to add motorized trails to the NFTS (Number of mitigation measures)	0	62	0	16	62	55	44
Future restoration and rehabilitation needs identified and prioritized (number)	34	34	34	34	34	34	34

RCO #2 - Standard and Guideline 101

Ensure that culverts or other stream crossings do not create barriers to upstream or downstream passage for aquatic-dependent species. Locate water drafting sites to avoid adverse effects to in stream flows and depletion of pool habitat. Where possible, maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows, wetlands, and other special aquatic features.

Consistency Determination: No culverts are being installed which could create barriers to upstream or downstream passage for aquatic-dependent species as part of this project. Any mitigation measures needed to assure passage for aquatic dependant species at low water crossings are included in Appendix A (Road Cards). Table R-6 below displays the mitigation measures being required for specific stream crossings as part of this project.

Table R-5. Mitigation measures associated with stream crossings

Route ID	Mitigation Measure
TKN-J5	Ensure that the crossing of Castle Creek is not widened during high flows to reduce impacts to the rare moss – Bruchia bolanderi - field check the route annually.
YRN-2	The northern-most crossing will need a hardened crossing on the right bank to minimize impacts.
YRS-SF4	A washed-out culvert needs to be replaced with a low water crossing.
SV-P5	At first crossing need to divert intermittent channel off route.
SV-P5	The second crossing is a perennial crossing. The sediment at the perennial crossing is primarily tire wash and redistribution of fines within the channel. This crossing could use some additional gravel on both approaches to reduce the channel widening and sedimentation into this tributary to Haypress Creek.
TKN-J12	Channel widening at one intermittent crossing and water is flowing down route. Route is a minor chronic sediment source and is in a 303d listed watershed. Water bars are needed to channel water away from trail.
TKN-J5	While the perennial crossing at the beginning of the route is currently stable, need to ensure it's not widened during high flows.
YRN-007	Install waterbars to control erosion at the stream crossing, and reconstruct existing waterbars along the steep beginning section of the route.
YRS-SF6b	This route has two stream crossings near the Omega Road. The lower of the two crossings has rill erosion entering into its culvert, and a headcut at the lower end of the crossing is eroding the road base into the stream. Below this crossing, the route picks up gradient (5-10%) and shows continuous rill erosion, approximately 3 feet wide and 1,000 feet long. This section needs drainage control and waterbars to mitigate these impacts.

RCO #2 - Standard and Guideline 102

Prior to activities that could adversely affect streams, determine if relevant stream characteristics are within the range of natural variability. If characteristics are outside the range of natural variability, implement mitigation measures and short-term restoration actions needed to prevent further declines or cause an upward trend in conditions. Evaluate required long-term restoration actions and implement them according to their status among other restoration needs.

Consistency Determination: All of the action alternatives improve relevant stream characteristics by reducing adverse impacts from roads and motorized trails. Table R-6 summarizes some of the key criteria used as indicators for improving relevant stream characteristics.

Table R-6. Indicators for improving relevant stream characteristics

Alternative	Alt 1 (No Action)	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Native surface road and motorized trail density within RCAs (miles/sq. mile)	1.7	1.4	1.2	1.2	1.5	1.4	1.2
Stream Crossing Density (number of crossings per square mile of RCAs)	7.5	6.6	5.4	5.5	6.9	6.1	5.5
Number of motorized stream crossings:							
Perennial Streams (number)	1655	1319	1300	1309	1359	1318	1309
Ephemeral Streams (number)	1683	1326	1309	1319	1378	1329	1320
Native surface roads and motorized trails within RCAs (miles)	674	551	472	478	584	522	481

OHV monitoring and field surveys conducted from 2003 through the 2007 field season identified sites associated with existing National Forest System roads and trails in need of restoration or rehabilitation. Additional needs on both system and unauthorized routes were identified during Travel Management surveys. These sites are being prioritized and scheduled for restoration or rehabilitation as funding permits.

RCO #2 - Standard and Guideline 103

Prevent disturbance to streambanks and natural lake and pond shorelines caused by resource activities (for example, livestock, off-highway vehicles, and dispersed recreation) from exceeding 20 percent of stream reach or 20 percent of natural lake and pond shorelines. Disturbance includes bank sloughing, chiseling, trampling, and other means of exposing bare soil or cutting plant roots. This standard does not apply to developed recreation sites, sites authorized under Special Use Permits and designated off-highway vehicle routes.

Consistency Determination: This Standard and Guideline does not apply to designated off-highway vehicle routes.

RCO #2 - Standard and Guideline 104

In stream reaches occupied by, or identified as "essential habitat" in the conservation assessment for, the Lahontan and Paiute cutthroat trout and the Little Kern golden trout, limit streambank disturbance from livestock to 10 percent of the occupied or "essential habitat" stream reach. (Conservation assessments are described in the record of decision.) Cooperate with State and Federal agencies to develop streambank disturbance standards for threatened, endangered, and sensitive species. Use the regional streambank assessment protocol. Implement corrective action where disturbance limits have been exceeded.

Consistency Determination: This Standard and Guideline only applies to disturbance from livestock grazing and is not applicable to this project.

RCO #2 - Standard and Guideline 105

At either the landscape or project-scale, determine if the age class, structural diversity, composition, and cover of riparian vegetation are within the range of natural variability for the vegetative community. If conditions are outside the range of natural variability, consider implementing mitigation and/or restoration actions that will result in an upward trend. Actions could include restoration of aspen or other riparian vegetation where conifer encroachment is identified as a problem.

Consistency Determination: This Standard and Guideline applies to vegetation management and is not applicable to this project.

RCO #2 - Standard and Guideline 106

Cooperate with Federal, Tribal, State and local governments to secure in stream flows needed to maintain, recover, and restore riparian resources, channel conditions, and aquatic habitat. Maintain in stream flows to protect aquatic systems to which species are uniquely adapted. Minimize the effects of stream diversions or other flow modifications from hydroelectric projects on threatened, endangered, and sensitive species.

Consistency Determination: This Standard and Guideline applies to stream flows and is not applicable to this project.

RCO #2 - Standard and Guideline 107

For exempt hydroelectric facilities on national forest lands, ensure that special use permit language provides adequate in stream flow requirements to maintain, restore, or recover favorable ecological conditions for local riparian- and aquatic-dependent species.

Consistency Determination: This Standard and Guideline applies to exempt hydroelectric facilities and is not applicable to this project.

RCO #3 - Standard and Guideline 108

Determine if the level of coarse large woody debris (CWD) is within the range of natural variability in terms of frequency and distribution and is sufficient to sustain stream channel physical complexity and stability. Ensure proposed management activities move conditions toward the range of natural variability.

Consistency Determination: The amount of coarse large woody debris in streams can be negatively affected by the amount of toads and trails near streams. All of the action alternatives reduce the amount of roads and motorized trails within RCAs and within 100 feet of riparian vegetation. In addition all of the action alternatives prohibit cross country travel within 100 feet of riparian vegetation. Therefore all of the action alternatives move conditions toward the range of natural variability in terms of coarse large woody debris. Table R-7 displays the key criteria associated with moving the level of coarse large woody debris conditions toward the range of natural variability.

Table R-6. Indicators proposed management activities move coarse large woody debris conditions toward the range of natural variability

Alternative	Alt 1 (No Action)	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7
Native surface road and motorized trail density within RCAs (miles/sq. mile)	1.7	1.4	1.2	1.2	1.5	1.4	1.2
Native surface roads and motorized trails within RCAs (miles)	674	551	472	478	584	522	481
Cross country travel within 100' of riparian vegeation (acres)	73,500	0	0	0	0	0	0
Roads and motorized trailes within 100' of riparian vegetation (miles)	345	237	231	234	250	238	234

RCO #4 - Standard and Guideline 109

Within CARs, in occupied habitat or "essential habitat" as identified in conservation assessments for threatened, endangered, or sensitive species, evaluate the appropriate role, timing, and extent of prescribed fire. Avoid direct lighting within riparian vegetation; prescribed fires may back into riparian vegetation areas. Develop mitigation measures to avoid impacts to these species whenever ground-disturbing equipment is used.

Consistency Determination: This Standard and Guideline is associated with the use of prescribed fire and is not applicable to this project.

RCO #4 - Standard and Guideline 110

Use screening devices for water drafting pumps.(Fire suppression activities are exempt during initial attack.) Use pumps with low entry velocity to minimize removal of aquatic species, including juvenile fish, amphibian egg masses and tadpoles, from aquatic habitats.

Consistency Determination: No screening devices for water drafting pumps are associated with this decision.

RCO #4 - Standard and Guideline 111

Design prescribed fire treatments to minimize disturbance of ground cover and riparian vegetation in RCAs. In burn plans for project areas that include, or are adjacent to RCAs, identify mitigation measures to minimize the spread of fire into riparian vegetation. In determining which mitigation measures to adopt, weigh the potential harm of mitigation measures, for example fire lines, against the risks and benefits of prescribed fire entering riparian vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could be damaging to habitat or long-term function of the riparian community.

Consistency Determination: This Standard and Guideline is not applicable to this project.

RCO #4 Standard and Guideline 112

Post-wildfire management activities in RCAs and CARs should emphasize enhancing native vegetation cover, stabilizing channels by non-structural means, minimizing adverse effects from the existing road

network, and carrying out activities identified in landscape analyses. Post-wildfire operations shall minimize the exposure of bare soil.

Consistency Determination: This Standard and Guideline is not applicable to this project.

RCO #4 Standard and Guideline 113

Allow hazard tree removal within RCAs or CARs. Allow mechanical ground disturbing fuels treatments, salvage harvest, or commercial fuelwood cutting within RCAs or CARs when the activity is consistent with RCOs. Utilize low ground pressure equipment, helicopters, over the snow logging, or other non-ground disturbing actions to operate off of existing roads when needed to achieve RCOs. Ensure that existing roads, landings, and skid trails meet Best Management Practices. Minimize the construction of new skid trails or roads for access into RCAs for fuel treatments, salvage harvest, commercial fuelwood cutting, or hazard tree removal.

Consistency Determination: This Standard and Guideline is not applicable to this project.

RCO #4 Standard and Guideline 114

As appropriate, assess and document aquatic conditions following the Regional Stream Condition Inventory protocol prior to implementing ground disturbing activities within suitable habitat for California red-legged frog, Cascades frog, Yosemite toad, foothill and mountain yellow-legged frogs, and northern leopard frog.

Consistency Determination: No ground disturbing activities within suitable habitat for California red-legged frog, Cascades frog, Yosemite toad, foothill and mountain yellow-legged frogs, and northern leopard frog requiring Regional Stream Condition Inventory protocols are appropriate for this project. Affects to these species are displayed in Chapter 3.03 Terrestrial and Aquatic Species.

RCO #4 Standard and Guideline 115

During fire suppression activities, consider impacts to aquatic- and riparian-dependent resources. Where possible, locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of RCAs or CARs. During pre-suppression planning, determine guidelines for suppression activities, including avoidance of potential adverse effects to aquatic- and riparian-dependent species as a goal.

Consistency Determination: This Standard and Guideline is associated with fire suppression activities and is not applicable to this project.

RCO #4 Standard and Guideline 116

Identify roads, trails, OHV trails and staging areas, developed recreation sites, dispersed campgrounds, special use permits, grazing permits, and day use sites during landscape analysis. Identify conditions that degrade water quality or habitat for aquatic and riparian-dependent species. At the project level, evaluate and consider actions to ensure consistency with standards and guidelines or desired conditions.

Consistency Determination: This project is not a landscape analysis. All elements of this project level decision were evaluated to ensure consistency with standards and guidelines or desired conditions.

Any actions needed to ensure consistency with are specified as mitigation measure requirements in Appendix A (Road Cards).

RCO #5 Standard and Guideline 117

Assess the hydrologic function of meadow habitats and other special aquatic features during range management analysis. Ensure that characteristics of special features are, at a minimum, at Proper Functioning Condition, as defined in the appropriate Technical Reports (or their successor publications): (1) "Process for Assessing PFC" TR 1737-9 (1993), "PFC for Lotic Areas" USDI TR 1737-15 (1998) or (2) "PFC for Lentic Riparian-Wetland Areas" USDI TR 1737-11 (1994).

Consistency Determination: This Standard and Guideline is associated with range management analysis and is not applicable to this project.

RCO #5 Standard and Guideline 118

Prohibit or mitigate ground-disturbing activities that adversely affect hydrologic processes that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. During project analysis, survey, map, and develop measures to protect bogs and fens from such activities as trampling by livestock, pack stock, humans, and wheeled vehicles. Criteria for defining bogs and fens include, but are not limited to, presence of: (1) sphagnum moss (Spagnum spp.*), (2) mosses belonging to the genus Meessia, and (3) sundew (Drosera* spp.*) Complete initial plant inventories of bogs and fens within active grazing allotments prior to re-issuing permits.*

Consistency Determination: Mitigation measures are specified in Appendix A (Road Cards) for those motorized trail additions to the National Forest Transportation System which could adversely affect hydrologic process that maintain water flow, water quality, or water temperature critical to sustaining bog and fen ecosystems and plant species that depend on these ecosystems. These mitigation measures assure consistency of all of the action alternatives with this standard and guideline. Table R-7 displays the mitigation measures required to assure consistency with this Standards and Guideline.

Table R-7. Mitigation measures required to assure consistency with Standard and Guideline 118

Route ID	Mitigation Measure
Eureka Diggings	The portion of the open area south of the road will be fenced and signed to prohibit OHV use to protect the seasonal wetlands/vernal pools.
SV-005	Place barriers at trail edge between the trail and the seep to reduce further impacts to this wetland. Instruct users and maintenance crews in weed identification so early detection and eradication of aggressive weeds can occur early.
TKN-J2	Place barriers around the vernal pool/seasonal wetland so that damage from motorized use is reduced/eliminated.
TKN-J5	Redirect water flow from the seep/spring at the beginning of the route and from overland flow down a portion of the route to Castle Creek – to the meadow.
TKN-J5	Place barriers so that turn arounds, camping, and parking do not occur within 100 feet of Castle Creek to reduce impacts to the Bruchia bolanderi occurrence.
TKN-J5	Ensure that the crossing of Castle Creek is not widened during high flows to reduce impacts to the rare moss – Bruchia bolanderi - field check the route annually.

Route ID	Mitigation Measure
TKS-11	Construct drainage structures to reduce impacts to adjacent wetlands.
TKS-11	Place barriers at the edges of the route where the route passes through the aspen clone/wet meadow complex to reduce impacts to those resources.
YRN-11	Place barriers at the end of the route between the route and the wet meadow to reduce impacts to the wet meadow complex.
YRN-5C	Reroute YRN-5c so it does not go through the meadow.
YRS-SF5	Place barriers between the route and the spur going into the wetland.
YRS-SF5	Place barriers between the route and the spur going down to the pond/peatland.
TKN-J5	Mitigate seep at beginning of route.
YRN-11	Place barriers at end of route to prevent encroachment into meadow

RCO #5 - Standard and Guideline 119

Locate new facilities for gathering livestock and pack stock outside of meadows and riparian conservation areas. During project-level planning, evaluate and consider relocating existing livestock facilities outside of meadows and riparian areas. Prior to re-issuing grazing permits, assess the compatibility of livestock management facilities located in riparian conservation areas with riparian conservation objectives.

Consistency Determination: This Standard and Guideline is not applicable since livestock or pack stock facilities are not authorized with this project.

RCO #5 - Standard and Guideline 120 - *Under season-long grazing:*

- *For meadows in early seral status: limit livestock utilization of grass and grass-like plants to 30 percent (or minimum 6-inch stubble height).*
- *For meadows in late seral status: limit livestock utilization of grass and grass-like plants to a maximum of 40 percent (or minimum 4-inch stubble height).*

  Determine ecological status on all key areas monitored for grazing utilization prior to establishing utilization levels. Use Regional ecological scorecards and range plant list in regional range handbooks to determine ecological status. Analyze meadow ecological status every 3 to 5 years. If meadow ecological status is determined to be moving in a downward trend, modify or suspend grazing. Include ecological status data in a spatially explicit Geographical Information System database.

  Under intensive grazing systems (such as rest-rotation and deferred rotation) where meadows are receiving a period of rest, utilization levels can be higher than the levels described above if the meadow is maintained in late seral status and meadow-associated species are not being impacted. Degraded meadows (such as those in early seral status with greater than 10 percent of the meadow area in bare soil and active erosion) require total rest from grazing until they have recovered and have moved to mid- or late seral status.

Consistency Determination: This Standard and Guideline is associated with grazing and is not applicable to this project.

RCO #5 - Standard and Guideline 121

Limit browsing to no more than 20 percent of the annual leader growth of mature riparian shrubs and no more than 20 percent of individual seedlings. Remove livestock from any area of an allotment when browsing indicates a change in livestock preference from grazing herbaceous vegetation to browsing woody riparian vegetation.

Consistency Determination: This Standard and Guideline is associated with grazing and is not applicable to this project.

RCO #6 Standard and Guideline 122

Recommend restoration practices in: (1) areas with compaction in excess of soil quality standards, (2) areas with lowered water tables, or (3) areas that are either actively down cutting or that have historic gullies. Identify other management practices, for example, road building, recreational use, grazing, and timber harvests that may be contributing to the observed degradation.

Consistency Determination: OHV monitoring and field surveys conducted from 2003 through the 2007 field season identified sites associated with existing National Forest System roads and trails in need of restoration or rehabilitation. Additional needs on both system and unauthorized routes were identified during Travel Management surveys. These sites are being prioritized and scheduled for restoration or rehabilitation as funding permits.

Critical Aquatic Refuges Standard and Guideline 123

Determine which critical aquatic refuges or areas within critical aquatic refuges are suitable for mineral withdrawal. Propose these areas for withdrawal from location and entry under U.S. mining laws, subject to valid existing rights, for a term of 20 years.

Consistency Determination: This standard and guideline is associated with mineral withdrawals and is outside the scope of this project.

Critical Aquatic Refuges Standard and Guideline 124

Approve mining-related plans of operation if measures are implemented that contribute toward the attainment or maintenance of aquatic management strategy goals.

Consistency Determination: This standard and guideline is associated mining plans of operation and is outside the scope of this project.

Appendix S: Roads Analyzed for Motorized Mixed Use

The following roads were brought forward to be analyzed for motorized mixed use (mixing highway-legal vehicles with non-highway-legal vehicles). They are arranged geographically by maintenance zone: The West Zone lies west of the Sierra Crest and north of Interstate 80, the South Zone is west of the crest and south of Interstate 80, and the East Zone is the forest area east of the crest.

The analyses focused on the likelihood of a crash occurring and the severity of an accident should one occur. Additionally, whether allowing motorized mixed use was consistent with the California Vehicle Code (CVC) was also determined. Key factors in assessing crash probability were traffic volume and the presence of blind corners or other features that impaired visibility. Road characteristics leading to more severe crashes include steep side slopes and higher speeds. If a road is not rated as having both low accident probability and severity, then mitigation measures are needed. Such measures can be signs advising of mixed use and allowing the road surface to deteriorate to a rougher state, thereby reducing travel speeds.

Road Number	**Road Name**	**Segment Length and Mile Post**	**Surface**	**Consistent with CVC?**	**Accident Probability** (HML)	**Accident Severity** (H/M/L)	**Can Risks Be Mitigated?** (Y/N)
120-08	Pendola Extension	3.6 0.0 to 3.6	Native	Yes	Low	Low	Yes
14	Grouse Ridge	5.8 0.0 to 5.8	Aggregate Native	Yes	Low	Moderate	Yes
14-01	Fall Creek	2.3 0.0 to 2.3	Native	Yes	Low	Moderate	Yes
14-07	Grouse Ridge CG	0.3 0.0 to 0.3	Native	Yes	Low	Low	Yes
17	Carr Lindsey	4.3 0.0 to 4.3	Aggregate Native	Yes	Low	Moderate	Yes
18	Bowman (over the snow)	14.5	Aggregate Native	No	Moderate	High	Yes
18-06	Blue Lake	1.0 0.0 to 1.5	Aggregate Native	Yes	Low	Low	Yes
20-12	Burlington Ridge	5.6 0.0 to 5.6	Aggregate Native	Yes	Low	Moderate	Yes

Road Number	Road Name	Segment Length and Mile Post	Surface	Consistent with CVC?	Accident Probability (HML)	Accident Severity (H/M/L)	Can Risks Be Mitigated? (Y/N)
20-12-01	Skillman CG	0.7 0.0 to 0.7	Asphalt	Yes	Low	Low	Yes
20-12-03	Towle Mill	1.3 0.0 to 1.3	Native	Yes	Low	Moderate	Yes
20-16	Diamond Creek	4.0 0.0 to 4.0	Aggregate Native	Yes	Low	Moderate	Yes
21	Washington Gaston	10 0.0 to 10.3	Asphalt Aggregate	Yes	High	High	No
25	Cal-Ida	12.5 12.0 to 22.5	Aggregate Native	Yes	Moderate	High	Yes
27	Fiddle Creek	9.9 0.0 to 9.9	Aggregate	Yes	Moderate	High	Yes
29	Omega	6.0 0.0 to 6.0	Aggregate Native	Yes	Moderate	High	Yes
29-02	Alpha	3.2 0.0 to 3.2	Aggregate Native	Yes	Low	Low	Yes
32	Chalk Bluff	2.1 0.0 to 2.1	Aggregate Native	Yes	Moderate	Moderate	Yes
34	Jouberts	11.9 0.0 to 11.9	Aggregate Asphalt	No	Low	High	No
35	Eureka	10.8 6.4 to 17.2	Native	Yes	Moderate	High	No
41	Pinoli Ridge	14.3 0.0 14.3	Aggregate Native	No	Low	Moderate	Yes
424-06	Lower Greenhorn	5.4 0.0 to 5.4	Native	Yes	Moderate	Moderate	Yes
49-47	Union Flat CG	0.2 0.0 to 0.2	Aggregate	Yes	High	High	No
654-02	Indian Spring CG	0.9	Asphalt	Yes	Low	Low	Yes
654-03	Indian Spring Staging	0.1 0.0 to 0.1	Aggregate	Yes	Low	Low	Yes

Road Number	Road Name	Segment Length and Mile Post	Surface	Consistent with CVC?	Accident Probability (HML)	Accident Severity (H/M/L)	Can Risks Be Mitigated? (Y/N)
738-04	Golden Quartz	0.3 0.0 to 0.3	Native	Yes	Low	Low	Yes
843-37	Faucherie Lake	3.4 0.0 to 3.4	Native	Yes	Low	Moderate	Yes
85	Rattlesnake	11.0 0.0 to 11.0	Aggregate Native	Yes	High	High	No
85-13	Lola Montez Lake	0.8 0.0 to 0.8	Native	Yes	Low	Moderate	Yes
93	Gold Valley	10.9 2.5 to 13.1	Aggregate Asphalt	Yes	Moderate	High	Yes
93-02	Monarch	1.8 0.0 to 1.8	Native	Yes	Moderate	High	No
93-03	Pauley Creek	4.4 0.0 to 4.4	Native	Yes	Moderate	High	No
93-04	Hog Canyon	4.7 0.0 to 4.7	Aggregate	Yes	Moderate	High	No
98	Banner Mine	8.1 0.0 to 8.1	Native	Yes	Low	Low	Yes
01	Jackass Point	2.9 0.0 to 2.9	Native	Yes	Low	Low	Yes
03	Barker Pass	10.9 0.0 to 10.9	Aggregate	No	Moderate	Moderate	Yes
04	Bear Valley	6.4 0.0 to 6.4	Aggregate	No	High	High	No
05	Treasure Mtn.	10.5 0.0 to 10.5	Native	Yes	Low	Moderate	Yes
06	Sawtooth	10.3 0.0 to 10..3	Aggregate	No	Low	High	Yes
07-40	Lake of Woods	4.1 0.0 to 4.1	Native	Yes	Low	Low	Yes

Road Number	**Road Name**	**Segment Length and Mile Post**	**Surface**	**Consistent with CVC?**	**Accident Probability** (HML)	**Accident Severity** (H/M/L)	**Can Risks Be Mitigated?** (Y/N)
07-6	Little Truckee Parking Area	0.15 0.0 to 0.15	Asphalt	Yes	Low	Low	Yes
09	Haskell Peak	14.3 0.0 to 14.3	Nat/Agg	Yes	Moderate	Moderate	Yes
11	Sagehen	5.2 0.0 to 5.2	Native	Yes	Moderate	Moderate	Yes
11-4	Sagehen SP	0.7 0.0 to 0.7	Native	Yes	Low	Moderate	Yes
11-4-2	Sagehen CG	0.4 0.0 to 0.4	Native	Yes	Low	Low	Yes
12	Yuba - Weber	17 0.0 to 17	Aggregate	No	Moderate	High	No
12-2	Yuba Pass CG	0.3 0.0 to 0.3	Aggregate	Yes	Low	Low	Yes
12-99	South Bonta	3.5 0.0 to 0.5	Native	Yes	Moderate	Moderate	Yes
15	Nichols Mill	8.2 0.0 to 8.2	Native	Yes	Moderate	Moderate	Yes
261-4 and spurs	Logger CG	0.2 0.0 to 0.2	Asphalt	Yes	Low	Low	Yes
28	Church Creek	2.7 0.0 to 2.7	Native	Yes	Moderate	Moderate	Yes
3-4	Niehaus	6.5 0.0 to 6.5	Native	Yes	Low	Low	Yes
49-53	South Fork State Tract	0.2 0.0 to 0.2	Aggregate	Yes	Low	Moderate	Yes
49-54	Carvin Creek Tract	0.8 0.0 to 0.8	Native	Yes	Low	Moderate	Yes
49-56	Haskell Creek Tract	0.5 0.0 to 0.5	Native	Yes	Low	Moderate	Yes

Road Number	**Road Name**	**Segment Length and Mile Post**	**Surface**	**Consistent with CVC?**	**Accident Probability** (HML)	**Accident Severity** (H/M/L)	**Can Risks Be Mitigated?** (Y/N)
52	Chapman Calpine	8.2 0.0 to 8.2	Native	Yes	Moderate	Moderate	Yes
54	Williams Creek	12.7 0.0 to 12.7	Asph/Nat	No	Moderate	High	No
541-10	Cold Canyon	1.4 0.0 to 1.4	Native	Yes	Low	Low	Yes
5688	Bald Ridge	14.6 0.0 to 14.6	Native	Yes	Moderate	High	No
5708	Pole Creek	7.0 0.0 to 7.0	Aggregate	Yes	Moderate	High	No
70	Pass Creek Loop	7.5 0.0 to 7.5	Nat/Agg	Yes	Moderate	Moderate	Yes
70-80	East Meadows CG	0.5 0.0 to 0.5	Asphalt	Yes	Low	Low	Yes
70-80-20	East Meadow CG	0.3 0.0 to 0.3	Asphalt	Yes	Low	Low	Yes
71	Carman Valley	11.4 0.0 to 11.4	Native	Yes	Low	Moderate	Yes
72	Verdi Peak	11.7 0.0 to 11.4	Native	Yes	Moderate	Moderate	Yes
72-2	Verdi Peak Spur	2.9 0.0 to 0.5	Native	Yes	Low	Low	Yes
76	Austin Meadows	2.1 0.0 to 2.1	Native	Yes	Low	Moderate	Yes
780-12	Carpenter Valley	14.574	Aggregate	No	Moderate	High	Yes
86	Meadow Lake	6.1 0.0 to 6.1	Aggregate	No	Moderate	High	No
89-33-1	Prosser Hill OHV	0.1 0.0 to 0.1	Asphalt	Yes	Low	Low	Yes
89-55	Rice Canyon	2.7 0.0 to 2.7	Chip Seal	No	Low	Moderate	Yes

Road Number	Road Name	Segment Length and Mile Post	Surface	Consistent with CVC?	Accident Probability (HML)	Accident Severity (H/M/L)	Can Risks Be Mitigated? (Y/N)
89-88	Old 71	0.7 0.0 to 0.7	Native	Yes	Low	Moderate	Yes
10-16	Sugar Pine OHV Staging Area	0.2 0.0 to 0.2	Aggregate	Yes	Low	Low	Yes
16	Canyon View Loop	6.7 0.0 to 6.7	Aggregate	Yes	Low	High	No
19	Texas Hill Mears	3.4 18.2 to 21.6	Aggregate	Yes	Low	High	No
19-16	Hellester	8.7 0.0 to 8.7	Native	Yes	Low	Low	Yes
24	Brimstone	2.5 0.0 to 2.5	Aggregate	Yes	Moderate	High	Yes
24-16	Parker Flat OHV Staging Area	0.2 0.0 to 0.2	Aggregate	Yes	Low	Low	Yes
24-21	Big Reservoir	0.4 0.1 to 0.5	Aggregate	Yes	High	High	No
33	Peavine	9.7 0.0 to 9.7	Aggregate	Yes	Low	High	No
33-27	Peavine Spur	0.4 0.0 to 0.4	Native	Yes	Low	Low	Yes
43	Robison Flat	5.7 0.0 to 5.7	Aggregate & Native	Yes	Low/Moderate	High	No
43-24 and spurs	Robinson Flat Campground	0.1	Aggregate	Yes	Low	Low	Yes
44	Cavanah Deep	11.6 1.6 to 13.2	Aggregate	Yes	Low	High	No
44-22	Last Chance	4.8 0.0 to 4.8	Aggregate	Yes	Low	High	Yes
45	Monumental Creek	6.3 0.0 to 6.3	Native	Yes	Low	High	Yes

Road Number	**Road Name**	**Segment Length and Mile Post**	**Surface**	**Consistent with CVC?**	**Accident Probability** (HML)	**Accident Severity** (H/M/L)	**Can Risks Be Mitigated?** (Y/N)
57	Red Star	4.7 0.0 to 4.7	Native	Yes	Low	Low	Yes
68	Coyote Spring	5.5 0.3 to 5.8	Native	Yes	Low	High	Yes
88-11	Mitchell Mine	2.8 0.0 to 2.8	Aggregate	Yes	Moderate	High	Yes
88-14	China Wall OHV Staging Area	0.2 0.0 to 0.2	Asphalt	Yes	Low	Low	Yes
88-30	Secret House	0.3 0.0 to 0.3	Native	Yes	Low	Low	Yes
96	Mosquito Ridge	2.7 40.6 to 43.7	Aggregate	No	Moderate	High	No
96-91	Ahart CG	0.4 0.0 to 0.4	Aggregate	Yes	Low	Low	Yes

Appendix T: Law Enforcement

Introduction

U.S. Forest Service Law Enforcement and Investigations (LEI) personnel are responsible for protecting the public, employees, natural resources, and other property under the agency's jurisdiction. Additionally, LEI investigates and enforces applicable laws and regulations that affect the National Forest System (NFS) lands, and prevents criminal violations. The new Travel Management Rule is one such regulation.

The Travel Management Rule requires designation of roads, trails, and areas open to motor vehicle use, and the prohibition of cross-country wheeled motorized vehicle travel by the public. This is a considerable change in public motorized access management from previous conditions where most Forests were managed as "open to cross-country travel." The implementation of designated routes and areas for motorized vehicles will be the responsibility of all agency employees, especially in the area of education and enforcement. The law enforcement program is primarily responsible for issuing violations to the Travel Management Rule.

The National LEI budget is funded by appropriated dollars from Congress to provide law enforcement services on the NFS lands. The Travel Management program is one of many Forest programs to benefit from federal law enforcement funding. For the past few years, law enforcement funding has increased and that has translated into an increase in field law enforcement personnel[1].

To enhance enforcement of the Travel Management Rule, Region 5 Forest Recreation Programs have applied for and received grant dollars (green sticker funding) from the State of California Off-Highway Motor Vehicle Recreation Division Grants Program. These State funds are earmarked specifically for enforcement of off-highway vehicle laws and regulations on the various Forests, and are performed primarily by Forest Protection Officers (FPO). In addition, Law Enforcement Officers (LEOs) support the FPOs as needed, especially if serious violations have occurred. In recent years, State law enforcement grants have ranged from 3-4 million dollars annually with similar funding anticipated for the 2008-2009 grant cycle.

Authority and Jurisdiction

The Forest Service exercises its law enforcement authority when violation of laws or regulations occurs on NFS lands or when incidents affect the NFS. The existing authorities for enforcement are completely adequate and no new laws will be needed to implement the Travel Management rule.

The Tahoe National Forest has a law enforcement plan that is updated annually. All Forest Service employees have a duty to know and understand their authorities and responsibilities, and to properly enforce laws and regulations relating to the Forest within their authority and capability. LEI and agency personnel provide a regular and recurring presence on vast amounts of public land, roads, trails, and areas, and take appropriate action if illegal activity is discovered. Violations involving motorized vehicles are primarily enforced FPOs, which patrol off-highway use roads, trails, and areas. These include violations

[1] Region 5 Law Enforcement budget figures for the past 4 years have increased and the number of law enforcement officers has increased by 65.

such as operating a motor vehicle in violation of federal regulations and California vehicle code, parking improperly, resource damage to soils, vegetation or wildlife, and disorderly or unruly behavior. LEOs have discretion when deciding what type of action to initiate when handling violations to the following federal laws that pertain specifically to motor vehicle use.

- The Act of June 4, 1897 (Title 16 United States Code 551) is the authority for issuing regulations at Title 36 Code of Federal Regulations, Part 261 (36 CFR 261). Specific OHV travel management regulations are in sections 261.9 – Property, 261.13 –Motor Vehicle Use, and 261.15 –Use of Vehicles Off-Road. These CFRs cover a wide array of misdemeanor infractions.
- The Act of March 3, 1905 (Title 16 United States Code 559) authorizes all employees of the Forest Service to make arrests for violation of the laws and regulations pertaining to National Forests. Normally, arrest authority is limited to trained law enforcement personnel. (Any employee may take immediate action when necessary to protect life and prevent serious damage to or destruction of property, escape of a suspect, or loss of material evidence when such action can be done with reasonable safety.)

Cooperation

The Forest Service shares responsibility and cooperates with local, State, and other Federal agencies in the execution of its law enforcement program. The authority for cooperation among agencies, especially as it pertains to Travel Management, is within the following laws:

- The act of August 10, 1971 (Title 16 United States Code 551a) authorizes the Secretary of Agriculture to cooperate with, and provide reimbursement to, any State or political subdivision thereof, for the enforcement of their laws within NFS. This law does not deprive any State or local law enforcement agency from exercising its criminal and civil jurisdiction on lands that are part of the NFS.
- The California Penal Code, Section 830.8 provides that Forest Service law enforcement personnel may exercise State Peace Officer authority where the sheriff of the county wherein the officer works has provided specific written permission for the officer.
- The State vehicle code section 38301 allows State law enforcement officer to enforce any of the Federal CFRs related to motor vehicles on NFS lands.[2]

Each Forest maintains close working relationships with many State and local law enforcement agencies that have law enforcement responsibilities within/and or adjacent to the Forest boundary. Significant cooperating agencies relative to the Travel Management Rule include the local county sheriff departments, the California Department of Fish and Game, California Highway Patrol, California Department of Forestry and Fire Protection, and occasionally one or more Federal agencies depending on the violation. Forest Service law enforcement personnel cooperate fully with these agencies in carrying out their law enforcement responsibilities by providing assistance; liaison, advice, and information.

[2] State Vehicle code section 38301. (a) It is unlawful to operate a vehicle in violation of special regulations which have been promulgated by the governmental agency having jurisdiction over public lands, including, but not limited to, regulations governing access, routes of travel, plants, wildlife habitat, water resources and historical sites.

Forests maintain Cooperative Law Enforcement Agreements with their respective county sheriff's office. In Region 5, the total cost for the 2008 Cooperative Law Enforcement Agreements is $891,397.[3] These dollars are for performance of duties in addition to the normal activities in which the sheriff's deputies handle crimes against persons and their property that may occur within the NFS boundary. In these agreements, both parties recognize that public use of NFS lands is usually located in areas that are remote or sparsely populated and the enforcement of State and local law is related to the administration and regulation of NFS lands. Within the Cooperative Law Enforcement Agreements, an Operating Plan is developed outlining the supplemental work to be performed by the cooperating agency. Relative to the Travel Management Rule, operating plans may provide:

- Supplemental patrols in areas of high use.
- Supplemental patrols on weekends or during particular months of high use.
- Additional officers for large group gatherings or events (enduros)
- Vehicle checkpoints for vehicle registration spark arrestors, and other miscellaneous items.

Implementation and Tracking

Implementation of the Forest Service law enforcement program is continually adapting as law enforcement personnel assess the changing patterns of visitor use and attitudes, and the trends in violations, especially for property and resource damage. One method of assessment is the analysis of Law Enforcement and Investigations Management Attainment Reporting System (LEIMARS) data. LEIMARS tracks all known violations of criminal law or regulation on NFS lands (FSH 5309.11, chapter 40 and FSM 5340). Additionally, imbedded in LEIMARS is the Case Tracking System, which tracks all felony and serious misdemeanor cases. These tracking systems:

- Capture and record information on location, volume, damages, and type of violations occurring on NFS lands.
- Provide a retrieval system of data on incidents and violations that is responsive to the needs of all organizational levels.
- Provide agency managers with a means to identify and monitor law enforcement activities.
- Specifically identify problem areas and periods of activity.
- Provide a method to record and analyze incidents involving violations or suspected violations on NFS lands.

Trends in violations related to the Travel Management Rule can be analyzed and appropriate action(s) taken, if needed. Appropriate action(s) may involve one or more techniques or adaptive strategies. In the law enforcement community, this is often referred to as the "three E strategy" of engineering, education, and enforcement. With the change in the Travel Management Rule, it is anticipated that the law enforcement program will use a combination of strategies, especially during the first five years of the rule implementation.

[3] Region 5 Law Enforcement Cooperative Agreement 2008 spreadsheet.

Implementation Strategy (Engineering – Education – Enforcement)

The Engineering strategy is designed to prevent or reduce inadvertent violations, resource damage, and crime vulnerability. The strategy's goal is to remove the opportunity to commit a violation. LEI personnel work with each Forest, particularly the recreation and engineering programs, to implement some or all of the following specific tactics:

- Proper design of improvements and facilities.
- Facility security measures such as installation of barricades, gates, and other natural obstacles.
- Forest signing, both directional and informational, to assist the public to ensure they stay on designated trails, and out of the wilderness and other sensitive areas.
- Physically close and rehabilitate decommissioned roads and trails.

The Educational strategy focuses on specific user groups, school groups, recreation users, and the public. The goal is to develop responsible and concerned public land use attitudes in forest users; it's violation prevention. Forest LEOs and FPOs make regular contacts in the field informing the users of the regulations and need for the prohibition. The LEI personnel work with each Forest, particularly the recreation and public information programs, to identify and implement some or all of the following specific tactics.

- Have motor vehicle use maps easily available to public.
- Have route numbers visually marked on the ground.
- Distribute maps and brochures promoting responsible use.
- Conduct environmental interpretation activities in local communities, at schools, and with special interest groups.
- Use of all forms of the media (television, radio, and newspapers), especially prior to, and during, the high use periods.
- Ensure all employees understand the Travel Management Rule.
- Utilize high visibility prevention patrols and public information checkpoints, especially during the peak use periods.
- Encourage cooperating law enforcement agencies to make visitor contacts and provide violator information to Forest Officers.
- Ride with other agency officers to demonstrate solidarity to the public.
- Issue news releases of arrests and successful prosecutions, including offender names, criminal penalties, and court ordered restitution.

The Law Enforcement strategy is to affect crime prevention measures that are designed to reduce specific criminal activity, deter potential and repeat offenders, maximize enforcement actions and visibility, and increase prosecutorial successes. All enforcement actions should result in a better understanding of regulations pertaining to the management of NFS lands. LEI personnel work with each Forest, to identify and implement some or all of the following specific tactics:

- Schedule officers to work during the identified problem periods, including holidays and weekends.

- Utilize high profile "saturation patrols" and stationary surveillance posts in the identified problem areas.
- Utilize the most effective and efficient means of patrol, including foot, horseback, all-terrain vehicle, snowmobile, watercraft, and aircraft.
- Aerial over-flights to enforce restriction under Travel Management Rule.
- Enlist the aid of volunteers.
- Initiate an awards program.
- Supplement patrols with cooperating law enforcement agencies in areas of concern.
- Use technical investigative equipment (cameras, monitors, sensors) to assist officers with detecting and monitoring violations at known or suspected violation sites.
- Conduct planned and approved compliance checkpoints.
- Follow-up on complaints to document violations, damages, and identify suspect vehicles or persons.
- Require cooperating law enforcement agencies to assist with reporting and/or enforcing violations within their authority.
- Patrol with other cooperating law enforcement agency officers.
- Conduct unpredictable patrol schedules.
- Conduct special enforcement actions (unmarked vehicle deployment, surveillance, traffic check-points).
- Utilize LEIMARS and Central Violations Bureau databases along with the State motor vehicle data, to identify repeat offenders for enhanced prosecution.
- Pursue court ordered restitution or civil collections for resource and property damages.
- Encourage prosecutorial and judicial support.
- Execute bench warrants related of off-highway vehicle violations.

Assumptions

Based on many years of enforcing off-highway vehicles, implementation of the Travel Management Rule from a law enforcement perspective assumes the following to be true. Additionally, these assumptions are based on several case studies in R5. These assumptions may change in time with analysis of the LEIMARS database.

Enforcement Assumptions:

- Enforcement of the laws and regulations related to Travel Management will be enforced equally in authority and weight as with all other Federal laws and regulations.
- As with any change in a regulation on NFS lands, there is usually a transitional period for the public to understand the changes. It is anticipated there will be a higher number of violations to the Travel Management Rule the first few years and the number of violations will decline as the users understand and comply with the rules. It is assumed:
  - Users in communities adjacent to the Forest will comply within 1-2 years.
  - Frequent users but further in distance from the Forest will comply within 2-3 years.

  - Infrequent users regardless of distance may take up to 5 years to comply.

- Law enforcement officer and agency personnel's presence and enforcement actions will positively affect OHV users' behaviors and attitudes.
- The Travel Management Rule and associated motor vehicle use map clearly define the designated routes; therefore, making violations to the rule unequivocal.
- Once the motor use vehicle map is published, the implementation of the established dedicated network of roads, trails, and areas with signs, and user education programs, will reduce the number of violations.
- FPOs spend a large percentage of their time on Travel Management issues, and depending on the Forest the estimate range from 30 to 50 percent. LEOs spend approximately 10-20% of their time on enforcement of off-highway vehicle issues.[4]

Agency Funding Assumptions:

- Appropriated program funding levels and number of law enforcement personnel does not affect enforcement of the Travel Management Rule. All laws and regulations are enforced equally.
- Appropriated funds will remain level or increase slightly in the next five years.
- The State of California Off-Highway Motor Vehicle Recreation Division Grants Program (green sticker funding) enhances and provides additional law enforcement presence in the field at the Forest level.

Public Attitude and Compliance Assumptions:

- Forest users want to do the right thing and will obey the rule[5], once they understand the rule and motor vehicle use map.
- User compliance[6] is based on the State of California Off-Highway Motor Vehicle Recreation Division data and is anticipated to be:
  - 95% of the users are fully compliant.
  - 2-3% of the users think about and may violate a law.
  - 1-2% of the users will violate the law.

Measures of Success

Measuring the success of the Travel Management Rule from a law enforcement perspective will be done using the LEIMARS database. An analysis of the data may alert a Forest to a particular problem area for violations such as a group campsite area that may be surrounded by flat meadow areas inviting riders to potentially violate the regulation. A successful program will see a positive change in the following measures:

- Measure 1: A reduction in the number of off-route travel violations.
- Measure 2: A reduction in the number of resource damage violations.

[4] Barnett, G. 2004-2005 Law Enforcement Workload Analysis.
[5] Tyler, Tom R. *Why People Obey the Law*, Princeton University Press, 2006, p. 320
[6] User compliance was computed by using the State Vehicular Recreation Area Fiscal year 2006/2007 data: 4.2M SVRA visitors divided by the 210,000 citations written, is approximately 5 percent non-compliant, and 95% compliant.