Eldorado National Forest
Georgetown Ranger District

Aquatic Species
Biological Assessment and Evaluation
for the
Tobacco Gulch Ecological Restoration Project
1 October 2012

PROJECT LOCATION:
El Dorado County, California
Legal location: Section 4 Township (T) 11 North (N), Range (R) 11 East (E), Mount Diablo Base and Meridian (MDB&M); Sections 2-4, 8-10, 15-18, 20, 21, 28, 29, 32, and 33, T11N, R12E, MDB&M; and Section 24, T12N, R10E, MDB&M.

Prepared By: /s/ Rob Grasso
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Forest Fisheries Biologist
Date: 03/07/2017

EFFECTS DETERMINATIONS:

<table>
<thead>
<tr>
<th>Species</th>
<th>TES Status</th>
<th>Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA red-legged frog</td>
<td>Threatened</td>
<td>May affect but is not likely to adversely affect</td>
</tr>
<tr>
<td>Critical habitat for CA red-legged frog</td>
<td>Designated</td>
<td>No effect</td>
</tr>
<tr>
<td>Sierra Nevada yellow-legged frog</td>
<td>Endangered</td>
<td>No effect</td>
</tr>
<tr>
<td>Critical habitat for Sierra Nevada yellow-legged frog</td>
<td>Designated</td>
<td>No effect</td>
</tr>
<tr>
<td>Yosemite toad</td>
<td>Threatened</td>
<td>No effect</td>
</tr>
<tr>
<td>Critical habitat for Yosemite toad</td>
<td>Designated</td>
<td>No effect</td>
</tr>
<tr>
<td>Foothill yellow-legged frog</td>
<td>RS Sensitive</td>
<td>May affect individuals but is not likely to result in a trend toward federal listing or loss of viability</td>
</tr>
<tr>
<td>Western pond turtle</td>
<td>RS Sensitive</td>
<td>May affect individuals but is not likely to result in a trend toward federal listing or loss of viability</td>
</tr>
<tr>
<td>Hardhead minnow</td>
<td>RS Sensitive</td>
<td>May affect individuals but is not likely to result in a trend toward federal listing or loss of viability</td>
</tr>
<tr>
<td>Pacific Lamprey</td>
<td>RS Sensitive</td>
<td>No effect</td>
</tr>
<tr>
<td>Central Valley spring-run Chinook salmon</td>
<td>Threatened</td>
<td>No effect</td>
</tr>
<tr>
<td>Central Valley steelhead</td>
<td>Threatened</td>
<td>No effect</td>
</tr>
<tr>
<td>Delta smelt</td>
<td>Threatened</td>
<td>No effect</td>
</tr>
<tr>
<td>Lahontan cutthroat trout</td>
<td>Threatened</td>
<td>No effect</td>
</tr>
<tr>
<td>Sacramento winter-run chinook</td>
<td>Endangered</td>
<td>No effect</td>
</tr>
</tbody>
</table>

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I. INTRODUCTION

For the Tobacco Gulch Ecological Restoration Project, the U.S. Forest Service, Eldorado National Forest, Georgetown Ranger District, proposes a combination of fuels reduction and forest health improvement actions including approximately 928 acres of proposed understory commercial as well as non-commercial thinning, mastication, tractor piling, pile burning, with an additional approximately 454 acres of mastication on plantations and non-plantations. Approximately 3 acres of hand thinning to improve recreational resources and approximately 1,406 acres of prescribed burning to reduce surface fuels. Approximately 905 acres will receive chemical treatment of noxious weeds and hand treatment of noxious weeds for populations less than 25 plants in areas excluding chemical herbicides. To accomplish this work, approximately 0.6 mile of new road, 7 miles of reconstructed road, and 0.3 miles of road decommissioning are necessary. The proposed project alternatives are described below.

Forest Service Manual (FSM) 2672.42 (USDA Forest Service 1990) directs that a biological assessment (BA) be prepared for all proposed projects that may have effects upon US Fish and Wildlife Service (USFWS) listed threatened, endangered, and proposed species. In addition, FSM 2670.32 (USDA Forest Service 1990) directs that a biological evaluation (BE) be prepared to determine the effects of proposed projects on USDA Forest Service Region 5 designated sensitive species.

The purpose of this document is to ensure that project decisions do not adversely affect species viability or create trends towards Federal listing. The Biological Assessment (BA) is prepared in accordance with legal requirements set forth under regulations implementing Section 7 of the Endangered Species Act (50 CFR 402; 16 U.S.C. 1536(c)). The listed and proposed species that may be affected by the proposed action are shown in Table 1. The Biological Evaluation (BE) will analyze the potential effects of the proposed Tobacco Gulch Ecological Restoration Project for Region 5 sensitive species [foothill yellow-legged frog, western pond turtle, and hardhead minnow].

The Management Indicator Species Report for aquatic organisms (i.e., aquatic macroinvertebrates and the Pacific treefrog (*Pseudacris regilla*) is provided in the Terrestrial Wildlife Biological Evaluation and Assessment for the Tobacco Gulch Ecological Restoration Project (Funari 2011).

II. CONSULTATION TO DATE

Pursuant to Section 7(c) of the Endangered Species Act of 1973 as amended, the USFWS is contacted to obtain a current list of threatened, endangered, proposed, and candidate species that may be present on the Eldorado National Forest (ENF). The most recent species list for the Tobacco Gulch Ecological Restoration Project was obtained from the USFWS’s IPaC website on March 06, 2017 and is available for review at the ENF Supervisors Office in Placerville, CA.
The Biological Assessment for the Tobacco Gulch Ecological Restoration Project (Grasso 2012) document analyzes the potential effects of the proposed projects upon the following federally listed threatened, endangered, candidate species, while this Biological Evaluation for the Tobacco Gulch Ecological Restoration Project document analyzes for Region 5 sensitive aquatic species (Table 1). Candidate species are managed as sensitive species by the USDA Forest Service:

**Federally Listed Threatened (T) and Endangered (E)**
- California red-legged frog (*Rana draytonii*), T
- Central Valley steelhead (*Oncorhynchus mykiss*), T
- Central Valley spring-run chinook salmon (*Oncorhynchus tshawytscha*), T
- Delta smelt (*Hypomesus transpacificus*), T
- Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*), T
- Winter-run chinook salmon (*Oncorhynchus tshawytscha*), E
- Sierra Nevada yellow-legged frog (*Rana sierrae*), E
- Yosemite toad (*Bufo canorus*), T

**Species with Critical Habitat Proposed or Designated in the Eldorado National Forest**
- California red-legged frog (X)
- Sierra Nevada yellow-legged frog (X)
- Yosemite toad (X)

**US Forest Service Region 5 Designated Sensitive Aquatic Species**
- Foothill yellow-legged frog (*Rana boylii*)
- Hardhead (*Mylopharodon conocephalus*)
- Western pond turtle (*Actinemys marmorata*)
- Pacific lamprey (*Entosphenus tridentatus*)

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**Key:**
- (E) Endangered - Listed as being in danger of extinction.
- (T) Threatened - Listed as likely to become endangered within the foreseeable future.
- (P) Proposed - Officially proposed in the Federal Register for listing as endangered or threatened.
- (NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
- (PX) Proposed Critical Habitat - The species is already listed. Critical habitat is being proposed for it.
- (C) Candidate - Candidate to become a proposed species.
- (V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
- (X) Critical Habitat designated for this species

There are no anadromous species of fish known to occur on the Eldorado National Forest due to
the presence of rim dams, water diversions and natural barriers; therefore no consultation with the National Marine Fisheries Service was initiated.

Table 1. Threatened, endangered, or sensitive aquatic species that may be present in Eldorado National Forest, their preferred habitat and elevation range, and their potential to reside in the Tobacco Gulch Ecological Restoration Project area.

<table>
<thead>
<tr>
<th>Species</th>
<th>TES Status</th>
<th>Elevation Range of Habitat</th>
<th>Preferred Habitat</th>
<th>Potential for Project to Affect this Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>California red-legged frog</td>
<td>threatened</td>
<td>Below 4,000 ft</td>
<td>Ponds and slow-moving streams</td>
<td>Present within project area.</td>
</tr>
<tr>
<td>Critical habitat for CA red-legged frog</td>
<td>Designated</td>
<td>Below 4,000 ft</td>
<td>Ponds and slow-moving streams</td>
<td>None</td>
</tr>
<tr>
<td>Central Valley spring-run Chinook salmon</td>
<td>threatened</td>
<td>N/A</td>
<td>Central Valley delta and up rivers to man-made and natural barriers</td>
<td>None.</td>
</tr>
<tr>
<td>Central Valley steelhead</td>
<td>threatened</td>
<td>N/A</td>
<td>Central Valley delta and up rivers to man-made and natural barriers</td>
<td>None.</td>
</tr>
<tr>
<td>delta smelt</td>
<td>threatened</td>
<td>N/A</td>
<td>Sacramento-San Joaquin delta</td>
<td>None.</td>
</tr>
<tr>
<td>foothill yellow-legged frog</td>
<td>FS sensitive</td>
<td>Below 4,500 ft</td>
<td>High gradient streams with cobbles, riffles, and open steam areas</td>
<td>Has not been sighted within or adjacent to, project area, but suitable habitat present.</td>
</tr>
<tr>
<td>hardhead</td>
<td>FS sensitive</td>
<td>Below 4,800 ft</td>
<td>Sacramento-San Joaquin delta, S. Fork American River, Mokelumne River</td>
<td>Known to reside in South Fork American River, downstream outside of project area.</td>
</tr>
<tr>
<td>Lahontan cutthroat trout</td>
<td>threatened</td>
<td>N/A</td>
<td>High elevation and east slope streams and lakes</td>
<td>None.</td>
</tr>
<tr>
<td>Pacific lamprey</td>
<td>FS sensitive</td>
<td>N/A</td>
<td>Freshwater streams and rivers; historical distribution similar to anadromous salmonids</td>
<td>None. May occur in the undammed Cosumnes River, but is extirpated above impassable dams in the other basins that drain the Eldorado.</td>
</tr>
<tr>
<td>Sierra Nevada yellow-legged frog</td>
<td>FS sensitive</td>
<td>Above 5,000 ft</td>
<td>High elevation low-gradient streams, lakes, and small ponds</td>
<td>None.</td>
</tr>
<tr>
<td>northern leopard frog</td>
<td>FS sensitive</td>
<td>Below 7,000 ft</td>
<td>Perennial streams and ponds</td>
<td>None. Incidental historical occurrence for this species on Forest at Riverton, CA (SFAM), and off-Forest in the Lake Tahoe Basin.</td>
</tr>
<tr>
<td>western pond turtle</td>
<td>FS sensitive</td>
<td>Below 5,000 ft</td>
<td>Ponds and slow moving streams</td>
<td>Observed sightings within, and adjacent to, project area with suitable nesting habitat identified in a GIS.</td>
</tr>
<tr>
<td>Sacramento winter-run chinook</td>
<td>endangered</td>
<td>N/A</td>
<td>Central Valley delta and up rivers to man-made and natural barriers</td>
<td>None.</td>
</tr>
<tr>
<td>Yosemite toad</td>
<td>Threatened</td>
<td>Above 6,500 ft</td>
<td>High elevation wetland areas and meadows</td>
<td>None.</td>
</tr>
</tbody>
</table>
III. Current Management Direction

Direction to maintain the viability of Region 5 endangered, threatened, and sensitive species is provided by the National Forest Management Act, the Code of Federal Regulations (CFR 219.19), the Forest Service Manual, FSM 2672 (USDA Forest Service 1990), and the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (EIS) (USDA Forest Service 2004a). This Amendment guides the management of the Sierra Nevada national forests until their forest plans are revised. The aquatic, riparian, and meadow conservation strategy in this EIS will provide clean water, functioning aquatic ecosystems, and environmental conditions that contribute to viable populations of associated species (USDA Forest Service 2004a).

Current Forest Service policy (FSM 2670 [USDA Forest Service 1990]) is to manage National Forest System lands so that the special protection measures provided under the Endangered Species Act will no longer be necessary, and threatened or endangered species will become de-listed. The Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (EIS) (USDA Forest Service 2004a) provides direction for the management of threatened and endangered species. The Aquatic Management Strategy in the EIS directs that Forests utilize administrative measures to protect and restore aquatic, riparian, and meadow ecosystems and provide for the viability of native animal species associated with these ecosystems. The following Aquatic Management Strategy goals pertain to aquatic endangered, threatened, and sensitive species:

- Maintain and restore water quality to meet goals of the Clean Water Act and Safe Drinking Water Act, providing water that is fishable, swimmable, and suitable for drinking after normal treatment.
- Maintain and restore habitat to support viable populations of native and desired non-native plant, invertebrate, and vertebrate riparian-dependent species.
- Maintain and restore the species composition and structural diversity of animal communities in riparian areas, wetlands, and meadows to provide desired habitats and ecological functions.
- Maintain and restore the distribution and health of biotic communities in special aquatic habitats (such as springs, seeps, vernal pools, fens, bogs, and marshes) to perpetuate their unique functions and biological diversity, and
- Maintain and restore spatial and temporal connectivity for aquatic and riparian species within and between watersheds to provide physically, chemically and biologically unobstructed movement for their survival, migration, and reproduction.

The Record of Decision for the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (USDA Forest Service 2004b) directs the Agency to conduct a Riparian Conservation Objectives analysis for projects occurring within Riparian Conservation Areas (RCAs). This analysis can be found in Tobacco Gulch Ecological Restoration Project RCO Consistency Report as part of the project record.
This BA/BE analyzes the following activities within the Tobacco Gulch Ecological Restoration Project: (1) activities described in the Environmental Assessment (Alternatives 1,2,3,4, & 5). The Tobacco Gulch Ecological Restoration Project area is situated approximately 3 miles east of Georgetown, California in the vicinity of Darling Ridge, Mace Mill, and Balderston.

The proposed treatment areas are primarily in the Mixed Conifer Forest Zone. All treatment areas are between elevations of approximately 2,200 and 3,500 feet. Within the 9,200 acre project area approximately 30 percent of the National Forest System land is proposed for treatment with this project.

ALTERNATIVE 1 – PROPOSED ACTION
The Proposed Action includes a combination of fuels reduction and forest health improvement actions designed to move stands toward the Desired Future Condition for the land allocation described in the Final Supplemental Environmental Impact Statement (FSEIS) for the Sierra Nevada Forest Plan Amendment dated 1/21/2004. Silvicultural treatments for each stand were chosen based on the ability of each treatment to effectively and efficiently meet the Purpose and Need. The focus of each treatment is based on the desired conditions of each treatment area, rather than the quantity or quality of the products removed from each area and therefore, some proposed treatments would not remove any commercial forest products.

Approximately 928 acres are proposed to be thinned with the cutting and removal of a mixture of commercial and non-commercial size trees. Follow-up mastication or tractor piling would occur shortly after the thinning is completed. Prescribed burning could occur concurrent with pile burning and/or approximately 2-7 years after the pile burning is completed.

Commercial thinning of select trees less than 30 inches diameter at 4.5 inches (dbh) would be done using a ground based whole tree logging system on slopes generally less than 35%. Removal of trees ≥ 30” dbh would not occur, except to allow for equipment operability or safety. Commercial timber removed from this project would be scaled or weighed for payment purposes.

Selected conifer trees greater than 1” dbh would be cut and removed to landings during operations along with the associated tops and limbs. In all units, existing and operation generated slash and brush would be tractor piled or masticated after harvest operations.

Biomass accumulated on landings could be disposed of in a number of ways, including on-site burning, commercial and personal use firewood, or as co-generation fuel.

Commercial tree removal would emphasize a clumpy distribution of residual trees rather than equal spacing of retained trees depending on the current structure, species distribution and health of trees. Particular attention would be given to providing horizontal heterogeneity to promote diverse habitat conditions. A large proportion of the growing space would be allocated to the largest tree stratum. Topographic features and structures within stands would be used to aid in determining appropriate post treatment stand conditions to move stands toward desired conditions.
Enhancement of individual black oak trees, groups of black oak trees, and pines would occur through selective removal of over-topping or encroaching conifers. In plantations, oak release would focus on providing sufficient space for a minimum of 15 to 20 years of development.

Approximately 3 acres are proposed to be treated by hand thinning to protect improvements for recreation.

Mastication of competing vegetation is proposed on an additional 454 acres of plantation and non-plantation stands.

Prescribed burning as the initial treatment is proposed on approximately 1,406 acres of the project area to reduce the amount of surface fuels outside of thinning units and in no harvest areas within stands proposed for commercial treatment. Follow-up burning may occur at a 2-7 year interval to move stands toward desired conditions.

Hand thinning in areas of dense fuels may occur prior to fire implementation in proposed prescribe burn treatment units.

Treatment of priority invasive plants (scotch broom, rush skeleton weed, and star thistle) would occur utilizing a variety of methods. Currently approximately 905 acres of invasive plant treatment is identified in the project area.

Hand treatment would be utilized on noxious weed populations less than 25 plants in size and in areas where herbicides would be excluded. Pulling would be the preferred treatment method when the ground is moist. Lopping would be preferred after when the plants are in drought conditions.

Ground based directed foliar application of herbicides identified below (Table 2.) would be used on rush skeleton weed and on larger population of scotch broom and yellow star thistle.

**Table 2.** Proposed herbicides for use in the Tobacco Gulch Ecological Restoration Project

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Trade Names</th>
<th>Target Species</th>
<th>Timing</th>
<th>Proposed Application Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aminopyralid</td>
<td>Milestone, Milestone VM or equivalent</td>
<td>Yellow starthistle, Rush skeletonweed, Italian thistle</td>
<td>rosette to bolting or fall;</td>
<td>0.078-0.11 lb a.e./acre</td>
</tr>
<tr>
<td>Clopyralid</td>
<td>Transline or equivalent</td>
<td>Yellow starthistle</td>
<td>rosette to bolting</td>
<td>0.25 lb a.e./acre</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>Rodeo or equivalent</td>
<td>Scotch Broom, yellow starthistle</td>
<td>when target plants are actively growing</td>
<td>2 to 4 lb a.e./acre</td>
</tr>
<tr>
<td>Imazapyr</td>
<td>Arsenal, Chopper or equivalents</td>
<td>Rush skeletonweed, yellow starthistle, scotch broom</td>
<td>when target plants are actively growing</td>
<td>0.25-0.375 lb a.e.</td>
</tr>
<tr>
<td>Triclopyr BEE</td>
<td>Garlon 4 ultra or equivalent</td>
<td>Scotch Broom</td>
<td>when target plants are actively growing</td>
<td>1.0 to 2.0 lb a.e.</td>
</tr>
</tbody>
</table>

**Adjuvant**

<table>
<thead>
<tr>
<th>Trade Names for Analyses</th>
<th>Spreader-Penetrator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spreader-Penetrator</td>
<td>Hasten, Competitor (aquatic formulation)</td>
</tr>
<tr>
<td>Marker Dye</td>
<td>Colorfast Purple</td>
</tr>
<tr>
<td>Marker Dye</td>
<td>Hilight Blue</td>
</tr>
</tbody>
</table>

Approximately 0.7 mile of road construction and approximately 0.3 miles of road decommissioning is proposed in the Mace Mill area in order to relocate an existing segment of...
A road that is in poor condition and currently transports sediment directly into a tributary of Little Silver Creek. The new construction would become part of trail 1.

Approximately 7 miles of road reconstruction are estimated to be necessary to facilitate accessibility to perform proposed treatments and/or to decrease sedimentation from unmaintained roads in the proximity of treatment units. Most of the proposed reconstruction associated with facilitating treatment is removal of brush from roads that have been overgrown since the previous entry. Some reconstruction, including road rocking, would repair road running surfaces reducing the loss of existing native surface material.

Reconstruction activities would also involve the replacement of inadequate drainage crossings, cutting or trimming of trees and brush for sight distance improvement, elimination of ruts, gate installation to control seasonal use or replacement of existing, non-functional gates or barriers, ditch repair, and installation of waterbars and dips on roads with inadequate runoff control.

Reconstruction on road 12N80B (trail 11E19) would involve removing and replacing an existing crossing that is collecting sediment upstream and scouring downstream. This crossing has been identified as an aquatic organism passage barrier and as being at high risk for failure, which could result in high sediment deposition downstream. The existing structure would be replaced with a 35 foot (in length or smaller) by 72 inch (in diameter or larger), partially embedded culvert (ie. the bottom placed below the stream bed) to allow for both aquatic organism passage and the passage of particles of sand, gravel, or soil carried by the natural flow of a stream. Material placed inside the pipe would consist of native materials from the surrounding area. Larger boulders may also be places inside the culvert to reduce water velocity. Work will be completed when no surface water is present 300 feet up and downstream from the site.

SNAG CREATION

An additional 0.25 snags per acre would be created and retained in units where CWHR size class is 4 and 5 and trees are not likely to be a hazard for public or worker safety.

Following the burn treatment, number of snags created and residual canopy cover levels would be evaluated to determine if the desired amount of snags were created in the identified areas. If less than the desired number of greater than 15 inch diameter snags are created through intended mortality and subsequent insect attack, and residual canopy cover is greater than 50%, additional snags would be created through baiting, topping or girdling.

Additional snag creation would be focused on ponderosa pine and Douglas-fir.

Snag creation would be focused in trees that are set-off or further away from others or mostly surrounded by other non-host species to reduce potential for bark beetle spill over into adjacent trees. In areas where trees cannot be offset, or where residual trees are host species anti-aggregate pheromones may be used.

If there is a need to create additional snags, activities would take place in between August and September and would not occur during periods of extended drought.

WILDLIFE USE

Selected areas of the unit ranging in size from ¼ acre or larger would be identified and left untreated to provide for horizontal and vertical structural diversity in stands that are greater than 5 acres in size or where core areas of adjacent units combine to create areas that are greater than 5 acres in size. Retention would focus on providing structure for wildlife use.
Within commercial thinning units trees with identified wildlife use characteristics, such as broken tops, bayonet tops, protected platforms, forked-tops with overhead canopy cover, large mistletoe brooms and hollow chambers would be preferentially retained.

Within units proposed for post-harvest treatment, patches of un-thinned hiding cover that are at least 0.10 acre in size for each 10 acres of treatment would be retained to provide escape or hiding cover for mule deer and other wildlife species. Retention of these patches would be provided for by not performing brush cutting or small tree thinning on selected patches of brush and dense patches of seedlings and saplings within the units. Priority for retention would be given to desirable conifer species, such as ponderosa pine and sugar pine, when available.

In plantations stands proposed for non-commercial treatments, approximately 5% of the plantation would not be treated in order to provide habitat diversity by leaving concentrations of trees or bush scattered at various locations within the treatment area. Preference would be directed towards retention of brush and/or tree cover in riparian areas, archaeological sites or other areas where less intensive management is most appropriate.

**DESIGN CRITERIA**

The following design criteria would be applied during implementation of activities associated with this project. The purpose of these design criteria is to avoid, or to minimize the potential for adverse effects to the resources discussed below.

Best Management Practices (BMPs) as defined by the State of California for water quality protection would be integrated in project design would be integrated into the proposed activities. Specifically, BMP’s identified in section 12.1 Timber Management, 12.2 Road Building, 12.5 Vegetation Management, 12.6 Fuels Management, and 12.7 Watershed Management would apply.

**COMMERCIAL HARVEST ACTIVITIES**

The project administrator would designate skid trail systems in each unit. To limit the extent of new areas of compacted ground within the project area, existing skid trails and landings would be used if appropriate. Landing size would be limited to the smallest size necessary to accommodate logging operations, slash pile storage, and burning.

Temporary roads would be closed and rehabilitated after use through a variety of methods which include blocking, ripping, and water-barring.

One-end suspension of all logs and biomass would occur during skidding operations in order to reduce ground disturbance.

Post-harvest machine piling and burning of existing and operations slash would occur as necessary to reduce surface fuels. Pile burning is planned to occur the first fall following piling in which burn prescriptions are met.

Tractor piling would be precluded on slopes greater than approximately 35%, and tractor piling would be precluded from sensitive areas, such as archaeological sites, sensitive plant zones and stream course buffer zones or inner-gorge areas.

Down logs greater than 16 inches in diameter would not be piled where they can be avoided.

Mastication may be substituted for tractor piling where surface fuels can be more effectively treated by this method.
Hardwoods greater than 4 inches diameter would be retained except where removal is needed for equipment operability.

Canopy closure and basal area would be retained at the stand level and would be consistent with the 2004 SNFPA ROD.

**SNAGS AND HAZARD TREES**

Standing dead trees (snags) over 12 inches in dbh that do not present a hazard for woods worker and public safety would be retained within the units. Snags under 12-inches dbh, and meeting treatment criteria would be cut and removed. The removal of dead and unstable live trees (hazard trees) of all sizes would occur along timber haul roads and landings for woods worker and public safety. The wildlife biologist would be involved in coordination of hazard tree removal on roads that enter or are adjacent to spotted owl or goshawk PACs.

Felled hazard trees or cull logs would be left in down log deficient areas (areas with less than 4 down logs greater than 16” and 10 feet in length per acre).

Hazard tree removal on or in the vicinity of archaeological sites would follow the guidelines for hazard tree removal included in the Sierra Programmatic Agreement (PA), Attachment 7, IIE).

Hazard trees within the Riparian Conservation Area (RCA) would be felled toward the stream and left in place, unless just above a culvert where an inlet could be blocked.

**PRESCRIBED FIRE**

Prescribed burn prescriptions would meet LRMP standards and guidelines. All burning activities would adhere to pertinent air quality regulations. Smoke emissions would be minimized by following Best Available Control Measures (BACM).

A smoke permit administered by the local County Air Resource Agency would accompany burn plans. For this project the El Dorado County Air Pollution Control District would issue the permit.

Smoke control and monitoring measures would be identified in a Smoke Management Plan prepared prior to burning. The Smoke Management Plan would identify potential smoke impacts on class 1 airsheds and populated communities/areas that may be impacted. Desired and acceptable wind directions for smoke travel, and mitigation strategies would be included in the smoke management plan. The Forest Service would contact the county prior to burning to notify the planned amount of acres to burn on a given day as well as the burn location. Burning would be conducted on the basis of whether the county grants or denies burn approval. Actual acreage burned would be submitted to the county upon completion of each days burning.

In preparation for prescribed fire, perimeter line construction would be constructed where roads, trails, or natural barriers are absent. This may involve hand cutting of vegetation including trees up to 6-inch diameter, pruning, and scraping a bare soil line, or where consistent with other design criteria, line construction with a D-6 or smaller dozer.

All fire lines would follow the established guidelines for water bar construction as outlined in the Best Management Practices. Upon completion of burning, the visible character of the firelines would be disguised by spreading pine needles, brush, etc where they intersect roads or trails in order to reduce the likelihood of the firelines becoming unwanted trails.
Prior to ignition, current fuel conditions surrounding trees > 30” dbh would be assessed. If mortality of trees greater than 30” is expected to exceed 5% raking of individual trees would occur.

Canopy cover reduction from burning would be less than 5% averaged across a treatment unit, not including targeted snag creation.

Within California spotted owl and northern goshawk PACs:

- down logs greater than 30” that are expected to be lost during burn activities due to surrounding fuel accumulation would be raked;
- burn activities would be designed to have an average flame length of less than 4 feet;
- additional hand treatments, including handline construction, tree pruning, and cutting of small trees (less than 6 inches dbh), would be conducted within 1 to 2-acre area surrounding known nest trees as needed to protect nest trees and trees in their immediate vicinity.

Burn only units not surveyed during planning would be surveyed and sensitive and invasive plant occurrences would be flagged for avoidance prior to implementation.

Firing techniques or lining would be used to preserve retention pockets identified for preservation of existing wildlife use characteristics and large down logs.

RIPARIAN CONSERVATION AREAS (RCAS)

No new landings are planned for construction within RCAs. After use, existing landings that are used in RCAs would be decommissioned in order to reduce chronic sediment delivery to the streams that may affect aquatic and aquatic-dependent species.

Mechanical equipment and treatment would occur outside the exclusion buffers in Table 3.

Table 3. Exclusion buffers for mechanical treatment in proximity to streams

<table>
<thead>
<tr>
<th>Aquatic Feature Type</th>
<th>Buffer Distance In Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perennial Streams and Special Aquatic Features</td>
<td>300</td>
</tr>
<tr>
<td>Intermittent Streams</td>
<td>150</td>
</tr>
<tr>
<td>Ephemeral Streams with &lt;35% Slope</td>
<td>25</td>
</tr>
<tr>
<td>Ephemeral 35-70% slope</td>
<td>50</td>
</tr>
<tr>
<td>Ephemeral &gt;70% slope</td>
<td>75</td>
</tr>
</tbody>
</table>
Prescribed fire ignition would occur outside of the exclusion zone in Table 4. Fire would be allowed to back into the exclusion zone without further ignition.

**Table 4.** Exclusion buffers for prescribed fire ignition in proximity to streams

<table>
<thead>
<tr>
<th>Aquatic Feature Type</th>
<th>Buffer Distance In Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perennial Streams and Special Aquatic Features</td>
<td>75</td>
</tr>
<tr>
<td>Intermittent Streams</td>
<td>50</td>
</tr>
<tr>
<td>Ephemeral Streams with &lt;35% Slope</td>
<td>10</td>
</tr>
<tr>
<td>Ephemeral 35-70% slope</td>
<td>50</td>
</tr>
<tr>
<td>Ephemeral &gt;70% slope</td>
<td>75</td>
</tr>
</tbody>
</table>

For all exclusion buffers, the distance is measured from the edge of the active channel/wetted perimeter or from the edge of riparian vegetation, whichever is greater.

**ROADS AND TRAILS**

Roads and trails within the project area would be managed consistent with the Eldorado National Forest Public Wheeled Motorized Travel Management Final Environmental Impact Statement (FEIS) (2008).

Roads used in the project not identified as open to public use would be blocked by gates, rocks, or other barriers.

Non-System Routes as identified in the Eldorado National Forest Public Wheeled Motorized Travel Management Final Environmental Impact Statement (FEIS) (2008) within commercial and non-commercial treatments may be eliminated or closed by a variety of methods including, but not limited to: covering with brush, ripping, re-contouring, and barricading with use of gates or natural material or a combination of the above.

In addition to the seasonal closure identified by the Travel Management EIS, roads identified as open for public use may be temporarily closed during inclement weather to protect reconstruction investments until those roads have stabilized.

Easements or Road Use Permits would be obtained before timber haul or reconstruction is initiated in units accessed from identified haul roads on which easements are not currently held. In order to obtain rights of way, reciprocal agreements may be negotiated with private landowners.

Water would be used on native surface roads to maintain surface fines, minimize dust, and maintain surface compaction. Existing waterholes and other sites such as ponds, lakes, or streams, used for water drafting would be inspected for existing amphibians and flow levels prior to use. A Forest Service approved screen covered drafting box, or other device to create a low entry velocity (Riparian Conservation Objective (RCO) #4, SNFPA ROD p. A-56), would be used while drafting.
to minimize removal of aquatic species, including juvenile fish, amphibian egg masses and tadpoles, from aquatic habitats.

New drainage structures and those identified for replacement in this project would be designed for 100-year storm events.

WILDLIFE

A limited operating period (LOP) prohibiting activities (except road use and maintenance) would be implemented within ¼ mile radii from nesting sites unless surveys confirm that the species is (are) not nesting:

- **February 15th thru September 15th for Northern Goshawk**
- **March 1st thru August 15st for California spotted owl**
  - Units 301-23, 301-2, 301-58, 302-28, 302-23, 302-33, 302-46, 303-34, and burn only treatments in ELD0016, ELD0098, and ELD0308.

A limited operating period (LOP) restricting activities within 1 mile of California red-legged frog (CRLF) known occupied* and known breeding habitat** would be implemented from 1st fall frontal system depositing a minimum of ¼ inch of rain on or near October 15th through April 15th.

- Mechanical treatment would not occur within the LOP in all of units 303-29, 303-30, 303-33, 303-34, 303-52, 303-56, and 304-44 and portions of units 302-28, 303-5, 303-36, and 303-57 (see Maps 6 and 7, Appendix A)
- Noxious weed treatments would be restricted to lopping or cutting during the LOP
- During the LOP prescribed fire activities may resume after a 72 hour drying period.

*Known occupied habitat is defined as the drainages in which CRLF have been documented during surveys (i.e., Trib. To Bear Creek and Trib to Little Silver Creek).
**Known breeding habitat is assumed at 14 acre private impoundment on private property based on adult and sub-adult occupancy of pond and in USFS pond created for CRLF dispersal in a tributary of Bear Creek

Herbicides will not be applied within 500 feet of CRLF occupied habitat* or within 300 feet of suitable CRLF breeding habitat.

Elderberry plants greater than 1” in diameter would be flagged and avoided during implementation.

RECREATION

Recreation facility improvements would be protected during all stages of project implementation.

Fuel reduction activities along system recreation trails would be performed so that the trail experience and difficulty level is maintained where possible. A 15 foot no treatment buffer would be located adjacent to trails designated as part of the system that are not proposed for reconstruction and use during this project.

Layout of landing and skid trail location would be performed so that the damage to trail tread and the impact to users is minimized within the Rock Creek Recreation Area. Where the crossing of a
system recreation trail by a skid trail would potentially lead to confusion for trail users or the creation of new user created, undesignated trails, the area would be blocked or signed after treatment.

Trails would be signed closed during felling, skidding, and mastication activities for the safety of trail users.

Where roads are reconstructed on designated recreation trails, trails would be constricted post-treatment to accommodate a trail experience but would also facilitate access to fire suppression crews should a wildfire start in the area. The trail location would traverse across the entire road prism to provide curves for variety and challenge for the trail users, but where possible, the majority of the trail tread be located on the outer third of the road bed to facilitate drainage of the trail in the future. Trail location would incorporate the drainage features of the road, such as rolling dips to also provide drainage for the trail.

An LOP would be put into effect for permitted special use events. The LOP would preclude timber harvest activities that interfere with the event and road construction and maintenance activities on the event routes. Event routes including the system roads and trails and the event only trails would be open and free of cut trees and debris during the event. Routes are identified in the special use permits at the time of issuance. Upon the issuance of special use permits, units affected by the LOP would be identified.

In the Mace Mill Staging Area:
- Roads and trails leading to and emanating from the Mace Mill Staging area would remain open except during active operations. Warning signs would alert the public of fuel reduction and other contract activities.
- Landings and slash piles would be located to avoid impacting the areas used for camping and parking. The signboard, signs and trail markers would be protected during contract operations and prescribed burning.

CULTURAL RESOURCES

Resources at risk would be identified and protected during project activities. The specific protection measures for cultural resources highlighted in the Cultural Resource Report R2009-05-03-30014 Tobacco Gulch Project would be followed during all phases of the project operations.

Cultural resource sites in and near treatment units, road reconstruction, road maintenance, and other project activity areas would be flagged for avoidance from ground-disturbing activities prior to project operations.

Timber harvest adjacent to site boundaries would be conducted as to directionally fell trees away from flagged sites.
Mechanized equipment would be excluded from site boundaries. With the approval of the district archaeologist, vegetation within site may be cut by hand inside of the flagged boundaries. Any woody materials to be pile-burned would be hand piled outside of site boundaries.

Hazard tree removal on or in the vicinity of archaeological sites would follow the guidelines for hazard tree removal included in the Sierra PA, Attachment 7, II E.

Pre-existing skid roads and landings would not be ripped or sub-soiled within boundaries of a historic property.

Existing breaches in ditches may be used to access treatment units. Breaches would be identified and/or agreed upon by the cultural resource specialist.

Any equipment moving from one treatment unit or road system to another by driving cross-country would not be driven across cultural sites.

Skid roads and landings would not be ripped or subsoiled within the boundaries of cultural sites.

Burn piles would be placed a sufficient distance from sites so as not to adversely affect site features.

Low intensity prescribed burning would be allowed on selected cultural resource sites as documented in Cultural Resource Report R2009-05-03-30014.

Cultural sites would be re-flagged prior to implementation of prescribed burning. Fireline placement for the prescribed burning associated with this project would be coordinated to protect cultural resource sites.

Should any previously undocumented cultural resources be encountered during project operations, all work cease immediately in that area until the District Archaeologist can inspect the area, document the resource, and provide for appropriate protective measures. Should any cultural resources become damaged in unanticipated ways by activities proposed in this project, the steps described in the Sierran PA for inadvertent effects would be followed.

**SENSITIVE AND WATCHLIST PLANTS**

Known Sensitive plant occurrences or those discovered during project implementation would be flagged for avoidance during thinning, piling, mastication, fireline construction, and burning except for horkelia occurrences specifically identified below. Newly, discovered locations would be reported to the project botanist.

Fire lines would not be cut through occurrences of Sensitive and watchlist plant species. Handline construction through occurrences of Parry’s horkelia may be permitted on a site-specific basis with approval from the project botanist.
Mastication within known occurrences of Parry’s horkelia in units 302-13, 302-23, 302-041, 302-49, 302-50, 303-37, 303-51 would be performed as reach-in. Where occurrences cover a large area access routes through occurrences would be flagged with the project botanist in order to minimize direct impacts from equipment. Follow-up prescribed burning would not occur in masticated areas of Parry’s horkelia. Treatment within any newly discovered occurrences would be evaluated and approved by the project botanist.

Prescribed burning in occurrences of Parry’s horkelia would be evaluated based on burn times and extent of population at the occurrence.

Piling and pile burning would not occur within occurrences of watchlist plant species.

**NOXIOUS WEEDS**

Occurrences of high priority noxious weed species (e.g., scotch broom, yellow starthistle, rush skeletonweed, and spotted knapweed) would be flagged with noxious weed flagging prior to project implementation and avoided by vehicles and equipment where feasible. Locations of any new infestations of noxious weeds would be mapped, reported to the project botanist, and documented for continued monitoring.

Mechanical treatments of weed free units in an area would be scheduled before weed-infested units.

All off-road equipment would be cleaned to insure it is free of soil, seeds, vegetative matter or other debris before entering National Forest System lands to prevent the introduction or spread of noxious weeds. Prior to the start of operations, the Forest Service would do a visual inspection for such debris. Equipment also would be cleaned prior to moving from an infested unit to a weed-free unit.

Firelines and burn piles would be placed away from noxious weed populations where feasible.

Any seed used for erosion control or restoration would be from a locally collected source (ENF Seed, Mulch and Fertilizer Prescription, March 21, 2000) and approved by the project botanist. Straw or mulch used for erosion control would be certified weed free. A certificate from the county of origin stating the material was inspected is required. On-site material also may be used if it comes from a weed-free area.

The Forest early detection rapid response process would be used to evaluate treatment of new occurrences of target noxious weeds within the project area. New occurrences of high priority noxious weed species would be treated by hand pulling (spring-summer before seed formation) or lopping in the late summer/early fall, or with analyzed herbicide treatments. Rush skeleton weed would not be pulled.

Where noxious weed populations overlap with occurrences of sensitive plants, hand treatment of noxious weeds would occur where feasible. If herbicide treatment of noxious weeds occurs within
sensitive plant occurrences, treatments would be coordinated with the project botanist and would be designed so as to not cumulatively affect more than 10% of a sensitive plant occurrence.

**SOILS**

Minimum effective soil cover would be 50% on slopes less than 25% and 70% on slopes >25%, except for units 302-23, 302-028, 302-032, 302-033, 302-046, 303-005, 303-30, 303-33, 303-034, 303-036, 303-38, 303-039, and 303-40 which would have 70% cover after mechanical treatment.

Following prescribed burning operations average soil cover for each treated unit would be maintained at 70% or greater one year following burning activities.

If soil cover does not meet threshold values above after treatment or burning of invasive weed populations, weed free mulch would be used to provide cover.

Mechanical treatment activities would be restricted and/or controlled during high soil moisture conditions.

For skid trails and fire lines terminating at roads or OHV trails, a waterbar would be placed at a maximum 30 feet from the intersection

Equipment use would be avoided on shallow soiled areas such as lava caps and granitic outcrops.

If excess soil displacement occurs skid trails would be re-contoured where possible and covered with slash or other organic material to a minimum of 70 percent cover at the conclusion of thinning activities.

An estimated 10-15% of landings and skid roads used in this project would be ripped or sub-soiled to alleviate soil compaction and erosion problems, restore infiltration, and discourage unauthorized OHV use. This work would be prioritized in units 302-023, 302-024, 302-026, 302-027, 303-005, 303-034, and 303-035, but would also occur based on ongoing evaluations by the sales administrator during project activities.

If implementation monitoring shows that project activities are likely to increase Erosion Hazard Ratings above a "moderate" rating for an area, based on site specific conditions that were not identified during project planning, activities in that area would be halted until mitigation measures to maintain at least a "moderate" rating are implemented.

**PESTICIDE USE**

All appropriate laws, policies, and regulations governing the use of pesticides, as required by the U.S. Environmental Protection Agency, the California Department of Pesticide Regulation, and the Forest Service Policy pertaining to pesticide-use, would be followed. All Forest Service personnel in charge of projects involving pesticide application would be Qualified Applicator Certified by DPR. All contract applicators would be appropriately licensed by the state.
Coordination with the appropriate County Agricultural commissioner would occur, and all required licenses and permits would be obtained prior to any pesticide application.

Compliance with the Clean Water Act is demonstrated through the implementation of Best Management Practices (BMPs) certified by the state, and then monitoring to determine if the appropriate Central Valley Regional Water Control Board standards are met. These BMPs are designed to prevent degradation of downstream water quality. The BMPs that are pertinent to the use of pesticides are BMPs 5-7, 5-8, 5-9, 5-10, 5-11, 5-12, and 5-13. A safety and spill plan would be developed to address site specific attributes of proposed treatment units.

Herbicide application would be a ground based application. Backpack sprayers would be used to apply a spray directly to targeted plants. Spraying would be stopped when moving between plants. With the method proposed, the herbicide is released through a handheld wand with a trigger that is controlled by the applicator. This allows the applicator to apply the herbicide over the target plant by moving their arm in a motion that covers the plant then to release the trigger stopping spray emission before moving on to the next target plant. Selective and non-selective herbicides are proposed for targeted control using a directed low-pressure spray.

Prior to the start of application, all spray equipment would be calibrated to insure accuracy of delivered amounts of pesticide. Spray nozzles would be required that produce a relatively large droplet. A low nozzle pressure (15 psi) would be required. A pressure gauge or a pressure regulator would be required on backpack sprayers. Periodically during application, equipment would be rechecked for calibration.

Spray nozzles would be kept within a vertical distance of 24 inches of vegetation being sprayed.

A directed spray away from conifer seedlings and oaks as well as the use of physical barriers would be required where appropriate.

Each treatment unit would be posted with a clearly visible sign along likely access points that the unit has been treated with pesticides. The specific pesticide would be identified, the treatment date specified, and the name and phone number of the appropriate contact would be identified.

Application would cease when weather parameters exceed label requirements, in the event of precipitation, or a forecast of greater than a 70% chance of precipitation in the next 24 hours.

Additives in the form of colorants and adjuvants would be added to the herbicide mixtures. A colorant would be added to assist in the inspection process to determine the location of coverage. An adjuvant or surfactant would be used to help the herbicide mixture be absorbed into the plant. The application rates would be in accordance with the material’s label instructions and are displayed in Table 2.

If applicators are expected to be within the 132 foot visual buffer of an activity center nest tree for more than one hour the district biologist would be on hand during implementation to observe owl behavior (FWS 2006). If owls flush off the nest during spraying, then the spraying party would
leave the area and be limited to within 40m of AC for the duration of the season. Spraying may resume later in the season when young have fledged and are not restricted to the nest.

Where herbicide is used within areas infested with noxious weeds in or adjacent to riparian habitats or within serpentine plant assemblages such as within the Traverse Creek Special Interest Area (SIA), glyphosate would be used to target infestations. Outside of the RCA or serpentine plant assemblages, glyphosate or other herbicides could be used to target noxious weeds where hand treatment is not expected to be effective or efficient.

No herbicide application would occur within the Traverse Creek SIA west of Bear Creek Road. The following exclusion zones (Table 5) would be applied to herbicide applications near Aquatic Features

**Table 5. Herbicide application exclusion zone for streams**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Stream Type</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aminopyralid, Clopyralid, Imazapyr, and Triclopyr</td>
<td>Perennial</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>Intermittent</td>
<td>150</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>Perennial</td>
<td>100</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>Seasonal</td>
<td>50</td>
</tr>
<tr>
<td>Aminopyralid, Clopyralid, Imazapyr, and Triclopyr</td>
<td>Ephemeral</td>
<td>50</td>
</tr>
<tr>
<td>Glyphosate</td>
<td></td>
<td>25</td>
</tr>
</tbody>
</table>

The following exclusion zones (Table 6) would be applied to herbicide applications near Sensitive plant species.

**Table 6. Exclusion zones for herbicide application in proximity to sensitive plants**

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Distance from Sensitive Plants¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aminopyralid</td>
<td>200</td>
</tr>
<tr>
<td>Clopyralid</td>
<td>200</td>
</tr>
<tr>
<td>Glyphosate</td>
<td>25 outside of Traverse Creek SIA*</td>
</tr>
<tr>
<td>Imazapyr</td>
<td>300</td>
</tr>
<tr>
<td>Triclopyr BEE</td>
<td>300</td>
</tr>
</tbody>
</table>

* Within Traverse Creek SIA 2004 SNFPA RCA buffers would apply for herbicide exclusion east of Bear Creek Road.

¹ Measured from exterior edge of sensitive plant occurrence exceptions for buffer where approved by project botanist in agreement with design criteria for overlap of noxious weeds and sensitive plants

**MONITORING**

Site-specific monitoring of project activities would be conducted if any of the action alternatives were implemented. This monitoring is designed to verify that the projects are implemented as designed, and are effective in meeting project and Forest Plan objectives.
The overarching purpose of monitoring is to provide feedback to the Forest that enables evaluation of the achievement of ecosystem health and sustainability and improvement of management to better meet the expectations of the public.

One aspect of monitoring looks at the degree to which the objectives, standards, and guidelines of the Forest Plan are being implemented. Another reason is to measure the effectiveness of management practices used in site-specific projects. Monitoring is also used to verify the assumptions and models used in planning. Funding for monitoring may vary; this may lead to assessing priorities as needed to assure the integrity of Forest Plan monitoring and evaluation.

The length of time needed for monitoring is determined by the results and evaluation of the activity or effect that is being monitored. When it is certain that regulations and standards are being met, monitoring of a particular element would cease. If monitoring evaluations show that regulations or standards are not being achieved at the desired level, management intervention would occur and monitoring would continue.

**Project Level Implementation**

Project implementation generally involves the efforts of a variety of individuals with both specialized and general skills and training. Employees are accustomed to working together to achieve the desired project objectives. For example, it is common for a sale preparation forester or a sale administrator to discuss specific ground or project conditions with the wildlife biologist or soil scientist to apply the best practices on the ground. Joint field reviews are taken as needed. These steady informal communications allow for incremental project adjustment throughout implementation to achieve the desired results.

Contracted treatments are monitored and evaluated during application by the contract officer or representative to determine whether contract provisions and NEPA elements are met.

**Wildlife**

Known nest sites for California spotted owl and Northern goshawk are visually inspected to determine occupancy where LOPs may be waived. Nest site surveys have been conducted on this portion of the Georgetown Ranger District for a number of years by the regional demographic study.

**Known California red-legged frog breeding habitat in proximity to treatment units would be monitored post treatment to ensure effectiveness of BMPs.**

**Timber Management**

Each active management unit would be visited at a frequency necessary to assure compliance. Monitoring of preparation and implementation would occur at regular intervals to ensure compliance with prescription intent and where applicable contract provisions. Minor contract changes or contract modifications would be enacted, when necessary, to meet objectives and standards on the ground.

**Water Quality**

Onsite evaluation protocols are used to assess the implementation and effectiveness of individual BMPs or groups of closely related BMPs. Additional details can be found in Investigating Water Quality in the Pacific Southwest Region, (USDA Forest Service, 2002) and Water Quality Management for National Forest System Lands in California (USDA Forest Service, 2000).
Onsite evaluation protocols are applied to both randomly and non-randomly selected project sites. The number of random evaluations to be completed each year is assigned by the Regional Office, based on: 1) the relative importance of the BMP in protecting water quality; and 2) those management activities most common on the individual Forest. Forests supplement these randomly selected sites with additional sites based on local monitoring needs, such as those prescribed in an environmental document, or as required under the Regional Water Quality Conditional Waiver for Timber Sale Activities on Federal Land.

Implementation, effectiveness and forensic monitoring of the project would occur as defined in the Central Valley Timber Harvest Waiver Eldorado National Forest Monitoring Plan for the Georgetown District.

At the onset of the rainy season, the USFS shall monitor project roads and areas where mechanical equipment has been utilized in order to verify ground disturbance and/or road systems are not resulting in additional deposition of sediment into aquatic features. The USFS shall notify US Fish and Wildlife Service within seven calendar days and take corrective action to minimize the sedimentation if issues are identified that may affect California red-legged frog or their habitat.

Noxious Weeds
Monitoring for new and expanding noxious weed populations would be conducted throughout the project implementation and post treatment. Treatment of noxious weeds would be continued depending on need. Monitoring areas include road reconstruction and maintenance, and landings (ripped or otherwise). Monitoring after prescribed burning would be conducted at documented noxious weed sites.

Threatened, Endangered and Sensitive Plants
Sensitive plant occurrences would be monitored after the completion of the project to ensure that protection measures were effective.

Cultural Resources
The District Archeologist would monitor cultural resource sites to ensure the effectiveness of protection measures.

On site monitoring of hazard tree removal would be performed by the District Archeologist where hazard tree removal has the potential to damage cultural resources.

Access Management
Traffic control barriers on proposed road construction and reconstruction on roads not designated in the 2008 Eldorado National Forest Travel Management FEIS would be monitored during the implementation phase of the project and following the project to determine the effectiveness of travel restriction methods.

Need for Herbicide
Effectiveness of initial treatments of mastication, brush cutting, or herbicide application would be visually monitored to determine need for follow-up herbicide treatment. Post-project monitoring would determine the effectiveness of treatment in meeting the project objectives.
ALTERNATIVE 2 – NO ACTION

The No Action alternative provides a means for evaluating the current ecosystem conditions as a baseline. It can also be used to compare the projected effects of each management alternative. The No Action can be used to look at the differences that would take place under the other alternatives, as well as the consequences of deferring activities if this alternative is selected.

It is important to keep in mind that “No Action” does not mean that there would be no further action in the project area. The current level of management would continue. Activities such as fire suppression, projects analyzed in earlier environmental analysis and decisions, and routine road and trail maintenance would continue. A list of Reasonably Foreseeable Activities, which would not be affected by this EA and subsequent Decision Notice, is included in Chapter 3. Selection of this alternative would defer all the proposed treatment activities at this time.

Under the No Action Alternative, none of the proposed silvicultural treatments, road improvements, noxious weed treatments or watershed improvement activities would be implemented with this project.

ALTERNATIVE 3 – NON COMMERCIAL

This alternative was developed in response to the November 3, 2009 Order from the United States District Court, Eastern District of California from Case 2:05-cv-00205-MCE-GGH to include a non-commercial funding alternative at the Project Level for the Sierra Nevada Forests Fuel Reduction Projects.

The Non-Commercial Alternative proposes to remove only those trees prescribed for removal in the Proposed Action that are needed to meet the minimum objectives to modify fire behavior on the landscape. In most stands proposed for commercial treatment, it has been determined that removal of intermediate and overtopped trees up to 12 inches in dbh, followed by tractor piling or mastication, and follow-up prescribed burning would achieve the minimum fuels objectives defined in the 2004 SNFPA.

Under this Alternative, treatment unit layout would remain the same as the Proposed Action. In general, the maximum diameter limit for removal would be 12-inches; however, in order to facilitate equipment access to treat the units effectively, there may be circumstances where larger than 12 inch trees are removed. This would include removal of trees for landings, skid roads and in order to access some denser areas of stands with mechanical harvest equipment.

Proposed harvest to enhance oak and pine and design criteria for snag creation and wildlife use would not be implemented with this alternative.
**ALTERNATIVE 4 – REDUCED HERBICIDE USE**

This alternative was developed based on scoping comments that negative effects to wildlife and forest users could result from exposure of forest users and wildlife to glyphosate. Based on a requested alternative submitted by the commenter, noxious weeds would be treated with hand treatments or with herbicide treatments that are restricted to the use of imazapyr and clopyralid.

**ALTERNATIVE 5 – 16-INCH DBH LIMIT AND SNAG CREATION**

This Alternative was developed based on a comment that removal of trees up to 30 inches has the potential to detrimentally reduce snag recruitment in the project area, increase fragmentation, and reduce habitat within the project area which could threaten viability of California spotted owl and other sensitive species. This alternative was designed based on a requested Alternative by the commenter where instead of the live trees over 16” dbh being removed, the trees that would otherwise be marked for removal would be girdled or killed in some other way in order to actively recruit more large snags, or such trees would be felled to provide large downed log structure.

**V. EXISTING ENVIRONMENT – SPECIES ACCOUNTS**

The Tobacco Gulch Ecological Restoration Project area is located within El Dorado County, California in the vicinity of Darling Ridge, Mace Mill, and Balderston approximately three air miles east of Georgetown, CA. The legal description is: T. 11N. R. 11E. Section: 4; T. 11N. R. 12E. Sections: 2-4, 8-10, 15-18, 20, 21, 28, 29, 32, and 33; T. 12N. R. 10E. Section 24. in mostly Sierra Mixed-Conifer stand class between 2,200 to 3,500 feet. Maps of the project location can be found in Appendix A.

Species that have the potential to be affected by project activities include: Federally Threatened – California Red-legged frog, Forest Service Sensitive (FSS) foothill yellow-legged frog, FSS western pond turtle, and FSS hardhead minnow.

California red-legged frog is documented within the project area boundary on several tributaries to Bear Creek as well as a tributary to Little Silver Creek, and several small ponds in the vicinity of the known breeding population on Bear Creek (Map 1, Appendix A). There is no critical habitat designated within the project area, however, Core Recovery habitat in the Traverse Creek 7th field watershed has been established.

Foothill yellow-legged frog has not been documented within the project area boundary or within any of the 7th field watersheds that comprise the analysis area, but was likely historically widespread in these watersheds. While the foothill yellow-legged frog has not been documented on public lands in these watersheds, their status on private lands is unknown. Foothill yellow-legged frogs are highly aquatic and do not venture far from water, therefore, only activities
occurring within, or immediately adjacent to Riparian Conservation Areas (RCAs) are likely to impact this species or its preferred habitat.

Western pond turtles have been observed both throughout the project area as well as within the watershed analysis area. Western pond turtles utilize both aquatic as well as terrestrial habitat types, therefore, may be affected by project activities both within RCAs as well as upland environments.

Hardhead minnow has not been documented within the project area boundary and has not been widely surveyed for in the watershed analysis area. Harhead minnows are found primarily in deep, clear, slow moving streams that are not common within the project area but are present downstream of the project. Natural barriers (e.g., cascades and waterfalls) exist on Rock Creek downstream as well as outside of the project area boundary. Such barriers likely limit the presence of hardhead within the project area but management activities still have the potential to affect this species and its preferred habitat types downstream.

The ability of project activities to affect these species is depend on where such activities are occurring within these watersheds, the amount of habitat affected, direct, indirect, and cumulative effects of this project compared with past, present and reasonably foreseeable future actions. The analysis area considered for the aforementioned species is limited to the following six Watersheds (7th Field) that span the Tobacco Gulch project area:

BEAR CREEK               CANYON CREEK               LOWER ROCK CREEK
OTTER CREEK               TRAVERSE CREEK             UPPER ROCK CREEK

A GIS analysis determined that there approximately: 13.5 mi. of perennial streams, 20 mi. of intermittent streams, and 106 mi. of ephemeral streams within the Tobacco Gulch project boundary. Table 7 contains a detailed description of the aquatic features in the project area as well as any site specific resource protection measures listed in Tables 3 & 4.
Table 7. Description of selected aquatic features in the Tobacco Gulch Ecological Restoration Project adapted from the Hydrology Report (O’Connell 2012)

<table>
<thead>
<tr>
<th>Observation Point</th>
<th>Hydrologic Feature</th>
<th>UTM Location1</th>
<th>Unit2</th>
<th>Field Observations</th>
</tr>
</thead>
</table>
| S1 up             | west fork of perennial tributary to Canyon Creek (upstream reaches) | 4312457 0693137 | 301-11 N, W 301-58 S, E | - Upper reaches of this drainage are likely ephemeral and intermittent and receive runoff from FSR13N58 and the nearby unnamed old road grade in the spring. Additional runoff likely occurs from storm events and SPI land to the west.  
- Old road grade separates unit 301-11 to the west from this drainage to the east. This road also separates this drainage from unit 301-58 to the east.  
- This road is proposed to be reconstructed and in areas is 25 feet from the drainage.  
- Drainage contains moss and shows signs of substrate scour, further suggesting intermittent flows.  
- Side-slopes are low to moderate, approaching 15% in areas.  
- Channel gradient is 5 to 10%, sinuosity is low, bankfull width is 2 feet in areas, and the substrate is composed of bedrock and cobble sized material.  
- Perennial pools from historic mining activities were observed to the west of this drainage in the southwest corner of unit 301-11. The unit boundary is currently flagged at 50 feet from these pools.  
- Crossing on this drainage between units 301-11 and 301-58 currently does not have a culvert. There is a scour pool below this low-water crossing that has been caused by the compacted road surface; which has also resulted in a gradient change between the channel above the crossing and the channel below the crossing.  
- The drainage in this area contains perennial flows from shallow groundwater and runoff. Alders were observed.  
- This reach is downstream of the reach mentioned above and the historic mining pools.  
- Channel is actively widening and down-cutting as a result of area road runoff, and denuded private lands to the west.  
- Sedimentation in pools was observed that is likely caused by all the runoff sources mentioned above along with streambank failures.  
- Channel gradient is around 5% with side-slopes ranging from 30 to 70%. Stream flow was a couple gallons per minute in August. Channel has step-pool morphology, contains large woody debris, and has an average channel width of approximately 3 feet.  
- The California Red-legged Frog, intermittent reaches would have a 150 foot exclusion zone for mechanical activities.  
- The California Red-legged Frog, intermittent reaches would have a 300 foot exclusion zone for mechanical activities. |
| S1 dwn            | west fork of perennial tributary to Canyon Creek | 4312258 0693045 | 301-58 E | - The drainage in this area contains perennial flows from shallow groundwater and runoff. Alders were observed.  
- This reach is downstream of the reach mentioned above and the historic mining pools.  
- Channel is actively widening and down-cutting as a result of area road runoff, and denuded private lands to the west.  
- Sedimentation in pools was observed that is likely caused by all the runoff sources mentioned above along with streambank failures.  
- Channel gradient is around 5% with side-slopes ranging from 30 to 70%. Stream flow was a couple gallons per minute in August. Channel has step-pool morphology, contains large woody debris, and has an average channel width of approximately 3 feet.  
- The California Red-legged Frog, intermittent reaches would have a 150 foot exclusion zone for mechanical activities.  
- The California Red-legged Frog, intermittent reaches would have a 300 foot exclusion zone for mechanical activities. |

Tobacco Gulch Ecological Restoration Project - BE
<table>
<thead>
<tr>
<th>Observation Point</th>
<th>Hydrologic Feature</th>
<th>UTM Location¹</th>
<th>Unit²</th>
<th>Field Observations</th>
</tr>
</thead>
</table>
| S2                | east fork of perennial tributary to Canyon Creek | 4312177 0693693 | 301-22 N | - Stream contains perennial flow with an average channel width of 6 feet, 3.5% channel gradient, and greater than 70% side-slopes.  
- Streambanks are relatively stable and the substrate is primarily composed of cobble and bedrock sized material.  
- Channel has a step-pool morphology, low sinuosity, and moderate gradient.  
- In areas, the channel is actively widening and down-cutting. Evidence of historic logging on sideslopes.  
- Stream flow is primarily fed by shallow groundwater from precipitation falling on the surrounding highlands. Additional runoff may be contributed from nearby roads such as FSR13N58, 13N58J, and 13N58Y.  
RECOMMEND: 150 foot minimum exclusion zone along this drainage due to the steep slopes. Due to the California Red-legged Frog, perennial reaches would have a 300 foot exclusion zone for mechanical activities. |
| S3                | Pegleg Creek      | 4306308 0690976 | Unit has been withdrawn | - Pegleg Creek is intermittent in this area but perennial downstream.  
- Drainage is steep, incised, and has side-slopes around 35%.  
- Unit boundary flag-line was at 75 feet in this area and increasing downstream as sideslopes increase and channel becomes more defined.  
- Scour pools were observed, some of which were damp and likely serve as good amphibian breeding habitat in the spring and early summer.  
- No obligate riparian vegetation was observed. |
| S4                | intermittent tributary to Bear Creek | 4307034 0691728 | Units have been withdrawn | - This drainage is located just east of FSR12N94B.  
- Streambanks are vulnerable and the channel is actively down-cutting. Incision is the result of historic logging practices in close proximity that have accelerated runoff and erosion.  
- Unit boundary flag-line is about 50 feet from the channel, but increases downstream as sideslopes increase and the channel becomes more defined.  
- Side-slopes range from 30 to 35%.  
- Good groundcover, debris, and litter were observed between the flag-line and the drainage. |
| S5                | intermittent tributary to Little Silver Creek | 4308441 0694570 | Within burn unit, 303-30 SW | - Trail C (11E19) crosses this drainage in its upper reaches. This crossing is an old humboldt crossing that has resulted in aggradation above the crossing, down-cutting below the crossing, and piping of flows underneath the trail crossing.  
- Channel contains litter, log jams, fine sediment deposits, and vertical scour. Channel is vulnerable to degradation during runoff events.  
- Side-slopes are low to moderate in the vicinity.  
RECOMMEND: 50 foot minimum exclusion zone for low gradient side-slopes due to degrading channel conditions. Replacing the crossing with an appropriately designed culvert and adjusting channel gradient in the zone of influence that has changed as a result of the crossing (i.e. aggradation and down-cutting). Additional streambank stabilization in the area would be beneficial as well. Due to the California Red-legged Frog, perennial reaches downstream would have a 300 foot exclusion zone for mechanical activities. |

¹ UTM Location: Universal Transverse Mercator coordinate system
² Unit: Metric system
<table>
<thead>
<tr>
<th>Observation Point</th>
<th>Hydrologic Feature</th>
<th>UTM Location¹</th>
<th>Unit²</th>
<th>Field Observations</th>
</tr>
</thead>
</table>
| S6                | Little Silver Creek | 4309058 0693174 | 303-56 E | - Unit 303-56 and Trail 11E18 are located to the east of this perennial drainage.  
- Historic logging practices are apparent on surrounding hillsides.  
- Channel is approximately 6 feet in width, with 6% gradient, and side-slopes ranging from 30% to greater than 70%. Channel morphology has a step-pool morphology and low to moderate sinuosity.  
- Streambanks are stable and channel substrate is primarily bedrock, boulder, and cobble sized material.  
- Riparian vegetation is dominated by alders. Large woody debris is present in the channel and on surrounding hillsides.  
- Unit boundary flag-line is currently on an old skid trail at approximately 150 feet from the drainage. While side-slopes are relatively steep, this distance combined with good ground and canopy cover make this an adequate exclusion zone.  
- Due to the California Red-legged Frog, this stream would have a 300 foot exclusion zone for mechanical activities. |
| S7                | intermittent tributary to Tobacco Gulch | 4310618 0694741 | 303-38 N | - This small drainage contains little channel definition with some wet areas and azelia growing in the channel.  
- Large woody debris and litter were also observed in the channel.  
- There was no evidence of excessive channel degradation.  
- Side-slopes are low to moderate gradient with good groundcover.  
- Unit boundary flag-line is 25 feet from the edge of the channel and utilizes slope breaks and an old skid trail. Appears to be adequate based on side-slopes, channel condition, and existing features.  
- Due to the California Red-legged Frog, this stream would have a 150 foot exclusion zone for mechanical activities. |
| S8                | Dutch Canyon | 4305727 0694508 | within burn unit, 302-28 W | - Dutch Canyon is intermittent in the upper reaches.  
- Channel is incised as much as 5 feet in areas. Channel width in areas is 5 feet with 7% channel gradient, and low sinuosity. Channel substrate is dominated by gravel and fine grained material.  
- Streambanks are highly unstable and the channel is actively widening and down-cutting in many areas. Side-slopes range from 30 to 70%.  
- Historic skid trails are on the side-slopes and just above the streambanks in areas.  
- Unit boundary flag-line ranges from 50 to 75 feet from the edge of the channel and utilizes existing skid trails and slope breaks.  
- RECOMMEND: Dutch Canyon should have a minimal exclusion zone of 100 feet with 50 feet on the lower reaches of ephemeral tributaries. Due to the California Red-legged Frog, intermittent reaches would have a 150 foot exclusion zone and perennial reaches would have a 300 foot exclusion zone for mechanical activities. |
<table>
<thead>
<tr>
<th>Observation Point</th>
<th>Hydrologic Feature</th>
<th>UTM Location¹</th>
<th>Unit²</th>
<th>Field Observations</th>
</tr>
</thead>
</table>
| S9                | intermittent tributary to  | 4302463       | 302-33 SE, NW | - Observations were made within unit 302-33 below FSR12N81 and northwest of FSR12N81D.  
- Drainage was flowing on July 15, 2010. Drainage is likely intermittent below FSR12N81 and primarily ephemeral above FSR12N81 within unit 302-32.  
- This area is overgrown with rose bushes, blackberry patches, poison oak, and grape vines.  
- This very thick vegetation is surrounded by low to moderate gradient slopes.  
RECOMMEND: Treatments could occur within 25 to 50 feet of the drainage depending on the slope. Due to the California Red-legged Frog, intermittent reaches would have a 150 foot exclusion zone and perennial reaches would have a 300 foot exclusion zone for mechanical activities. |
|                   | Bear Creek                 | 0693676       |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| S10               | Harricks Ravine            | 4300695       | 302-46 N      | - Harricks Ravine is tributary to Rock Creek. Upper reaches within the unit 302-23 are likely ephemeral while reaches just south of unit 302-46 display channel definition and are intermittent. Channel was dry on July 15, 2010.  
- Observations were made west of FSR12N81C within unit 302-46.  
- Channel is somewhat incised and has steep side-slopes approaching 50% gradient.  
- Good groundcover on side-slopes in the form of poison oak, blackberry plants, and ferns.  
RECOMMEND: Harricks Ravine should have a minimal exclusion zone of 50 feet where sideslope gradients are low. Due to the California Red-legged Frog, intermittent reaches would have a 150 foot exclusion zone for mechanical activities. |
|                   |                            | 0693982       |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

¹UTM data is in NAD 83 Zone 10S. The first number is the northing followed by the easting.

²This column refers to units that contain the observation point and units adjacent to the observation point. Units that contain the observation point have no letter designation. Units adjacent to the observation point have a letter designation that indicates their relative direction from the observation point. E.g. 301-58 S, E indicates that unit 301-58 is adjacent to the observation point and is located to the south and to the east of the observation point.
The Hydrology Report for the Tobacco Gulch Ecological Restoration Project (O’Connell 2012) provides a model-based summary for the aforementioned watersheds and the risks for cumulative watershed effects (CWEs, Table 8) as a result of implementing the Tobacco Gulch ERP and its alternatives as compared to the no action alternative (Alternative 2). The CWE analyses are based on the current disturbance level within each watershed, and amount of equivalent roaded acres (ERA) to produce and estimate that can be compared with a upper limit value or Threshold of Concern (TOC), which serves as an indicator when an increase in adverse effects can be anticipated (for more information regarding this method review the Hydrology Report).

Table 8. Risk of CWEs for the Tobacco Gulch Fuels Reduction and Forest Health Project from Hydrology Report (O’Connell 2012).

<table>
<thead>
<tr>
<th>7th Field Watershed</th>
<th>Threshold of Concern (TOC)</th>
<th>Action¹</th>
<th>ERA - % of watershed</th>
<th>ERA - % of TOC⁴</th>
<th>Risk of CWEs⁵</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>2013²</td>
<td>2015³</td>
<td>2013²</td>
</tr>
<tr>
<td>Bear Creek</td>
<td>12-14</td>
<td>No Action</td>
<td>11.8</td>
<td>11.6</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternatives 1, 3, 4, and 5</td>
<td>13.3</td>
<td>12.4</td>
<td>111</td>
</tr>
<tr>
<td>Canyon Creek</td>
<td>14-16</td>
<td>No Action</td>
<td>7.4</td>
<td>7.2</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternatives 1, 3, 4, and 5</td>
<td>7.7</td>
<td>7.5</td>
<td>55</td>
</tr>
<tr>
<td>Lower Rock Creek</td>
<td>10-12</td>
<td>No Action</td>
<td>3.7</td>
<td>3.6</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternatives 1, 3, 4, and 5</td>
<td>4.7</td>
<td>4.2</td>
<td>47</td>
</tr>
<tr>
<td>Otter Creek</td>
<td>12-14</td>
<td>No Action</td>
<td>6.4</td>
<td>6.2</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternatives 1, 3, 4, and 5</td>
<td>7.0</td>
<td>6.7</td>
<td>58</td>
</tr>
<tr>
<td>Traverse Creek</td>
<td>14-16</td>
<td>No Action</td>
<td>6.3</td>
<td>6.2</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternatives 1, 3, 4, and 5</td>
<td>6.4</td>
<td>6.2</td>
<td>46</td>
</tr>
<tr>
<td>Upper Rock Creek</td>
<td>12-14</td>
<td>No Action</td>
<td>3.2</td>
<td>3.2</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alternatives 1, 3, 4, and 5</td>
<td>5.6</td>
<td>5.3</td>
<td>46</td>
</tr>
</tbody>
</table>

¹ In all cases the Alternatives 1, 3, 4, and 5 row value includes other activities within the watershed that have not yet been implemented or completed, including activities on adjacent private lands. For project specific ERA contributions and calculations of 2013 ERA values see Appendix C.

² For the purposes of this analysis it was assumed that mechanical activities would occur beginning in 2012 and would therefore be measurable in 2013.

³ For the purposes of this analysis it was assumed that follow-up burning and herbicide treatment would follow mechanical activities and therefore have been accounted for in 2015.

⁴ ERA as a percentage of TOC was calculated using the lower TOC limit. E.g. Bear Creek: ERA - % of TOC= ERA - % of watershed/12 *100

⁵ Risk is based on the ERA value as a percentage of the TOC. See Appendix C for Risk Categories.

The four species listed in Table 1 included in the BA/BE analyses for this document are the CA red-legged frog, foothill yellow-legged frog, western pond turtle, and hardhead minnow. Both the CA red-legged frog and the western pond turtle have been documented within the project area. Based on elevation, historic range,
potentially suitable habitat, lack of extensive surveys, and percentage of privately owned land within the watershed analysis areas, foothill yellow-legged frogs as well as hardhead minnow have the potential to be present within the project area and could be affected by project activities. The species accounts describe in detail the direct, indirect, and cumulative effects of the proposed activities as well as the alternatives may have on each species.

VI. EFFECTS OF THE PROPOSED PROJECT

A. Direct and Indirect Effects of the Proposed Action (Alternative 1) Common to All Species

Effects Common to all species
The degree to which aquatic organisms and habitats can be affected by land management activities depends largely on the intensity of these activities in, and immediately adjacent to, riparian areas. Within riparian areas, “The desired condition is to provide sustainable aquatic, riparian, and meadow (ARM) compositions, structures, and functions including processes within desired ranges of variability, well-distributed habitat for desired plant, invertebrate, and vertebrate species as well as connectivity among watersheds (USDA Forest Service 2004c).”

Riparian areas provide shade, regulate microclimates, and contribute pieces of large woody debris that create and enhance habitat complexity. Thus depending on the amount of alteration, changes in riparian vegetative composition and structure that fall outside of the range of natural variability, have the potential to influence daily water temperature regimes, affect macroinvertebrate assemblages, and affect aquatic species presence and reproduction.

Climate Change
In the Western United States, increased temperatures have led to more precipitation falling as rain rather than snow, earlier snowmelt and snowmelt-driven streamflow (Stewart and others 2005, Hamlet and others 2007), and reduced spring snowpack (Mote 2003, Mote and others 2005, Barnett and others 2008). For the mountainous regions of the Western United States, snowmelt provides approximately 70 percent of annual streamflow (Mote and others 2008). Both increased winter rain (as opposed to snow) and shifts to earlier spring snowmelt result in greater winter and spring streamflows leading to increased flood risk and reduced summer streamflows in snowmelt-dominated and transient (rain/snow) watersheds. This reduction in summer streamflow could have major implications for fisheries, wildlife, water supply, and agriculture. Climate controls ecosystem structure and processes such as species distribution and abundance, regeneration, vegetation productivity and growth, and disturbance, including insects, and fire. Increasing temperatures and changes in precipitation with climate change will impact both ecosystem structure and ecosystem processes. Viability of a species is dependent on the availability of suitable habitat. Animal species respond to climate variability in the short term through shifts in geographic range (migration) when suitable habitat is not available in the former range. Mortality and population extirpation in parts of a species’ former range often occur. Over time, extirpation and colonization events cumulatively result in shifts of the species’ distribution range (Davis and Shaw 2001, Delcourt and Delcourt 1991). Land-use changes, development, and introduction of invasive species often impede the ability of species to respond to climate change adaptively resulting in small population sizes and isolation of populations as a result impede gene flow (Joyce and others, in press).

Widespread fire years and fire extent are associated with warmer and drier spring and summer conditions in the Western United States (McKenzie and others 2004, Westerling and others 2006, Heyerdahl and others 2008, Taylor and others 2008). Warmer spring and summer conditions lead to relatively early snowmelt, and lower summer soil and fuel moisture, and thus longer fire seasons (Westerling and others 2006). Increased
temperatures and drought occurrence in some locations owing to global warming will likely lead to increased fire frequency and extent. Intensity of fires may also increase in some areas if higher temperatures interact with fuel characteristics to increase fire intensity.

**Herbicides, Adjuvants, and Marker Dyes**

Herbicides proposed for use in the Tobacco Gulch project include: Aminopyralid (Milestone or equivalent), Clopyralid (Transline or equiv.), Glyphosate (Rodeo or equiv.), Imazapyr (Arsenal, Chopper or equiv.), and Triclopyr BEE (Garlon 4 ultra or equivalent). The proposed adjuvants include a silicone/modified vegetable oil blend (Hasten, Syl-Tac, or Competitor-aquatic formulation), and the proposed marker dyes colorfast purple or hilight blue. Characteristics of these herbicides, adjuvants, and marker dyes as they relate to aquatic species are shown in Table 9. For analysis of effects to aquatic species, the US Forest Service uses computational tools in risk assessment documents and worksheets developed for the USDA Forest Service by Syracuse Environmental Research Associates, Inc. (SERA). These are available on-line at [link](http://www.fs.fed.us/foresthealth/pesticide/index.shtml)

Adjuvants such as surfactants are not registered or approved by the Environmental Protection Agency (EPA) the same way herbicides are. Additionally, manufacturers often claim proprietary rights to mixtures so that the actual chemical makeup is unknown. As a result, toxicity data are not readily available. Given this information, there are no SERA risk assessments for three adjuvants proposed for used in the Tobacco Gulch ERP: Hasten, Syl-Tac, and Competitor. When such SERA risk assessment documents are unavailable, technical reports, publications, manufacture label, material safety datasheets (MSDA), as well as any web-based information may be used to supplement analyses.

**Table 9. Risk Assessment summary with Hazard Quotients\(^1\) for sensitive fish and amphibians for the Tobacco Gulch Ecological Restoration Project.**

<table>
<thead>
<tr>
<th>Herbicide (common name)</th>
<th>Expected Application rate</th>
<th>Aquatic Organism (Fish, Amphibians)</th>
<th>Hazard Quotient (accidental spill – worst case scenario)</th>
<th>Hazard Quotient (non-accidental acute exposure)</th>
<th>Hazard Quotient (chronic/long-term exposure)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aminopyralid (Milestone)</td>
<td>0.11 lbs./acre</td>
<td>Fish, Algae, Amphibian</td>
<td>0.04</td>
<td>0.001</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.02</td>
<td>0.0004</td>
<td>N/A</td>
</tr>
<tr>
<td>Clopyralid (Transline)</td>
<td>0.25 lbs./acre</td>
<td>Fish, Algae, Amphibian</td>
<td>0.0004</td>
<td>0.0002</td>
<td>0.0003</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Glyphosate (Rodeo)</td>
<td>4.0 lbs./acre</td>
<td>Fish, Algae, Amphibian</td>
<td>4</td>
<td>N/A</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>0.06</td>
</tr>
<tr>
<td>Imazapyr (Arsenal, Chopper)</td>
<td>0.375 lbs./acre</td>
<td>Fish, Algae, Amphibians</td>
<td>0.8</td>
<td>0.01</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Triclopyr (Garlon 4 Ultra)</td>
<td>2.0 lbs./acre</td>
<td>Fish, Algae, Amphibians</td>
<td>(48)(^2)</td>
<td>(0.6)(^2)</td>
<td>(0.001)(^2)</td>
</tr>
</tbody>
</table>

N/A = Not Available (no information reported).

\(^1\) Hazard Quotient (HQ) is the ratio of the anticipated level of exposure to a reference dose of acceptable exposure as determined by the Environmental Protection Agency (EPA). A HQ of less than 1 indicates little concern from exposure. HQ’s near 1.0 pose a greater reason for concern. (SERA 2003, 2004, 2007).

\(^2\) Information is for “Tolerant” Fish Species, no sensitive data available.
**Risk analyses:**
The risk assessments are based upon Human Health and Ecological Risk Assessment reports prepared by Syracuse Environmental Research Associates (2003, 2004 and 2007) which utilize the best available science to describe the level of herbicide expected to be introduced, persist, and transport within the forest environment, and to evaluate the likelihood of adverse ecological effects. The majority of current understanding about the effects of herbicides is based upon laboratory experiments on a few model organisms, or model tissue or cell lines. When specific data on aquatic species is lacking (e.g., amphibians), the risk assessments extrapolate to similar types of species, in this situation fish. Because of the inherent error and unknowns in extrapolating to other species not specifically studied, the Forest Service uses the most sensitive endpoint from the most sensitive species tested as the toxicity index for aquatic species. However, this method does not completely alleviate the possibility that some species are particularly sensitive to one or more herbicides.

Herbicide treatments can affect aquatic species through: 1) acute toxicity, 2) chronic toxicity, and 3) secondary effects upon habitat. Acute exposure is a measure of a chemical’s effect based on a short exposure for only a short period of time. Acute exposure can occur at a lethal (inducing death) or sub-lethal level (inducing behavioral changes, i.e. decreased avoidance response). Accidental spill would constitute the greatest potential for an acute event. An accidental spill incident involving chemical transport, mixing, application, and storage would be very unlikely as procedures and requirements are designed to prevent such an event, and have been shown to be effective. Best Management Practices (USDA 2000) provide guidance for emergency spill procedures and are designed to minimize the magnitude of effect resulting from a spill. In chronic and sub-chronic toxicity, the organism is subjected to continuous or repeated exposures at lower concentrations over a longer period of time. The response of the organism to the chemical may be slight or delayed, with effect manifested over a range of temporal scales, including the life span of the individual to multiple generations. These exposures are most likely if chemical was present in ground water and subsequently entered surface flow, or if rain events created overland flow and mobilized residual herbicide from leaf surfaces or soil. Chronic and sub-chronic exposure can adversely affect individual growth or the function of certain organs and can have systemic effects with neurological, immunological, endocrine function, reproductive, teratogenic (birth defect), carcinogenic, and mutagenic implications.

In the SERA Risk Assessments, risk is expressed as hazard quotients, which is the ratio of the anticipated level of the exposure to EPA reference doses for acceptable exposure. Hazard quotients less than 1.0, indicate that the exposure poses little reason for concern. Hazard quotients nearing 1.0 pose a greater reason for concern. Table 9 lists the results of the SERA risk assessments based on the herbicide proposed and application rate for the Tobacco Gulch project area. Hazard quotients are developed during NEPA for each type of herbicide in each project as an accidental spill, peak Estimated Environmental Concentration (EEC), and longer-term EEC (which gives chronic effects from herbicide exposure).

Potential roles of toxicants (Carey and Bryant 1995) include: a) affecting the susceptibility of young to disease; b) retarding growth and development of young; c) affecting the ability to avoid predation; d) affecting the development of physiological, morphological, or behavioral processes in a manner that subsequently impairs the ability of the young for future reproduction; and e) directly causing mortality of young. Additionally, recent research indicates that standard toxicology testing for certain pesticides may underestimate the power of pesticides when combined with other stressors such as predators (Renner 2004).

*Aminopyralid (Milestone)*
Aminopyralid is a relatively new pesticide and information is limited to studies required for registration, however, there is no existing information according to the SERA risk assessments to suggest that specific groups or individuals may be especially sensitive to the systemic effects of aminopyralid including aquatic and
terrestrial invertebrates, fish, and amphibians. No specific information regarding the toxicological effects on turtles or reptiles in general was located during searches.

**Clopyralid (Transline)**

There is no information to suggest that specific groups or individuals may be especially sensitive to the systemic effects of clopyralid according to the SERA risk assessments, however data on toxicity to fish are extremely and atypically limited; while no literature regarding the toxicity of clopyralid to amphibians is known. No chronic studies or even long-term studies on fish egg –and-fry have been encountered. The dose-response assessment uses admittedly limited data suggesting that at least some fish species may be more sensitive to clopyralid. No specific information regarding the toxicological effects on turtles or reptiles was located during literature searches.

**Glyphosate (Rodeo)**

Fish, amphibians, and most aquatic invertebrates appear to be equally sensitive to the toxicity of technical grade glyphosate and glyphosate formulation (Bidwell and Gorrie 1995, USDA 1984). For the more toxic formulations of glyphosate, the risk characterization for aquatic organisms suggests that amphibians are the group at greatest risk in both terms of sensitivity and severity of effects. A substantial body of information is available on the toxicity of glyphosate, glyphosate formulations, and formulations with adjuvants (e.g., surfactants) to fish. Concerns for aquatic organisms are enhanced when glyphosate formulations include the use of polyoxyethyleneamine (POEA) surfactants similar to those found in original Roundup formulations. Howe and others (2004) demonstrated that the glyphosate POEA formulation had negative impacts on amphibians. At an application rate of 1 lb a.e./acre, the upper bound HQ for sensitive species of amphibians is 2. The corresponding HQs for sensitive species in other groups of aquatic organisms are 1.7 for fish, 1.1 for invertebrates, 1.0 for algae and aquatic macrophytes. Concern for amphibians is enhanced by the study of Howe and others (2004) which indicates that two formulations of Roundup as well as the POEA surfactant used in one of the more toxic formulations of glyphosate are associated with the development of intersex gonads. The HQs for aquatic species will increase linearly with application rate. Because the upper bound HQs for most groups of aquatic organisms exceeds or reaches the level of concern at the relatively low application rate of 1 lb a.e./acre, care should be exercised when applying more toxic formulations of glyphosate near surface water. Unlike the case with more toxic formulations, risks to amphibians and aquatic invertebrates appear to be insubstantial for the less toxic formulations. Algae appear to be the group of non-target aquatic organisms that are most sensitive to the less toxic formulations. At an application rate of 1 lb a.e./acre, the upper bound of the HQ for sensitive species of algae is 0.8. Risks to fish cannot be ruled out based on standard and conservative assumptions and methods for applications of less toxic formulations of glyphosate at rates in excess of about 2.5 lb a.e./acre (acute effects). It seems most likely, however, that adverse effects would be observed in stressed populations of fish and less likely that effects would be noted in otherwise healthy populations of fish. No specific information regarding the toxicological effects on aquatic reptiles (e.g., turtles) was located during searches.

Label directions for the less toxic formulations of glyphosate state that a surfactant should be added to the formulations prior to application. Some surfactants are virtually nontoxic and are not likely to impact the toxicity of glyphosate. The use of a nontoxic surfactant would have no substantial impact on the risk characterization. Based on the available toxicity data in fish and aquatic invertebrates, however, some other surfactants which might be used with the less toxic formulations of glyphosate could pose a much greater risk than the glyphosate formulation itself.

**Imazapyr (Arsenal)**

Studies on the effects of imazapyr indicate it is relatively non-toxic to aquatic invertebrates and fish. A separate dose-response assessment for amphibians was not conducted in the SERA (2003a) risk assessment. Neither the
published literature nor the U.S. EPA files includes data regarding the toxicity of imazapyr to amphibian species. Most of the available toxicity data suggest that amphibians are no more sensitive to imazapyr than fish, however, Trumbo (2005) found imazapyr to be slightly toxic to bullfrog (Lithobates [Rana] catesbeiana) tadpoles. Imazapyr is not expected to bioaccumulate in the food chain, but residual soil contamination with imazapyr could be prolonged in some areas since there is little to no degradation of imazapyr in soil, it is not readily degraded by other chemical processes, and it does not bind strongly with soil particles (Tu and others 2001). Despite its potential mobility, imazapyr has not been reported in water runoff. No specific information regarding the toxicological effects on turtles or reptiles was located during literature searches.

Triclopyr (Garlon 4)
Studies on the effects of triclopyr are relatively well-defined. There is a major difference in the potential hazards posed by triclopyr – triethylamine (TEA) formulations (e.g., Garlon 3A) and triclopyr – butoxyethyl ester (BEE) formulations (e.g., Garlon 4) to fish. In addition, TCP (3,5,6 – trichloro – 2 – pyridinol) a major degradant of triclopyr, is substantially more toxic in fish than either TEA or BEE formulations of triclopyr and may persist in soil and water. Since fish are apparently more sensitive to both TEA and BEE than amphibians and more extensive toxicity data is available on fish, a separate dose-response assessment for amphibians was not conducted in the SERA risk assessment, but Garlon 4 has been observed to cause behavioral (neurological) changes that may affect survivability in frog tadpoles when exposed (Berrill and others 1994). To reduce the risk that triclopyr would reach streams at levels that would result in effects to aquatic organisms, stream buffers were used in the project design. USFS Region 5 monitoring results show that employing untreated buffers on streams reduces the rate of water contamination to near zero. Using these buffers for triclopyr, the expected contamination is expected to be at or below that found in past water monitoring. Such a level of water contamination with triclopyr would represent a low risk of adverse effects to fish and amphibians. No specific information regarding the toxicological effects on turtles or reptiles was located during literature searches.

Adjuvant (Surfactant): Risk Analysis

Ethylated or methylated seed oil also known as Modified Seed Oil [MSO] based (e.g., Hasten, Wilbur-Ellis Co.). Hasten is a modified vegetable oil made from corn, canola, or soybean oil that is combined with sorbitan alkylethoxylate ester as a non-ionic surfactant. Hasten also contains ethoxylated ingredients. The polyoxyethylene dialkylester in the formulation of Hasten is not sufficiently identified to say anything definite about its composition or toxicity (Bakke 2007). The U.S. Food and Drug Administration (FDA) considers methyl and ethyl esters of fatty acids produced from edible fats and oils to be food grade additives. However, the unreacted ethylene oxide as well as 1,4-dioxane present in the final formulation of Hasten are considered likely to be human carcinogens. Hasten has a Caution signal word and may be mildly irritating to the skin and eyes. The product is of low acute oral and dermal toxicity. No studies on amphibians with Hasten were found. For a comprehensive look at the risks of 1,4-dioxane in the POEA surfactant, refer to Borrecco and Neisess 1991. For a comprehensive look at the risks of ethylene oxide in ethoxylated surfactants, refer to USDA, 2003.

Silicone/modified vegetable oil blend (Syl-Tac, Wilbur-Ellis Co.)
Syl-Tac is a mixture of Hasten and Sylgard 309 and is a blend of vegetable oils and silicone-based surfactants (Bakke 2007). Syl-Tac has a Caution signal word and may cause slight skin and eye irritation; and is of low acute oral and dermal toxicity. Sylgard 309 (Refer to discussion above for Hasten) has a Warning signal word. It is considered slightly irritating to the skin and is considered severely irritating to the eyes. No studies on amphibians with Syl-Tac were found. There has been concerned expressed about the toxicity of silicone-based surfactants on terrestrial insects (Bakke 2007).

Modified vegetable oil (Competitor, Wilbur-Ellis Co.)
Competitor, like Hasten, is a modified vegetable oil that is combined with sorbitan alkylethoxylate ester as a non-ionic surfactant. Competitor also contains ethyl oleate and dialkyl polyoxyethylene glycol. Like Hasten, the formulation of Competitor is not sufficiently identified to say anything definite about its composition or toxicity (Bakke 2007). The U.S. Food and Drug Administration (FDA) considers methyl and ethyl esters of fatty acids such as ethyl oleate produced from edible fats and oils to be food grade additives. Ethyl oleate can be synthesized as well as metabolized by humans, for instance, when consumed as alcohol. Sorbitan alkylpoyethoxylate belongs to a class of chemicals called alcohol ethoxylates (AEs) and are added to a variety of household products as emulsifiers and as lubricants that rapidly degraded by microbes in aquatic systems (http://www.marinwater.org/documents/Chap8_SurfDye9_2_08.pdf). Dialkyl polyoxyethylene glycol (PEG) is a polymer synthesized by reaction of glycol with ethylene oxide. The terminal hydroxyl groups can be alkylated to produce various dialkyl PEG compounds that are widely used in cosmetics, toothpaste, and laxatives. Competitor was specifically designed for use in water and contains alkyl ethoxylate instead of nonyl phenol ethoxylate (NPE), a known endocrine disrupter in aquatic habitats. Competitor has a Caution signal word and may be mildly irritating to the skin and eyes. The product is of low acute oral and dermal toxicity. No studies on amphibians with Competitor were found.

Marker dyes

Marker dyes are considered necessary to allow applicators to verify that herbicides were applied to the intended target. According to SERA (1997) there is no published information regarding the use of marker dyes with herbicides. Furthermore two common colorants Hi-Light® Blue and Colorfast® Purple both manufactured by Becker Underwood, Ames, Iowa are considered proprietary and ingredients are unknown, but Colorfast Purple has demonstrated carcinogenic activity in mice.

Colorfast Purple

Marker dyes are considered necessary to allow applicators to verify that herbicides were applied to the intended target. According to SERA (1997) there is no published information regarding the use of marker dyes with herbicides. Furthermore two common colorants Hi-Light® Blue and Colorfast® purple both manufactured by Becker Underwood, Ames, Iowa are considered proprietary and ingredients are unknown, but Colorfast® purple has demonstrated carcinogenic activity in mice. Basic Violet 3 is the colorant used in Colorfast® purple used as markers for vegetation. The chronic toxicity and carcinogenicity of Basic Violet 3 was tested in mice (Littlefield and others 1985) and rats (Littlefield and others 1989). Marked carcinogenic activity was observed in mice, and this study serves as the basis for the quantitative cancer risk assessment for this compound (Littlefield and others 1985). In rats, there is an indication that the dye accelerates the development of leukemia; however, the effect is less remarkable than that observed in mice (Littlefield and others 1989). Turkeys exposed to Basic Violet 3 in drinking water contracted occlusive laryngotracheitis (Clark and others 1993). A marker solution containing the dye, dihydroxyacetone, and acetone was associated with contact dermatitis, although the dye itself did not cause an allergic reaction (Cox and others 1989). In patch tests, concentrations between 0.01% and 5% of Crystal Violet lactone [CAS 1552-42-7] used in carbonless copy paper were associated with the development of contact dermatitis (Shehade and others 1987). Colorfast® purple would only be used with herbicides with stream buffers. There is no data on toxicity or LC50s of amphibians nor any aquatic species from colorfast purple exposure or its colorant, Basic Violet 3. Based on what is known regarding carcinogenicity of Basic Violet 3 to mice and rats, it can be assumed that at least similar if not more dramatic effects would occur to fish, amphibians, and to some degree turtles.

HiLight Blue

The ingredients in Hi-Light blue are proprietary but none of the ingredients are listed as hazardous or toxic. The dye in HiLight blue is commonly used in toilet bowl cleaners and as a colorant for lakes/ponds. The effects of
Hilight Blue on aquatic organisms is unknown, but since it is not a suspected carcinogen it can be assumed that it is less toxic than Colorfast Purple.

Do mixtures of herbicides and surfactants represent a greatly increased risk over the individual compounds alone (i.e. synergism)? Although considerable information exists on the effects of herbicides on aquatic organisms, information regarding the additive, antagonistic, and most concerning synergistic effects of herbicides with the use of multiple chemicals as well as the addition of surfactants and/or colorants is not only lacking, but largely speculative due to proprietary information, the difficulty in identifying chemical degradants, and different mixture concentrations. Surfactants, by their very nature, are intended to increase the effect of a pesticide by increasing the amount of pesticide that is in contact with the target (by reducing surface tension). This is not synergism, but more accurately is a reflection of increased dose active ingredient of the herbicide into the plant. Although there is not much data in the technical literature, the references included in Bakke (2007) indicate a lack of synergistic effects between surfactants and pesticides.

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California red-legged frog
*Rana draytonii*

**Species Account**

*The California red-legged frog has been reduced over 70 percent from its historic range. Although found near sea level to about 5,200 ft. (1,500 m), most occurrences are below 4,000 (Federal Register 2006). Preferred habitats include: quiet side channel pools of low-gradient streams, marshes, and ponds. Long overland movements (up to 1 mile between breeding habitats) into terrestrial habitats during the rainy season have been documented. More abundant in coastal areas of the geographic range and found only within isolated portions of the Sierra Nevada Range.*

**Critical Habitat**

Activities related to the Tobacco Gulch Ecological Restoration Project will not occur within Critical Habitat for the California red-legged frog (USDI 2010). The nearest critical habitat is North Fork Weber Creek watershed, approximately 8 air miles south east of the project area.

**Recovery Habitat**

The project does have activities occurring in the Traverse Creek Core Recovery Area (USDI 2010 and USDI 2002) which contains a documented California red-legged frog sighting on Traverse Creek from 1975. Approximately, 244 acres within the Traverse Creek and Bear Creek 7th Field watersheds is proposed for prescribed burn only treatment with additional 29 acres of masticate and follow-up prescribed burning (if necessary) in the Traverse Creek watershed.

Potential threats to survival of the California red-legged frog and associated recovery actions identified in the California red-legged frog Recovery Plan (USDI 2002) which are applicable to the Tobacco Gulch ERP include:
1. Develop guidelines for fire management practices (prescribed burns) to decrease incidental impacts to the California red-legged frog. Prescribed burning should be used when doing so will enhance ecosystem health (e.g., reduce fuels, control non-native plants) and decrease chances of catastrophic fires. However, prescribed burning should be carried out in upland habitats during seasons when frogs are not likely to be dispersing or estivating in uplands, if ecologically appropriate.

Affected Environment
The Tobacco Gulch Ecological Restoration Project area is situated approximately 3 miles east of Georgetown, California (El Dorado County) in the vicinity of Darling Ridge, Mace Mill, and Balderston. Legal location: Section 4 Township (T) 11 North (N), Range (R) 11 East (E), Mount Diablo Base and Meridian (MDB&M); Sections 2-4, 8-10, 15-18, 20,21,28,29,32, and 33, T11N, R12E, MDB&M; and Section 24, T12N, R10E, MDB&M. Maps of the project area can be found in Appendix A. The proposed treatment areas are primarily in the Mixed Conifer Forest Zone. All treatment areas are between elevations of approximately 2,200 and 3,500 feet. Within the 9,800 acre project area approximately 30 percent of the National Forest System land is proposed for treatment with this project.

The geographic scope of the direct, indirect, and cumulative effects analysis for the Tobacco Gulch ERP is confined to the following Hydrologic Unit Code (HUC) 7th Field watersheds that span the Tobacco Gulch ERP area in order of percent affected area:

UPPER ROCK CREEK BEAR CREEK LOWER ROCK CREEK
CANYON CREEK TRAVERSE CREEK* OTTER CREEK

*The Traverse Creek watershed is listed as a Core Recovery Watershed for California red-legged frog (USDI 2002).

Streams
Within the Tobacco Gulch ERP area (maps in Appendix A), the predominant named streams or their tributaries where project activities will be occurring include: Rock Creek, Bear Creek, Pegleg Creek, Hog Canyon Creek, Traverse Creek, Little Silver Creek, Canyon Creek, Dutch Canyon Creek, Harricks Ravine Creek, and Otter Creek.

Lakes and Ponds
There are a number of lakes and ponds within a mile of the Tobacco Gulch ERP area. In the northern end of the project area there are two mine ponds (T.12N, R.11E, Section 3) and five lakes (on private land): Lake Walton (T.12N, R.11E, Section 5), and Chiquita Lake and two unnamed lakes (T.13N, R.11E, Section 27 and 34), and another unnamed lake (T.12N, R.12E, Section 6). On the west side is a private pond in the Bear River watershed and several ponds created by the Forest Service where CRLF have been documented (T.12N, R.11E, Sections 8, 17, and 18). Furthermore, there are at least 5 more private ponds within a mile of the Tobacco Gulch ERP west side area boundary (T.12N, R.11E, Sections 30-32). Toward the southern end within the project area lies two ponds, called “Raccoon Ponds” (T.12N, R.11E, Section 33). In addition, 12 more ponds occur on private land within a mile of the southern Rock Creek boundary (T.11N, R.11E, Sections 14-16).

Important Biological Requirements of the California red-legged frog

Breeding habitat
All life history stages are most likely to be encountered in and around breeding sites, which are known to include marshes, springs, permanent and semi-permanent natural ponds, ponded and backwater portions of streams, as well as artificial impoundments such as stock ponds, irrigation ponds, and siltation ponds (USDI 2005). California red-legged frog larvae remain in these habitats until metamorphosis in the summer months.
Young California red-legged frogs can occur in slow moving, shallow riffle zones in creeks or along the margins of ponds. Creeks and ponds where CRLFs are found most often have dense growths of woody riparian vegetation (USDI 2005, Hayes and Jennings 1988). These habitats may be provided by perennial and/or intermittent streams.

**Summer habitat**
In summer, California red-legged frogs are often found close to a permanent pond or a deep pool in a creek where emergent vegetation, undercut banks, or semi-submerged rootballs afford shelter from predators. California red-legged frogs may also disperse from breeding habitat to forage and seek summer sheltering habitat when water becomes unavailable. California red-legged frogs will take shelter in small mammal burrows and other upland refugia on the banks up to 100 meters from the water any time of the year and can be encountered in a variety of upland settings (Jennings and Hayes 1994; USDI 2002). These habitats may be provided by perennial and/or intermittent streams.

**Upland habitat**
California red-legged frogs are frequently encountered in open grasslands occupying seeps and springs. Such bodies may not be suitable for breeding but may function as foraging habitat or refugia for dispersing frogs. During periods of wet weather, starting with the first rains of fall, some individuals make overland excursions through upland habitats and appear to do so without regard to topographical features (USDI 2002).

**Movement**
After precipitation events California red-legged frogs may roam from aquatic sites as much as 1.6 kilometers (1 mile). California red-legged frogs will often move away from water after the onset of fall rains resulting in ¼ inch of precipitation (Tatarian 2008) causing sites where California red-legged frogs were easily observed in the summer months to appear to be absent of this species. Additionally, California red-legged frogs will sometimes disperse in response to receding water which often occurs during the driest time of the year. California red-legged frogs may move up to 3 kilometers (1.8 miles) up or down drainages and are known to wander throughout riparian woodlands up to several dozen meters from the water. Dispersing frogs have been recorded to cover distances from 0.40 kilometer (0.25 mile) to more than 3.2 kilometers (2 miles) without apparent regard to topography, vegetation type, or riparian corridors (Bulger et al. 2003). California red-legged frogs have been observed to make long-distance, straight-line, point to point migrations rather than using riparian or drainage corridors for moving between habitats. Dispersal distances are considered to be dependent on habitat availability and environmental conditions such as water permanence.

**Project Area**

**Aquatic Habitat: GIS analysis, surveys, and sightings**

**Surveys conducted in the project area**
California red-legged frog surveys have been conducted periodically in the project area since 2001 but cannot be considered comprehensive since they have not included the number of site visits necessary to meet the current USFWS survey guidance described in the “Revised Guidance on Site Assessments and Field Surveys for the California red-legged frog (USDI Fish and Wildlife Service 2005). Site assessments and field surveys have been conducted by qualified surveyors, but the field surveys conducted prior to 2010 primarily involved single daytime searches. Field surveys conducted in 2010 involved two daytime and two nighttime visits. Because these surveys were not conducted to meet the established survey protocol, the negative results from these surveys are not interpreted to indicate an absence of California red-legged frogs. As discussed with the USFWS, site assessment information and field surveys can be used together to help evaluate the likelihood for
California red-legged frog presence in streams occurring in the project area. Surveys performed during 2009 and 2010 (Table 10) focused on tributaries toward the west side of the Rock Creek watershed on NFS lands were California legged-frogs were encountered. Surveys also occurred throughout the greater Rock Creek area, but no additional California red-legged frogs were found during these surveys.

Known occurrences
The nearest observed sightings of California red-legged frogs occurred in the Bear Creek and Little Silver drainages (Map 1, Appendix A). In 2009, an adult California red-legged frog was observed in a tributary to Little Silver Creek, and a juvenile California red-legged frog was observed in a tributary to Bear Creek. A population has since been confirmed on private property in a 14 acre storage impoundment on Bear Creek adjacent to National Forest lands. Subsequent sighting of CRLFs have occurred in 2015, 2016 and 2017 in a set of ponds built by the Forest Service within a mile of the known breeding pond. Breeding has been documented in one pond to the northeast of the known breeding pond in T.12N, R.11E, Sections 8.

Potential Breeding Habitat in the Tobacco ERP Area
Stream Habitat:
A GIS analysis within one mile of the Tobacco Gulch ERP area indicates that Rock Creek T.11N R.11E (Sections 4, 8) & T.12N R.11E (Sections 3, 10, 22, 33, 34), Little Silver Creek T.12N R.11E (Section 16), Pegleg Creek T.12N R.11E (Sections 18, 19), Bear Creek T.11N R.11E (Sections 7, 8) & T.12N R.11E (Sections 18, 19, 20, 29, 32), Canyon Creek T.13N R.11E (Sections 31, 32, 33), Whaler Creek T.12N R.11E (Section 25, 35, 36), Traverse Creek T.12N R.10E (Sections 13, 24, 25, 36); T.12N R.11E (Section 31), & T.11N R.11E (Section 6), and Dutch Canyon Creek T.12N R.11E (Section 21) have low gradient stream habitat (equal to or less than 2% gradient) below 4,000 feet elevation (Maps 2 and 3 in Appendix A). Site assessments were conducted on portions of these streams on National Forest lands to evaluate suitability as California red-legged frog (CRLF) reproductive habitat. The results of these surveys of low gradient stream reaches in 2009 and 2010 are shown in Table 10. Moving from west to east across the greater Rock Creek area, the terrain becomes steeper and potential breeding habitat becomes lower. Dispersal into Whaler Creek (outside of project boundary, but within one mile) would involve 4.6 miles of dispersal movement from nearest suspected breeding locations in Bear Creek (Private) and is likely beyond the distance frogs would travel between breeding locations.

Upper Rock Creek Watershed: Contains the upper reaches of Rock Creek, Little Silver Creek, Tobacco Gulch (creek), and contains the majority of project treatment units. These portions of Rock Creek have low gradient stream reaches that were determined to be unsuitable as breeding habitat because of high flow during spring. Rock Creek likely only serves as adult habitat. On Little Silver Creek there are two low gradient stream reaches in Section 16 that have potentially suitable habitat. Little Silver Creek was surveyed in 2009 for dispersing CRLF downstream from the original sighting of one adult which was in the intermittent higher gradient section in the headwaters. Trout were observed in the lower perennial low gradient reach sections. Surveys found that low gradient reaches on Little Silver Creek and a tributary to Little Silver Creek did not provide suitable reproductive habitat because these reaches were channelized and did not provide suitable pools. The area is not typical breeding habitat but might be marginally suitable for CRLF reproduction. Tobacco Gulch (creek) contains mostly high gradient stream channels but has some low gradient as well as low gradient tributary stream reaches that are potentially suitable as CRLF breeding habitat.

Bear Creek Watershed: Contains all of Bear Creek and Pegleg Creek. Bear Creek has an existing 14 acre storage pond and impoundment within the main channel (T12N R11E Section 18 on private; Map 2 in Appendix A) with a known CRLF population. There are at least three low gradient reaches on private land and one low gradient reach on National Forest lands (T12N R11 Section 32). The low gradient reach on National Forest land does not provide suitable reproductive habitat because of channelized reaches and lack of suitable
pools. The area is not typical breeding habitat but might be marginally suitable for CRLF reproduction. Pegleg Creek has two low gradient segments located on private in T12N R11E Sections 18 and 19. These reaches have not been evaluated for potential breeding habitat suitability. Surveys of the portion of Pegleg Creek on National Forest land in section 18 indicate there is perennial flow at this location and may serve as adult habitat only.

Table 10. 2009 and 2010 surveys for California red-legged frog presence and habitat suitability

<table>
<thead>
<tr>
<th>Location</th>
<th>Day Survey Date</th>
<th>Night Survey Date</th>
<th>Stream Name</th>
<th>Habitat Suitability</th>
<th>CRLF present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canyon Creek</td>
<td>8 April 2010</td>
<td>26 April 2010</td>
<td>Trib to Canyon Creek</td>
<td>One pool present. Channel degraded, downcutting. Poor breeding habitat.</td>
<td>No</td>
</tr>
<tr>
<td>Canyon Creek</td>
<td>7 April 2010, 19 April 2010, 6 June 2010</td>
<td>1 July 2010</td>
<td>Trib to Canyon Creek</td>
<td>No breeding habitat, refuge or migration habitat possible.</td>
<td>No</td>
</tr>
<tr>
<td>Canyon Creek</td>
<td>18 May 2010</td>
<td></td>
<td>Canyon Creek</td>
<td>Marginal habitat. Trout present and channelized pools with strong current.</td>
<td>No</td>
</tr>
<tr>
<td>Tobacco Gulch</td>
<td>24 August 2009</td>
<td></td>
<td>Tobacco Gulch</td>
<td>Stream pools present; potential CRLF breeding habitat</td>
<td>No</td>
</tr>
<tr>
<td>Tobacco Gulch</td>
<td>24 August 2009</td>
<td></td>
<td>Trib. Tobacco Gulch</td>
<td>Very little aquatic habitat present. Not breeding habitat.</td>
<td>No</td>
</tr>
<tr>
<td>Tobacco Gulch</td>
<td>24 August 2009</td>
<td></td>
<td>Tobacco Gulch</td>
<td>Low gradient stream reaches channelized. Not breeding habitat.</td>
<td>No</td>
</tr>
<tr>
<td>Little Silver Creek</td>
<td>17 August 2009</td>
<td></td>
<td>Trib. Little Silver Creek</td>
<td>Low gradient stream reaches channelized. Not breeding habitat.</td>
<td>No</td>
</tr>
<tr>
<td>Little Silver Creek</td>
<td>12 August 2009</td>
<td></td>
<td>Little Silver Creek</td>
<td>Stream pools present; not typical breeding habitat.</td>
<td>No</td>
</tr>
<tr>
<td>Little Silver Creek</td>
<td>17 August 2009</td>
<td></td>
<td>Little Silver Creek</td>
<td>Low gradient stream reaches Channelized; not breeding habitat.</td>
<td>No</td>
</tr>
<tr>
<td>Dutch Canyon</td>
<td>25 August 2009</td>
<td></td>
<td>Dutch Canyon</td>
<td>Low gradient reach; primarily riffle; not breeding habitat.</td>
<td>No</td>
</tr>
<tr>
<td>Bear Creek</td>
<td>18 August 2009, 21 October 2009</td>
<td></td>
<td>Trib. To Bear Creek</td>
<td>Channelized creek; not breeding habitat</td>
<td>Yes</td>
</tr>
<tr>
<td>Raccoon Pond #1</td>
<td>9 June 2010, 23 June 2010, 19 August 2009</td>
<td>9 June 2010</td>
<td></td>
<td>Potential breeding habitat; bullfrogs present; surveyed many years</td>
<td>No</td>
</tr>
<tr>
<td>Raccoon Pond #2</td>
<td>9 June 2010, 23 June 2010, 19 August 2009</td>
<td>9 June 2010</td>
<td></td>
<td>Potential breeding habitat; bullfrogs present; surveyed many years</td>
<td>No</td>
</tr>
<tr>
<td>Harrick’s Ravine</td>
<td>19 August 2009</td>
<td></td>
<td>Harrick’s Ravine Creek</td>
<td>High gradient stream; not breeding habitat.</td>
<td>No</td>
</tr>
</tbody>
</table>

Canyon Creek: Contains a few small reaches of low-gradient stream segments on the main stem and tributaries. CRLF habitat is marginal since trout are present and pools are channelized with strong flows. There is a pond nearby (40m x 20m) [10N 693116, 4312492] that may serve as potential CRLF breeding habitat.

Whaler Creek: Low gradient stream reaches on Whaler Creek were determined to be unsuitable as breeding habitat because of the high stream flow during spring. Several low gradient reaches of Whaler Creek were visited in 2010 and all were determined to be unsuitable as breeding habitat because of the strong current in the spring, although Whaler Creek has the other characteristics of suitable breeding habitat (pools present, max depth = 2+ meters).
**Traverse Creek:** The Traverse Creek watershed is a Core Recovery Area (USDI 2010 and USDI 2002) which contains a documented California red-legged frog sighting on Traverse Creek from 1975. The Hydrology Report concluded that the risk to CWEs as a result of implementing this project would be Low for this watershed. Within the watershed there is also Slat Creek and two Tributaries to Traverse Creek. A prescribed burn only treatment (Unit 5 - 244 acres) is located within the headwaters of the Traverse Creek Watershed that also overlaps with the Bear Creek Watershed, and a 29 acre masticate and prescribed burn treatment (Unit 304-46). Due to the lack of activity adjacent to potential habitat no project specific surveys were conducted in this watershed.

**Dutch Canyon Creek:** In Section 21, south of Little Silver Creek in Dutch Canyon, some low-gradient stream reaches were surveyed in 2009 and 2010. The stream here did not have suitable reproductive habitat. There were trout present and the habitat was devoid of pools, with primarily riffle sequences from erosional influences.

**Otter Creek Watershed:** Otter Creek does not contain any drainage features within the project area boundary. The northern extent of the project boundary extends only slightly into the Otter Creek drainage but will not be affected by project activities.

**Lake and Pond Habitat:** There are several lakes and ponds within a mile of the Tobacco Gulch ERP Area. To the north of the project area there are two mining ponds. The size of the one pond is approximately 20 feet by 15 feet and about 3 to 4 feet deep, and the other is very small, about 3 feet by 3 feet. The larger pond (20 x 15 ft) has the potential to serve as suitable breeding habitat however, dense blackberry bush covers about half of the pond edge, followed by a dense canopy of alder overhead resulting in high shading. The smaller pond was not considered suitable breeding habitat. These ponds were surveyed numerous times but only Pacific tree frogs were heard. Five lakes on the north side of the project area occur within 1 mile but are on private land and were not able to be surveyed. Lake Walton (T.12N, R.11E, Section 5), Chiquita Lake (2.79 acres) and two associated lakes (1.6 and 0.17 acres) (T.12N, R.12E, Section 6) are also within one mile of the project boundary that were not surveyed for this project. Lake Walton does contain bullfrogs and trout and has some habitat along the southern margin that may be suitable breeding habitat, but California red-legged frogs have not been surveyed at the lake since it is on private land. The other unnamed, and unsurveyed lake (T12N, R12E, S6) is approximately 0.66 acres in size.

In the western portion of the project area is a pond on private land in the Bear Creek drainage and several smaller ponds built by the Forest Service (T.12N R.11E, Sections 8, 17, and 18; Map 2 in Appendix A). California red-legged frogs have been documented in these ponds and two are suspected breeding locations. At least 8 more private ponds occur within a mile of the Tobacco Gulch ERP western boundary (T.12N, R.11E, Sections 18, 30-32).

Toward the southern end of the project boundary lies two ponds, called “Raccoon Ponds” (T.12N, R.11E, Section 33; Map 3 in Appendix A). These ponds have been surveyed most years over the last ten years and contain numerous bullfrogs and occasionally western pond turtles have been sighted. Two years ago these ponds were completely dry at the end of summer/fall. The 2010 surveys found bullfrogs again. Within a mile of the southern project boundary lies about 12 more ponds/lakes on private land (T.11N, R.11E, Sections 14-16). These waterbodies include Finnon Reservoir and are all located more than 1.0 mile from the nearest waterbodies in the Tobacco Gulch ERP area.
Environmental Baseline and Cumulative Effects

Aquatic Habitat Existing Condition
A Riparian Conservation Objective (RCO) Field Review of the Tobacco Gulch Ecological Restoration Project [ERP] (O’Connell and Others 2012) was performed. This included a review of most of the streams in the Tobacco Gulch area to analyze management consistency with Riparian Conservation Objectives from the Sierra Nevada Forest Plan Amendment (USDA 2004). In this report, a suite of data was collected via field surveys including land use, the presence and extent of erosional features, impacts to riparian vegetation, and additional information relevant to the site.

Cumulative Effects Analysis Area
The cumulative effects analysis for the California red-legged frog (CRLF) includes a land area of 54,579 acres encompassing the following HUC 7th field watersheds: Upper Rock Creek (13,476 acres), Bear Creek (5,340 acres), Lower Rock Creek (4,320 acres), Canyon Creek (10,156 acres), Traverse Creek (9,833 acres), and Otter Creek (11,454) Table 11. The area of cumulative effects analysis was bounded in this manner because it includes the streams of the watershed and any downstream effects from the activities of this analysis. There are over 30 miles of stream within the Tobacco Gulch ERP area boundary where cumulative effects from project activities will be discussed in detail.

Access by roads and trails is probably the most significant factor allowing public access to riparian and stream areas within the analysis area. Use includes past OHV enduro events and the regular use of the trails by OHVs, equestrians, hikers and bicycles. Both motorized and non-motorized impacts from concentrated use may include: soil compaction and erosion, loss of plant cover, and increase in bare ground. Additional impacts from OHV and dispersed camping around streams include weakening the vegetation and creating ruts, increasing compaction and creating un-vegetated areas within the riparian zone. Future recreational activities in the project area may be moderate to heavy, mainly consisting of off-road vehicle use, camping, hunting, target practice, woodcutting, and angling. The impacts associated with trails and public uses on the Rock Creek recreational trails are more likely to occur within summer, upland and movement habitats for CRLF.
Table 11. Summary of the watersheds in the Tobacco Gulch Ecological Restoration Project Cumulative Effects analysis area.

<table>
<thead>
<tr>
<th>7th Field Watershed/Acres</th>
<th>Stream Name – Tributary to</th>
<th>Flow regime</th>
<th>Percent of project boundary in watershed</th>
<th>Miles of stream within project boundary</th>
<th>Stand-Units</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Rock Creek/13,476</td>
<td>Rock Creek &amp; Little Silver Creek - SFAM</td>
<td>Perennial/Intermittent</td>
<td>40%</td>
<td>18.5</td>
<td>303-38, 303-39, 303-40, 303-05 -1, 303-53</td>
<td>Thin, masticate, pile, Rx burn, herbicide treatment</td>
</tr>
<tr>
<td>Bear Creek/5,340</td>
<td>Bear Creek – SFAR</td>
<td>Perennial/Intermittent</td>
<td>37%</td>
<td>5.5</td>
<td>302-21, 302-23, 302-32, 302-33, 302-39</td>
<td>Thin, masticate, pile, Rx burn, herbicide treatment</td>
</tr>
<tr>
<td>Canyon Creek/10,156</td>
<td>Canyon Creek – MFAR</td>
<td>Perennial/Intermittent</td>
<td>9%</td>
<td>1.5</td>
<td>301-02, 301-11, 301-22, 301-23, 301-58</td>
<td>Thin, masticate, pile, Rx burn, herbicide treatment</td>
</tr>
<tr>
<td>Traverse Creek/9,833</td>
<td>Tributary to Traverse Creek - SFAM</td>
<td>Perennial/Intermittent</td>
<td>7%</td>
<td>0.8</td>
<td>304-46</td>
<td>Masticate/Rx burn</td>
</tr>
<tr>
<td>Otter Creek/11,454</td>
<td>None</td>
<td>-</td>
<td>1%</td>
<td>0</td>
<td>301-23</td>
<td>Masticate/Rx burn</td>
</tr>
</tbody>
</table>
Direct and Indirect Effects to CRLF for Alternative 1
California red-legged frogs (CRLF) were detected within the project area boundary during 2009 project level surveys (tributary to Bear Creek, tributary to Little Silver Creek, and past surveys in the area: Traverse Creek (1975). Overall, suitable foraging habitat exists in most of the project area in tributary streams, while potential breeding habitat is likely restricted to only a few low gradient (less than 2 percent) reaches of Traverse Creek, Pegleg Creek, Bear Creek, Canyon Creek, and Little Silver Creek. Although the majority of identified low gradient reaches in a Geographic Information System (GIS) occur on private land and have not been surveyed by Forest Service, CRLF presence is being assumed in these locations as well as potential breeding habitat in low-gradient reaches on private land. Since CRLF have been recently detected in a tributary to Bear Creek and a tributary to Little Silver Creek, this species has the potential to be affected by project activities for Alternative 1 listed in Table 1 including: effects from timber harvest, road related activities, fuels reduction, prescribed burning, herbicide application, and stream crossing improvements since treatments will be occurring within and adjacent to RCAs where frogs are most likely, and known to occur. The status us CRLF in the Traverse Creek Watershed/Core Recovery Area is unknown on private land, and they have not been detected on public lands since 1975.

To account for any potential effects to CRLF or its habitat mechanical ground-based equipment and associated activity will not be occurring within 300 feet of perennial as well as special aquatic features; and not within 150 feet of intermittent features (see Design Criteria – Riparian for additional buffers regarding slope as well as ephemeral streams). CRLF is highly associated with water within stream channel or ponded water habitats during the spring and summer months, but will also utilize upland terrestrial habitats after the first frontal system depositing a ¼ inch or more of rainfall in the fall. This utilization of both aquatic and terrestrial habitats increases the risk of direct and indirect effects to CRLF during project activities. To account for this a limiting operating period (LOP) will be implemented from the first fall frontal system depositing a ¼ inch or more of rain on or near October 15th through April 15th for mechanical treatment units within one mile of known occupied or know breeding habitat (see Design Criteria – Wildlife for affected Units). In order to reduce wildfire risk and promote riparian habitat beneficial to the CRLF the LOP, in conjunction with project design features, may be waived for fall prescribed burning if it can be determined: that no CRLF occupy nearby habitat (within one mile of burning activities), and no CRLFs have moved (dispersed) from a known occupied area determined by pre-implementation survey monitoring (for more info see Design Criteria – Wildlife).

Given these project design features, direct as well as indirect effects to CRLF or aquatic habitat are expected to be minimal. The greatest threat to CRLF would most likely be from an accidental spill of an herbicide especially glyphosate or triclopyr directly to water. The use of these herbicides is necessary to control scotchbroom, an encroaching monotypic noxious weed, in upland habitats that is competing with nonnative vegetation. Based on the hazard quotients listed in Table 9 for sensitive and tolerant fish species under this scenario CRLFs could be affected if water were to become contaminated with either herbicide. Under an accidental spill or worst case scenario for glyphosate, sensitive fish had a hazard quotient (HQ) rating of 4.0, and triclopyr (HQ: 48 for tolerant fish) suggesting that effects to CRLF would be likely. Since this scenario is not part of planned project activities and minimized through the use of Best Management Practices (BMPs), and buffer zones (Table 6) effects to CRLF are not discussed in detail.
The likelihood of an accidental spill scenario during application is extremely low. In addition, glyphosate readily adheres to soil particles and is not likely to enter groundwater or be mobilized after precipitation events. Degradant chemicals of triclopyr (example TCP: 3,5,6 – trichloro – 2 – pyridinol) do not adhere to soil particles and may be able to persist or percolate through soil into ground water, but this has not been documented in the risk assessments. Since mixing as well as application of triclopyr will not be occurring adjacent to any suitable CRLF habitat, risks to CRLF would be low under proper application. However, to account for any potential effects from herbicides applied in upland environments when frogs have the potential to come in contact with them herbicides would be restricted during the LOP and only hand removal methods would be utilized.

Table 12. Potential Treatments effects to California red-legged frog (CRLF) for Alternative 1 of the Tobacco Gulch Ecological Restoration Project.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Direct Effects</th>
<th>Indirect Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timber Harvest – commercial thinning and hazard tree removal</td>
<td>Crushing of individual CRLFs from harvest equipment, tractor piling, and falling timber.</td>
<td>• Harassment from noise and ground vibration • Removal of downed woody debris for cover habitat. • Reduction in microclimate structure that may alter habitat suitability. • Changes in sedimentation rates to streams that may affect pool structure and forage base. • Increased peak flows from reduced water uptake by trees altering habitat availability/suitability. • Loss of canopy structure may lead to warming of, and earlier drying out of streams. • Loss of future large woody debris recruitment for cover in streams that would impound sediment, reduce stream velocities, and create pool habitat.</td>
</tr>
<tr>
<td>Road Construction, reconstruction, and maintenance. Road decommissioning and landing obliteration</td>
<td>Crushing or disturbance of individual CRLFs from road equipment on roads where frogs might be under cover materials, especially on overgrown roads.</td>
<td>• Accelerated erosion from concentrated or diverted flow leading to increased sediment rates to streams that may degrade habitat, fill in pools and reduce macroinvertebrate forage base. Roads within RCAs • Brush clearing resulting in reduced cover habitat. • Vehicle lubricants and fluids entering waterways contaminating water. • Increased public access to riparian areas by OHVs that may degrade habitat quality, and dispersed recreation/camping that may result in removal of CRLF from streams as pets.</td>
</tr>
<tr>
<td>Fuels Treatment - non-commercial</td>
<td>Mortality or wounding CRLF from tractor piling</td>
<td>• Harassment from noise and ground vibration</td>
</tr>
<tr>
<td>Activity</td>
<td>Threats and Impacts</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>---------------------</td>
<td></td>
</tr>
</tbody>
</table>
| Thinning, machine piling and mastication | - Removal of downed woody debris for cover habitat.  
- Reduction in microclimate structure that may alter habitat suitability.  
- Changes in sedimentation rates to streams that may affect pool structure and forage base.  
- Increased peak flows from reduced water uptake by trees altering habitat availability/suitability.  
- Loss of canopy structure may lead to warming of, and earlier drying out of streams.  
- Loss of future large woody debris recruitment for cover in streams that would impound sediment, reduce stream velocities, and create pool habitat |
| Prescribed fire – pile burning, understory burning, dozer and hand fire lines | - Harassment from noise and ground vibration  
- Changes in sedimentation rates to streams that may affect pool structure and forage base.  
- Reduction in habitat quality due to water chemistry changes from ignition fuels, accidental fuel spill, and ash input into streams.  
- High – intensity areas of fire (e.g., spotting) in riparian areas resulting in decreased habitat |
| After burning: | - Changes in infiltration and water surface runoff rates that may affect habitat suitability.  
- Changes in water yield leading to changes in water permanence.  
- Changes in sedimentation rates to streams.  
- Water quality changes as a result of residual ignition fuels during or after runoff events.  
- Water chemistry changes as a result of ash input into streams during or after runoff events. |
| Herbicide Use | - Mortality and decreased growth as a result of exposure, contact, or ingestion of contaminated forage and prey (macrophytes and insects).  
- Decreased growth due to reduction in aquatic forage base (macrophytes, algae [for tadpoles], and insects for terrestrial frogs) as a result of water contamination. |
| Herbicide Use | - Mortality from direct application to individual CRLF, or direct contact with sprayed area.  
- Mortality to CRLF from |
misapplication or accidental spill in water.

1 Risk of direct and indirect effects to aquatic species is dependent upon: chemical type, amount of chemical, location of application, adjuvants, colorants, timing, spray drift, spill, leaching into groundwater, or contaminating surface water.

**Cumulative Effects to CRLF for Alternative 1**

A cumulative effect represents the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions.” (40 CFR 1508.7). The cumulative effects analysis presented here for CRLF does not attempt to quantify the effects of past management or human actions by adding up all prior actions on an action-by-action basis. Current conditions within the Tobacco Gulch ERP area have been impacted by innumerable actions over the last century (and beyond) resulting in a very dynamic landscape. In addition, assessing cumulative effects in fire excluded or otherwise altered forests is extremely difficult. Trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. By looking at current conditions, we are sure to capture all the residual effects of past human actions as well as natural events, regardless of which particular action or event contributed to those effects. For these reasons, the analysis of past actions in this document is based on current environmental conditions. Assessing how, as a result of implementing, or not implementing the Tobacco Gulch ERP will contribute to cumulative effects on CRLF or its habitat using the current existing conditions (and not a historic reference condition) as a baseline is the goal of this analysis.

Past disturbances: management activities that have the most impact on streams and watersheds within the Tobacco Gulch ERP area include gold mining, off-highway vehicle recreation, multiple logging events, increased road density, and grazing. All of which have increased sediment delivery to streams and negatively altered aquatic habitat and hydrologic conditions, which in turn, determines the presence and/or absence of aquatic dependent species within, adjacent to, and downstream of the proposed project. During the last decade, protective measures for streamside zones in timber harvest areas have become more restrictive. Although timber harvest on private lands had buffers next to streams, the intensity and size of past timber harvest activities has resulted in fragmentation of habitat for many species making National Forest System lands increasingly important for sustaining habitat for aquatic and riparian-dependent species.

Additionally, cumulative effects to riparian systems due to anthropogenic disturbance resulting from recreational activities near or in streams in the past is believed to have adversely affect threatened, endangered, and sensitive aquatic species through removal of riparian vegetation and/or the accumulation of sediment. In both the short and long term, amphibian and aquatic-dependent reptile populations could be adversely affected by past collection of individuals or by anthropogenic habitat disturbances such as off-highway vehicle use in and adjacent to streams.

These aforementioned changes in habitat along with the introduction of non-native species into the Sierra Nevada, has adversely affected many native aquatic species. Jennings (1996) notes that several Sierra Nevada amphibian species have shown dramatic declines in abundance, distribution, and diversity due to the introduction of aquatic predators such as trout and bullfrogs.

Present disturbances within the project area include human-related activities such as, dispersed recreation, fuels reduction, prescribed burning, unauthorized road use, off-highway vehicle use, and recreational gold mining. Natural processes include erosion, stream aggradation as well degradation mainly as a result of short-duration episodic climatic events (examples, heavy rains or rain-on-snow events).
Reasonably foreseeable future disturbances include human activities such as timber harvest, fuels reduction, road re-construction, road maintenance, road decommissioning, off-highway vehicle use, recreational mining will continue to take place within the Tobacco Gulch ERP area. The level of recreational use on all National Forest System lands is expected to continue and increase temporally as the human population continues to increase. Increases in dispersed camping along streams, and unmaintained roads as well as trails, particularly within the floodplain and adjacent riparian areas of streams, have the most potential to adversely affect aquatic and riparian habitats.

The California Department of Forestry website (CDF 2012) was checked for planned timber harvest plans on private lands in the watersheds where this project is located. The timber harvest plan listing dated 16 March 2012 indicated one timber harvest plans within the Bear Creek watershed area analyzed in this document. The Gear Creek Ranch (THP 4-12-001-ELD) within the vicinity of the Tobacco Gulch ERP proposed harvesting 347 acres with a combination of shelterwood and group selection harvest has been approved by the state of California. No other known Timber Harvest Plans (THPs) are under preparation (http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_thpstatus.php last visited 3/16/2012).

Any timber activities being planned in the future by the USDA Forest Service will follow the standards and guidelines established under the Sierra Nevada Forest Plan Amendment (USDA Forest Service 2004a). Under these standards and guidelines, the effects of future sales in the project area are expected to maintain and restore the species composition and structural diversity of plant and animal communities in riparian areas.

**Effects of Alternative 1 to CRLF Discussion:**

Recovery of the watersheds within the Tobacco Gulch ERP will largely depend on the gradual reduction of sediment into streams and may take decades under the current existing conditions. These long-term and larger scale factors often addressed in cumulative watershed effects analyses highlight the value of addressing activities beyond the scope of the Tobacco Gulch ERP.

In the Sierra Nevada, the effects of human-related activity including historic: mining, logging, road building, grazing, recreation along with other factors including: new emergent diseases, pesticide use, habitat degradation, climate change, and introduced non-native species, as well as the synergistic interactions among these factors, have all been suggested as causes for the decline of amphibians and reptiles. Understanding the extent to which these factors may have affected CRLF in the watersheds associated with the Tobacco Gulch ERP area is beyond the scope of this analysis; so too is an analysis determining the extent to which these factors will continue to effect local CRLF populations. However, the connected actions of the Tobacco Gulch ERP with these other factors in determining whether a trend from current baseline conditions will occur is the goal of this analysis.

Direct and indirect actions with the potential to impact CRLF have been identified and disclosed. The degree in which these actions will affect individual frogs largely depends on the timing and duration of events, resulting impacts and the time it takes to recover to a pre-condition. For the Tobacco Gulch ERP this trend is only expected to last 1-2 years post-treatment.

**Conclusions:** When considered with past, present, and reasonably foreseeable future activities, any cumulative impacts to CRLF or its preferred habitat as a result of implementing Alternative 1 of the Tobacco Gulch ERP are expected to be ‘low’ for the following reasons:

- Exclusion of mechanical equipment activities within 300 feet of perennial streams and 150 feet of intermittent streams.
- Limited Operating Period for equipment and herbicide application in units within one mile on known CRLF.
- Small percentage of project occurring within each identified watershed resulting in low cumulative watershed effects (with the exception of Bear Creek).
- Short (1-2 yr) duration of project activities.
- Established stream buffer exclusion zones.
- Overall reduction in wildfire risk.
- Restoration of riparian habitat through prescribed fire.

Overall, the actions of Alternative 1 will likely benefit CRLF from a reduction in wildfire risk and restoration of riparian habitat mostly through prescribed fire. Since response of amphibians depends on the type and magnitude of disturbance, the amount and configuration of remaining habitat, as well as their life-history characteristics project activities may still impact this species even when the outcome is positive. Given the status of CRLF in each watershed (public as well as private) is not fully known, the presence of CRLF within the project boundary, the Bear Creek watershed being over threshold for cumulative watershed effects, and the unpredictable outcome of prescribed fire a “may affect but is not likely to adversely affect the California red-legged frog.” determination was reached.

**Determination of Effects**

*It is my determination that Alternative 1 of the Tobacco Gulch Ecological Restoration Project may affect but is not likely to adversely affect the California red-legged frog.*

*It is my determination that Alternative 1 of the Tobacco Gulch Ecological Restoration Project will not affect critical habitat designated for the California red-legged frog.*
**Direct, Indirect and Cumulative Effects to CRLF for Alternative – 2 (No Action)**

Under the No Action Alternative, none of the proposed silvicultural treatments, road construction/reconstruction, noxious weed herbicide treatments, fuels reduction treatments, or prescribed burning would be implemented. Other management projects activities from prior decisions would still occur including road maintenance, trail maintenance, fire suppression.

Under the No Action alternative, fuels would not be reduced, but would continue to accumulate. The risk for high intensity wildfire would remain or increase, with the possibility of stand replacement mortality for much of the project area. The effects to amphibians post-wildfire are still poorly understood, but it is likely that a reduction in both forest ground cover as well as canopy cover would lead to reduced habitat suitability. No action could lead to a greater risk of erosional effects to aquatic features during periods of increased run-off and snowmelt in the years following a high severity wildfire than Alternative 1, Alternative 3, Alternative 4, and Alternative 5.

The hydrologic response to a high severity wildfire is increased erosion rates increase by two or more magnitudes for several years and returns to near pre-wildfire levels within four or five years. However, the effects to aquatic features and beneficial uses of water both within and downstream of a high severity wildfire are difficult to predict and depend on many factors. The single most important factor is often the size of the rainfall event that occurs during the first several years after the wildfire when the ground is most vulnerable to accelerated runoff and erosion.

Tree mortality (snags) in riparian zones as a result of wildfire may contribute to large woody debris (LWD) recruitment that is lacking in most drainages and remain elevated for the next 10 – 15 years post-wildfire (Gresswell 1999). However, high-severity wildfire is capable of consuming and subsequently removing in-channel LWD (Minshall and others 1997). The removal of LWD from channels post high-severity wildfire often leads to erosion, increased sediment yields and recovery time (Debano and others 1996).

**Effects of Alternative 2 to CRLF Discussion:**

There would be no direct, indirect or cumulative effects to CRLF or its habitat as the result of project activities not being implemented under Alternative 2. Potential effects to CRLF from wildfire under Alternative 2 could be expected since CRLF are present within the project area. Post-wildfire effects could be expected to last 1-15 years depending on burn severity and precipitation events. Wildfire impacting riparian canopy cover as well as coarse woody debris in riparian and upland habitats could render habitat unsuitable further fragmenting CRLF populations and hinder recolonization efforts.

**Conclusions:** When considered with past, present and reasonably foreseeable future activities, any cumulative impacts to CRLF or its preferred habitat by selecting Alternative 2 of the Tobacco Gulch ERP are expected to be unchanged with the exception of wildfire for the following reasons:

- Lack of any timber harvest, mastication, road related activities, herbicide treatments, as well as fuels reduction and prescribed burning treatments occurring.
- Remaining potential for wildfire and post-wildfire effects in an untreated landscape, especially high-intensity wildfire risk.

Overall, the lack of actions under Alternative 2 would likely not affect CRLF, however, since there would be no reduction in wildfire risk in an untreated landscape post-wildfire effects could be expected that may have lasting consequences if habitat is rendered unsuitable from high-severity wildfire. Since response of amphibians depends on the type and magnitude of disturbance, the amount and configuration of remaining habitat, as well as their life-history characteristics wildfire may impact this species from lack of pre-treatment. Given the status of CRLF in each watershed (public as well as private) is not fully known, the presence of CRLF within the Tobacco Gulch Ecological Restoration Project - BE
project boundary, the Bear Creek watershed being over threshold for cumulative watershed effects, and the unpredictable outcome of wildfire fire a “may affect but is not likely to adversely affect the California red-legged frog.” determination was reached.

Determination of Effects

It is my determination that Alternative 2 of the Tobacco Gulch Ecological Restoration Project may affect but is not likely to adversely affect the California red-legged frog.

It is my determination that Alternative 2 Tobacco Gulch Ecological Restoration Project will not affect critical habitat designated for the California red-legged frog.

Direct, Indirect and Cumulative Effects to CRLF for Alternative – 3 (Non - Commercial)
The Non-Commercial Alternative proposes to remove only those trees located in the commercial thinning units of the Proposed Action that are needed to meet fire behavior on the landscape. In most stands proposed for commercial treatment, it has been determined that removal of intermediate and overtopped trees up to 12 inches in dbh, followed by tractor piling or mastication, and follow-up prescribed burning would achieve the minimum fuels objectives defined in the 2004 SNFPA. Direct, indirect and cumulative effects to CRLF for Alternative 3 are similar to Alternative 1. The difference in alternatives is the removal of trees with a maximum diameter limit of 12 inches. The effects to CRLFs from removing trees in this size class would be similar to the effects listed for Alternative 1 (Table 12) since ground-based equipment would still be excluded from perennial and intermittent buffer zones (300 ft/150 ft, respectively). Ephemeral channels, with narrower buffers than intermittent streams, often lack riparian vegetation as well as habitat structure required for CRLF would also not result in any adverse effects. Increased future coarse woody debris on the ground in, or adjacent to, RCAs may disrupt surface water runoff and impound sediment resulting in less sediment delivery to streams and increased coarse woody debris would likely promote cover habitat for CRLFs in streamside riparian zones. Canopy cover in, and adjacent to, riparian conservation areas (RCAs) would not likely experience a reduction in stream shading or an increase in solar radiation since 12 inch diameter trees do not usually contribute to canopy structure, thus any effects (e.g., temperature increase) from a reduction in canopy should not be observable in streams.

Effects of Alternative 3 to CRLF Discussion:
Under Alternative 3 CRLF would experience similar direct, indirect and cumulative effects as Alternative 1 where ground-based equipment would still be excluded from perennial and intermittent buffer zones (300 ft/150 ft, respectively). Retention of large trees over 12 inches DBH adjacent to RCAs may provide an overall benefit to CRLF by promoting coarse woody debris resulting in increased habitat complexity (example pools formation), and facilitate future large woody debris recruitment in streams. All other activities listed under Alternative 1 would still occur, making Alternative 3 less likely to impact CRLF or its habitat than Alternative 1.

Conclusions: When considered with past, present, and reasonably foreseeable future activities, any cumulative impacts to CRLF or its preferred habitat as a result of implementing Alternative 3 of the Tobacco Gulch ERP are expected to be ‘low’ for the following reasons:
• Retention of large trees would likely promote and facilitate future CRLF habitat.

Overall, the effects of implementing Alternative 3 over Alternative 1 would have less impacts and would likely benefit CRLF from a reduction in wildfire risk and restoration of riparian habitat through prescribed fire. Since response of amphibians depends on the type and magnitude of disturbance, the amount and configuration of
remaining habitat, as well as their life-history characteristics project activities may still impact this species even when the outcome is positive. Given the status of CRLF in each watershed (public as well as private) is not fully known, the presence of CRLF within the project boundary, the Bear Creek watershed being over threshold for cumulative watershed effects, and the unpredictable outcome of prescribed fire a “may affect but is not likely to adversely affect the California red-legged frog.” determination was reached.

**Determination of Effects**

*It is my determination that Alternative 3 of the Tobacco Gulch Ecological Restoration Project may affect but is not likely to adversely affect the California red-legged frog.*

*It is my determination that Alternative 3 Tobacco Gulch Ecological Restoration Project will not affect critical habitat designated for the California red-legged frog.*

**Direct, Indirect, and Cumulative Effects to CRLF for Alternative – 4 (Limited Herbicide)**

Direct, indirect, and cumulative effects to CRLF for Alternative 4 are similar to Alternative 1. The difference in alternatives is the limited use of herbicides, specifically the elimination of Glyphosate (Rodeo or equivalent). Herbicide application would be limited to Imazapyr (Arsenal) and Chlopyralid (Transline) to treat scotch broom, rush skeletonweed, and yellow starthistle. Since the hazard quotients (HQ) for Imazapyr (HQ = 0.8) and Chlopyralid (HQ = 0.0004) listed in Table 9 do not indicate an elevated risk from a worst case scenario accidental spill for sensitive species of fish, while the inclusion of Glyphosate (HQ = 4.0) for sensitive fish, and Triclopyr (HQ = 48) for tolerant fish do indicate potential, direct, indirect and cumulative effects to CRLF, a reduction in potentially hazardous herbicides as a result of limited use for Alternative 4 would likely result in less potential herbicide effects to CRLF.

**Effects of Alternative 4 to CRLF Discussion:**

Under Alternative 4 CRLF would experience similar direct, indirect and cumulative effects as listed under Alternative 1. However, under Alternative 4 there would be no application of glyphosate or triclopyr, two herbicides with hazard quotients above one for fish. Any potential effects to CRLF from the use of these herbicides under Alternatives 1, 3, & 5 would be greatly reduced under Alternative 4.

Conclusions: When considered with past, present, and reasonably foreseeable future activities, any cumulative impacts to CRLF or its preferred habitat as a result of implementing Alternative 1 of the Tobacco Gulch ERP are expected to be ‘low’ for the following reason:

- Elimination of glyphosate and triclopyr from use.

Overall, the actions of Alternative 4 will likely benefit CRLF from a reduction in wildfire risk and restoration of riparian habitat through prescribed fire. Since response of amphibians depends on the type and magnitude of disturbance, the amount and configuration of remaining habitat, as well as their life-history characteristics project activities may still impact this species even when the outcome is positive. Given the status of CRLF in each watershed (public as well as private) is not fully known, the presence of CRLF within the project boundary, the Bear Creek watershed being over threshold for cumulative watershed effects, and the unpredictable outcome of prescribed fire a “may affect but is not likely to adversely affect the California red-legged frog.” determination was reached.
Determination of Effects

*It is my determination that Alternative 4 of the Tobacco Gulch Ecological Restoration Project may affect but is not likely to adversely affect the California red-legged frog.*

*It is my determination that Alternative 4 Tobacco Gulch Ecological Restoration Project will not affect critical habitat designated for the California red-legged frog.*

**Direct, Indirect, and Cumulative Effects to CRLF for Alternative – 5 (16 inch DBH Limit and Snag Recruitment)** Alternative 5 proposes to retain trees over 16 inches that would have otherwise been removed. In addition, trees over 16” would be girdled or killed in some way in order to actively recruit more large snags, or such trees would be felled to provide large downed log structure. Direct, indirect and cumulative effects to CRLF for Alternative 5 are similar to Alternative 1. The difference in alternatives is that trees greater than 16 inches that would have been removed under Alternative 1 would be left onsite and intentionally dispatched to promote snag development or felled to create coarse woody debris on the ground to enhance wildlife habitat. The effects to CRLF’s from removing trees up to this size class would be similar to the effects listed for Alternative 1 (Table 12). However, canopy cover in, and adjacent to, perennial and intermittent RCAs would not likely experience a reduction in stream shading, an increase in solar radiation input, or a reduction in stream nutrient input from needle cast since ground-based equipment would still be excluded from these buffer zones (300 ft/150 ft, respectively). Ephemeral channels, with narrower buffers than intermittent streams, often lack riparian vegetation as well as habitat structure required for CRLF would also not result in any adverse effects. Increased coarse woody debris on the ground in, or adjacent to, RCAs may disrupt surface water runoff and impound sediment resulting in less sediment delivery to streams. Increased coarse woody debris would likely promote cover habitat for CRLF’s in streamside riparian zones. Future recruitment of large woody debris (snags) to streams from large (16 inch and greater) trees retained by dispatching or felling in RCAs would also likely increase stream habitat under this alternative by promoting pool habitat for CRLF where trees cross streams.

**Effects of Alternative 5 to CRLF Discussion:**
Under Alternative 5 CRLF would experience similar direct, indirect and cumulative effects as Alternative 1. However, snag retention, promotion is likely to provide an overall benefit to CRLF by promoting coarse woody debris in the vicinity of RCAs and create habitat via future large woody debris recruitment in streams that will result in an increase in habitat complexity (e.g., pool formation). All other activities listed under Alternative 1 would still occur, still Alternative 5 is less likely to impact CRLF or its habitat than Alternative 1.

**Conclusions:** When considered with past, present, and reasonably foreseeable future activities, any cumulative impacts to CRLF or its preferred habitat as a result of implementing Alternative 5 of the Tobacco Gulch ERP are expected to be ‘low’ for the following reasons:
- Intentional dispatching of trees to promote snag retention and thus facilitate future CRLF habitat.

Overall, the actions of Alternative 5 will likely benefit CRLF from a reduction in wildfire risk and restoration of riparian habitat through prescribed fire. Since response of amphibians depends on the type and magnitude of disturbance, the amount and configuration of remaining habitat, as well as their life-history characteristics project activities may still impact this species even when the outcome is positive. Given the status of CRLF in
each watershed (public as well as private) is not fully known, the presence of CRLF within the project boundary, the Bear Creek watershed being over threshold for cumulative watershed effects, and the unpredictable outcome of prescribed fire a “may affect but is not likely to adversely affect the California red-legged frog.” determination was reached.

**Determination of Effects**

*It is my determination that Alternative 5 of the Tobacco Gulch Ecological Restoration Project may affect but is not likely to adversely affect the California red-legged frog.*

*It is my determination that Alternative 5 Tobacco Gulch Ecological Restoration Project will not affect critical habitat designated for the California red-legged frog.*

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**Foothill yellow-legged frog**

*Rana boylii*

**Species Account**

**Distribution, Abundance, and Habitat**

Found in or adjacent to rocky streams in a diversity of habitats such as valley-foothill hardwood, valley-foothill hardwood-conifer, valley-foothill riparian, ponderosa pine, mixed conifer, coastal scrub, mixed chaparral, and various wetland types. In California, west of the Cascades and distributed the length of the western flank of the Sierra Nevada Mountains to Kern Co. The documented elevation range is from sea level to 1,940m (6,370 ft) in the Sierra Nevada (Jennings and Hayes 1994). However, of the 220 foothill yellow-legged frog detections\(^1\) on or adjacent to the Eldorado National Forest, a single detection was above 1,525 m (5,000 ft), and was unconfirmed whether it was actually a Sierra Nevada yellow-legged frog or foothill yellow-legged frog. The mean elevation for these detections was approximately 787 m (2,583 ft). Given this information, the max upper elevation extent for foothill yellow-legged frog on the Eldorado National Forest is believed to be closer to 4,500 feet.

**Species and Habitat Account**

The species accounts for foothill yellow-legged frog (FYLF) can be obtained from the Eldorado National Forest (ENF) Supervisor’s Office in Placerville, California.

**Existing Surveys and Sightings**

FYLF were not detected within the project area boundary during project level surveys or during past surveys in the area, and there are there are no known occurrences of FYLF within the project area, but suitable habitat does exist throughout the entire project area. The nearest known sighting of FYLF to the Tobacco Gulch Ecological Restoration Project was at the confluence of Rock Creek and the South Fork American River (approximately

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\(^1\) Detections may include more than one individual and/or more than one life stage.
2.75 air miles south of the project boundary) in 2003 where several frogs and tadpoles were seen.

**Direct and Indirect Effects to FYLF for Alternative 1**

Although FYLFs have not been detected within the project area boundary, suitable habitat does exist, and FYLFs have been detected in the South Fork American River at the confluence of Rock Creek, which is approximately 2.75 miles south of project treatment units. FYLFs have the potential to be affected by project activities for Alternative 1 listed in Table 13. Effects from timber harvest, road related activities, fuels reduction, prescribed burning, herbicide/fungicide application, and road stream crossing improvements are all possible under Alternative 1. Since FYLFs are highly associated with water within stream channels in conjunction with project design features, any direct or indirect effects to FYLF or aquatic habitat are expected to be minimal for the following reasons. Mechanical ground-based equipment activity will not be occurring within 300 feet of perennial and special aquatic features; and not within 150 feet of intermittent features. In additions, such equipment will be limited to operating near ephemeral channels as follows: 25 foot buffer on slopes less and 35 percent, 50 foot buffer on slopes 35-70 percent, and 75 foot buffer on slopes greater than 70 percent slope. Fire ignition distances during prescribed burning activity will also be limited (see Tables 3 & 4) within Riparian Conservation Areas (RCAs), however fire will be allowed to back burn into RCAs to meet fuels and habitat restoration objectives.

The greatest threat to FYLF would most likely be from an accidental spill of Glyphosate or Triclopyr directly to water. Based on the hazard quotients listed in Table 9 for sensitive and tolerant fish species under this scenario FYLF populations could be affected if water were to become contaminated. Under an accidental spill or worst case scenario for Glyphosate, sensitive fish had a hazard quotient rating of 4.0, while Triclopyr had a hazard quotient rating of 48 for tolerant fish suggesting that effects to FYLF would be likely. Since this scenario is not part of planned project activities and is minimized through the use of Best Management Practices (BMPs), effects to FYLF under this situation are not discussed in detail. Glyphosate readily adheres to soil particles so it is not likely to enter groundwater or be mobilized after precipitation events, therefore the risks to FYLF would be low under proper application. However, the chemical degradants of Triclopyr (e.g., TCP: 3,5,6 – trichloro – 2 – pyridinol), which are known to be toxic to fish and amphibians have the ability to persist in soil and potentially percolate through soil into ground water. Though this has not been documented in the risk assessments, there is still some cause for concern regarding the use of this chemical. Since mixing as well as application of Triclopyr will not be occurring adjacent to any known FYLF occupied habitat or within any perennial or intermittent RCA (300/150 feet, respectively), minimal effects to FYLF are expected under Alternative 1 when proper application is followed.

<table>
<thead>
<tr>
<th>Table 13. Potential Treatments effects to FYLF, if present and undetected.</th>
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<tr>
<td><strong>Treatment Effect</strong></td>
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<td>Timber Harvest – commercial thinning and hazard tree removal</td>
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<td>Activities</td>
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| Road Construction, reconstruction, and maintenance. Road decommissioning and landing obliteration | - Increased peak flows from reduced water uptake by trees altering habitat availability/suitability.  
- Loss of canopy structure may lead to warming of, and earlier drying out of streams.  
- Loss of future large woody debris for cover and in streams that impounds sediment, reduces stream velocity, and creates pool habitat. |
| Crushing or disturbance of individual FYLFs from road equipment on roads where frogs might be under cover materials, especially on overgrown roads. | - Accelerated erosion from concentrated or diverted flow leading to increased sediment rates to streams that may degrade habitat, fill in pools and reduce forage base. |
| Roads within RCAs                  | - Brush clearing resulting in reduced sheltering habitat.               |
|                                    | - Vehicle lubricants and fluids entering waterways contaminating water  |
|                                    | - Increased public access to riparian areas by OHVs that may degrade habitat quality, and dispersed recreation/camping that may result in removal of FYLF from streams as pets. |
| Fuels Treatment - non-commercial thinning, machine piling and mastication | - Changes in infiltration and water surface runoff rates that may affect habitat suitability from removal of coarse woody debris.  
- Changes in water yield leading to changes in water permanence.  
- Changes in sedimentation rates to streams as a result of ground disturbance that may alter pool depths.  
- Water chemistry changes as a result of ignition fuels and ash input into streams that may affect water quality. |
| Mortality or wounding FYLF from tractor piling occupied downed wood. Harassment by noise and ground vibration from fuel treatment equipment (e.g., mastication). | - Harassment from noise and ground vibration |
| Prescribed fire – pile burning, understory burning, dozer and |
| Herbicide Use<sup>1</sup> | Mortality from direct application to an individual FYLF or water containing individuals. Mortality to FYLF from misapplication or accidental spill in water. | - Changes in sedimentation rates to streams that may affect pool structure and forage base.  
- Reduction in habitat quality due to water chemistry changes from ignition fuels, accidental fuel spill, and ash input into streams.  
- High – intensity areas of fire (e.g., spotting) in riparian areas resulting in decreased habitat quality.  
After burning:  
- Changes in infiltration and water surface runoff rates that may affect habitat suitability.  
- Changes in water yield leading to changes in water permanence.  
- Changes in sedimentation rates to streams.  
- Water quality changes as a result of residual ignition fuels during or after runoff events.  
- Water chemistry changes as a result of ash input into streams during or after runoff event altering suitability.  
- Mortality and decreased growth as a result of exposure, ingestion of contaminated forage and prey (macrophytes and insects).  
- Decreased growth due to reduction in the amount of forage base (macrophytes, algae [for tadpoles], and insects) from application. |

<sup>1</sup>Risk of direct and indirect effects to aquatic species is dependent upon: chemical type, amount of chemical, location of application, adjuvants, colorants, timing, spray drift, spill and leaching into groundwater.

### Cumulative Effects to FYLF for Alternative 1
A cumulative effect represents the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions.” (40 CFR 1508.7). The cumulative effects analysis presented here for FYLF does not attempt to quantify the effects of past management or human actions by adding up all prior actions on an action-by-action basis. Current conditions within the Tobacco Gulch ERP area have been impacted by innumerable actions over the last century (and beyond) resulting in a very dynamic landscape. In addition, assessing cumulative effects in fire excluded or otherwise altered forests is extremely
difficult. Trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. By looking at current conditions, we are sure to capture all the residual effects of past human actions as well as natural events, regardless of which particular action or event contributed to those effects. For these reasons, the analysis of past actions in this document is based on current environmental conditions. Assessing how, as a result of implementing, or not implementing the Tobacco Gulch ERP will contribute to cumulative effects on FYLF or its habitat using the current existing conditions (and not a historic reference condition) as a baseline is the goal of this analysis.

Past disturbances: management activities that have the most impact on streams and watersheds within the Tobacco Gulch ERP area include gold mining, off-highway vehicle recreation, multiple logging events, increased road density, and grazing. All of which have increased sediment delivery to streams and negatively altered aquatic habitat and hydrologic conditions, which in turn, determines the presence and/or absence of aquatic dependent species within, adjacent to, and downstream of the proposed project. During the last decade, protective measures for streamside zones in timber harvest areas have become more restrictive. Although timber harvest on private lands had buffers next to streams, the intensity and size of past timber harvest activities has resulted in fragmentation of habitat for many species making National Forest System lands increasingly important for sustaining habitat for aquatic and riparian-dependent species.

Additionally, cumulative effects to riparian systems due to anthropogenic disturbance resulting from recreational activities near or in streams in the past is believed to have adversely affect threatened, endangered, and sensitive aquatic species through removal of riparian vegetation and/or the accumulation of sediment. In both the short and long term, amphibian and aquatic-dependent reptile populations could be adversely affected by past collection of individuals or by anthropogenic habitat disturbances such as off-highway vehicle use in and adjacent to streams.

These aforementioned changes in habitat along with the introduction of non-native species into the Sierra Nevada, has adversely affected many native aquatic species. Jennings (1996) notes that several Sierra Nevada amphibian species have shown dramatic declines in abundance, distribution, and diversity due to the introduction of aquatic predators such as trout and bullfrogs.

Present disturbances within the project area include human-related activities such as, dispersed recreation, fuels reduction, prescribed burning, unauthorized road use, off-highway vehicle use, and recreational gold mining. Natural processes include erosion, stream aggradation as well degradation mainly as a result of short-duration episodic climatic events (examples, heavy rains or rain-on-snow events).

Reasonably foreseeable future disturbances include human activities such as timber harvest, fuels reduction, road re-construction, road maintenance, road decommissioning, off-highway vehicle use, recreational mining will continue to take place within the Tobacco Gulch ERP area. The level of recreational use on all National Forest System lands is expected to continue and increase temporally as the human population continues to increase. Increases in dispersed camping along streams, and unmaintained roads as well as trails, particularly within the floodplain and adjacent riparian areas of streams, have the most potential to adversely affect aquatic and riparian habitats.

The California Department of Forestry website (CDF 2012) was checked for planned timber harvest plans on private lands in the watersheds where this project is located. The timber harvest plan listing dated 16 March 2012 indicated one timber harvest plans within the Bear Creek watershed area analyzed in this document. The Gear Creek Ranch (THP 4-12-001-ELD) within the vicinity of the Tobacco Gulch ERP proposed harvesting 347 acres with a combination of shelterwood and group selection harvest has been approved by the state of
California. No other known Timber Harvest Plans (THPs) are under preparation (http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_thpstatus.php last visited 3/16/2012).

Any timber activities being planned in the future by the USDA Forest Service will follow the standards and guidelines established under the Sierra Nevada Forest Plan Amendment (USDA Forest Service 2004a). Under these standards and guidelines, the effects of future sales in the project area are expected to maintain and restore the species composition and structural diversity of plant and animal communities in riparian areas.

**Effects of Alternative 1 to FYLF Discussion:**

Recovery of the watersheds within the Tobacco Gulch ERP will largely depend on the gradual reduction of sediment into streams and may take decades under the current existing conditions. These long-term and larger scale factors often addressed in cumulative watershed effects analyses highlight the value of addressing activities beyond the scope of the Tobacco Gulch ERP.

In the Sierra Nevada, the effects of human-related activity including historic: mining, logging, road building, grazing, recreation along with other factors including: new emergent diseases, pesticide use, habitat degradation, climate change, and introduced non-native species, as well as the synergistic interactions among these factors, have all been suggested as causes for the decline of amphibians and reptiles. Understanding the extent to which these factors may have affected FYLF in the watersheds associated with the Tobacco Gulch ERP area is beyond the scope of this analysis; so too is an analysis determining the extent to which these factors will continue to effect local amphibian FYLF populations. However, the connected actions of the Tobacco Gulch ERP with these other factors in determining whether a trend from current baseline conditions will occur is the goal of this analysis.

Direct and indirect actions with the potential to impact FYLF have been identified and disclosed. The degree in which these actions will affect individual frogs largely depends on the timing and duration of events, resulting impacts and the time it takes to recover to a pre-condition. For the Tobacco Gulch ERP this trend is only expected to last 1-2 years post-treatment.

**Conclusions:** When considered with past, present, and reasonably foreseeable future activities, any cumulative impacts to FYLF or its preferred habitat as a result of implementing Alternative 1 of the Tobacco Gulch ERP are expected to be ‘low’ for the following reasons:

- FYLF has not been detected within project area boundary.
- Small percentage of project occurring within each identified watershed resulting in low cumulative watershed effects (with the exception of Bear Creek).
- Short (1-2 yr) duration of project activities.
- Established stream buffer exclusion zones.
- Overall reduction in wildfire risk.
- Restoration of riparian habitat through prescribed fire.

Overall, the actions of Alternative 1 will likely benefit FYLF from a reduction in wildfire risk and restoration of riparian habitat through prescribed fire. Since response of amphibians depends on the type and magnitude of disturbance, the amount and configuration of remaining habitat, as well as their life-history characteristics project activities may still impact this species even when the outcome is positive. Given the status of FYLF in each watershed (public as well as private) is not fully known, the presence of FYLF within 3 miles of the project boundary, the Bear Creek watershed being over threshold for cumulative watershed effects, and the unpredictable outcome of prescribed fire a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.” determination was reached.
Determination of Effects

It is my determination that Alternative 1 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.
Direct, Indirect and Cumulative Effects to FYLF for Alternative – 2 (No Action)
Under the No Action Alternative, none of the proposed silvicultural treatments, road construction/reconstruction, noxious weed herbicide treatments, fuels reduction treatments, or prescribed burning would be implemented. Other management projects activities from prior decisions would still occur including road maintenance, trail maintenance, fire suppression.

Under the No Action alternative, fuels would not be reduced, but would continue to accumulate. The risk for high intensity wildfire would remain or increase, with the possibility of stand replacement mortality for much of the project area. The effects to amphibians post-wildfire are still poorly understood, but it is likely that a reduction in both forest ground cover as well as canopy cover would lead to reduced habitat suitability. No action could lead to a greater risk of erosional effects to aquatic features during periods of increased run-off and snowmelt in the years following a high severity wildfire than Alternative 1, Alternative 3, Alternative 4, and Alternative 5.

The hydrologic response to a high severity wildfire is increased erosion rates increase by two or more magnitudes for several years and returns to near pre-wildfire levels within four or five years. However, the effects to aquatic features and beneficial uses of water both within and downstream of a high severity wildfire are difficult to predict and depend on many factors. The single most important factor is often the size of the rainfall event that occurs during the first several years after the wildfire when the ground is most vulnerable to accelerated runoff and erosion.

Tree mortality (snags) in riparian zones as a result of wildfire may contribute to large woody debris (LWD) recruitment that is lacking in most drainages and remain elevated for the next 10 – 15 years post-wildfire (Gresswell 1999). However, high-severity wildfire is capable of consuming and subsequently removing in-channel LWD (Minshall and others 1997). The removal of LWD from channels post high-severity wildfire often leads to erosion, increased sediment yields and recovery time (Debano and others 1996).

Effects of Alternative 2 to FYLF Discussion:
There would be no direct, indirect or cumulative effects to FYLF or its habitat as the result of project activities not being implemented under Alternative 2. Potential effects to FYLF from wildfire under Alternative 2 could be expected since the likelihood of FYLF presence within the project area is high, the amount of suitable habitat, and existing surveys documenting presence of FYLF within 3 miles of the Tobacco Gulch project area. Post-wildfire effects could be expected to last 1-15 years depending on burn severity and precipitation events. Wildfire impacting riparian canopy cover as well as coarse woody debris could render habitat unsuitable further fragmenting FYLF populations and hindering recolonization efforts.

Conclusions: When considered with past, present and reasonably foreseeable future activities, any cumulative impacts to FYLF or its preferred habitat by selecting Alternative 2 of the Tobacco Gulch ERP are expected to be unchanged with the exception of wildfire for the following reasons:

- Lack of any timber harvest, mastication, road related activities, herbicide treatments, as well as fuels reduction and prescribed burning treatments occurring.
- Remaining potential for wildfire and post-wildfire effects in an untreated landscape, especially high-intensity wildfire risk.

Overall, the lack of actions under Alternative 2 would likely not affect FYLF, however, since there would be no reduction in wildfire risk in an untreated landscape post-wildfire effects could be expected and may have lasting consequences if habitat is rendered unsuitable from high-severity fire. Since response of amphibians depends on the type and magnitude of disturbance, the amount and configuration of remaining habitat, as well as their life-history characteristics wildfire may impact this species from lack of pre-treatment. Given the status of FYLF in each watershed (public as well as private) is not fully known, the presence of FYLF within 3 miles of the Tobacco Gulch Ecological Restoration Project - BE
project boundary, the Bear Creek watershed being over threshold for cumulative watershed effects, and the unpredictable outcome of wildfire a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.” determination was reached.

**Determination of Effects**

*It is my determination that Alternative 2 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.*

**Direct, Indirect and Cumulative Effects to FYLF for Alternative – 3 (Non - Commercial)**

The Non-Commercial Alternative proposes to remove only those trees located in the commercial thinning units of the Proposed Action that are needed to meet to modify fire behavior on the landscape. In most stands proposed for commercial treatment, it has been determined that removal of intermediate and overtopped trees up to 12 inches in dbh, followed by tractor piling or mastication, and follow-up prescribed burning would achieve the minimum fuels objectives defined in the 2004 SNFPA. Direct, indirect and cumulative effects to FYLF for Alternative 3 are similar to Alternative 1. The difference in alternatives is the removal of trees with a maximum diameter limit of 12 inches. The effects to FYLFs from project related activities (Table 13) by removing trees in this size class would be similar to the effects listed for Alternative 1 since ground-based equipment would still be excluded from perennial and intermittent buffer zones (300 ft/150 ft, respectively). Ephemeral channels, with narrower buffers than intermittent streams, often lack riparian vegetation as well as habitat structure required for FYLF would also not result in any adverse effects. Increased future coarse woody debris on the ground in, or adjacent to, RCAs may disrupt surface water runoff and impound sediment resulting in less sediment delivery to streams and increased coarse woody debris would likely promote cover habitat for FYLFs in streamside riparian zones. Canopy cover in, and adjacent to, riparian conservation areas (RCAs) would not likely experience a reduction in stream shading or an increase in solar radiation since 12 inch diameter trees do not usually contribute to canopy structure, thus any effects (e.g., temperature increase) from a reduction in canopy should not be observable in streams.

**Effects of Alternative 3 to FYLF Discussion:**

Under Alternative 3 FYLF would experience similar direct, indirect and cumulative effects as Alternative 1 where ground-based equipment would still be excluded from perennial and intermittent buffer zones (300 ft/150 ft, respectively). Retention of large trees over 12 inches DBH adjacent to RCAs may provide an overall benefit to FYLF by promoting coarse woody debris resulting in increased habitat complexity (example pools formation), and facilitate future large woody debris recruitment in streams. All other activities listed under Alternative 1 would still occur, making Alternative 3 less likely to impact FYLF or its habitat than Alternative 1.

**Conclusions:** When considered with past, present, and reasonably foreseeable future activities, any cumulative impacts to FYLF or its preferred habitat as a result of implementing Alternative 3 of the Tobacco Gulch ERP are expected to be ‘low’ for the following reasons:

- Retention of large trees would likely promote and facilitate future FYLF habitat.

Overall, the effects of implementing Alternative 3 over Alternative 1 would have less impacts and would likely benefit FYLF from a reduction in wildfire risk and restoration of riparian habitat through prescribed fire. Since response of amphibians depends on the type and magnitude of disturbance, the amount and configuration of remaining habitat, as well as their life-history characteristics project activities may still impact this species even when the outcome is positive. Given the status of FYLF in each watershed (public as well as private) is not fully known, the presence of FYLF within 3 miles of the project boundary, the Bear Creek watershed being over
threshold for cumulative watershed effects, and the unpredictable outcome of prescribed fire a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.” determination was reached.

**Determination of Effects**

*It is my determination that Alternative 3 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.*

**Direct, Indirect and Cumulative Effects to FYLF for Alternative – 3 (Non - Commercial)**
The Non-Commercial Alternative proposes to remove only those trees located in the commercial thinning units of the Proposed Action that are needed to modify fire behavior on the landscape. In most stands proposed for commercial treatment, it has been determined that removal of intermediate and overtopped trees up to 12 inches in dbh, followed by tractor piling or mastication, and follow-up prescribed burning would achieve the minimum fuels objectives defined in the 2004 SNFPA. Direct, indirect and cumulative effects to FYLF for Alternative 3 are similar to Alternative 1. The difference in alternatives is the removal of trees with a maximum diameter limit of 12 inches. The effects to FYLFs from project related activities (Table 13) by removing trees in this size class would be similar to the effects listed for Alternative 1 since ground-based equipment would still be excluded from perennial and intermittent buffer zones (300 ft/150 ft, respectively). Ephemeral channels, with narrower buffers than intermittent streams, often lack riparian vegetation as well as habitat structure required for FYLF would also not result in any adverse effects. Increased future coarse woody debris on the ground in, or adjacent to, RCAs may disrupt surface water runoff and impound sediment resulting in less sediment delivery to streams and increased coarse woody debris would likely promote cover habitat for FYLFs in streamside riparian zones. Canopy cover in, and adjacent to, riparian conservation areas (RCAs) would not likely experience a reduction in stream shading or an increase in solar radiation since 12 inch diameter trees do not usually contribute to canopy structure, thus any effects (e.g., temperature increase) from a reduction in canopy should not be observable in streams.

**Effects of Alternative 3 to FYLF Discussion:**
Under Alternative 3 FYLF would experience similar direct, indirect and cumulative effects as Alternative 1 where ground-based equipment would still be excluded from perennial and intermittent buffer zones (300 ft/150 ft, respectively). Retention of large trees over 12 inches DBH adjacent to RCAs may provide an overall benefit to FYLF by promoting coarse woody debris resulting in increased habitat complexity (example pools formation), and facilitate future large woody debris recruitment in streams. All other activities listed under Alternative 1 would still occur, making Alternative 3 less likely to impact FYLF or its habitat than Alternative 1.

**Conclusions:** When considered with past, present, and reasonably foreseeable future activities, any cumulative impacts to FYLF or its preferred habitat as a result of implementing Alternative 3 of the Tobacco Gulch ERP are expected to be ‘low’ for the following reasons:
- Retention of large trees would likely promote and facilitate future FYLF habitat.

Overall, the effects of implementing Alternative 3 over Alternative 1 would have less impacts and would likely benefit FYLF from a reduction in wildfire risk and restoration of riparian habitat through prescribed fire. Since response of amphibians depends on the type and magnitude of disturbance, the amount and configuration of
remaining habitat, as well as their life-history characteristics project activities may still impact this species even when the outcome is positive. Given the status of FYLF in each watershed (public as well as private) is not fully known, the presence of FYLF within 3 miles of the project boundary, the Bear Creek watershed being over threshold for cumulative watershed effects, and the unpredictable outcome of prescribed fire a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.” determination was reached.

Determination of Effects

It is my determination that Alternative 3 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.

Direct, Indirect, and Cumulative Effects to FYLF for Alternative – 4 (Limited Herbicide)

Direct, indirect, and cumulative effects to FYLF for Alternative 4 are similar to Alternative 1. The difference in alternatives is the limited use of herbicides, specifically the elimination of Glyphosate (Rodeo or equivalent). Herbicide application would be limited to Imazapyr (Arsenal) and Chlopyralid (Transline) to treat scotch broom, rush skeletonweed, and yellow starthistle. Since the hazard quotients (HQ) for Imazapyr (HQ = 0.8) and Chlopyralid (HQ = 0.0004) listed in Table 9 do not indicate an elevated risk from a worst case scenario accidental spill for sensitive species of fish, while the inclusion of Glyphosate (HQ = 4.0) for sensitive fish, and Triclopyr (HQ = 48) for tolerant fish do indicate potential, direct, indirect and cumulative effects to FYLF, a reduction in potentially hazardous herbicides as a result of limited use for Alternative 4 would likely result in less potential herbicide effects to FYLF.

Effects of Alternative 4 to FYLF Discussion:

Under Alternative 4 FYLF would experience similar direct, indirect and cumulative effects as listed under Alternative 1. However, under Alternative 4 there would be no application of glyphosate or triclopyr, two herbicides with hazard quotients above one for fish. Any potential effects to FYLF from the use of these herbicides under Alternatives 1, 3, & 5 would be greatly reduced under Alternative 4.

Conclusions: When considered with past, present, and reasonably foreseeable future activities, any cumulative impacts to FYLF or its preferred habitat as a result of implementing Alternative 1 of the Tobacco Gulch ERP are expected to be ‘low’ for the following reasons:

- FYLF has not been detected within project area boundary.
- Elimination of glyphosate and triclopyr from use.

Overall, the actions of Alternative 4 will likely benefit FYLF from a reduction in wildfire risk and restoration of riparian habitat through prescribed fire. Since response of amphibians depends on the type and magnitude of disturbance, the amount and configuration of remaining habitat, as well as their life-history characteristics project activities may still impact this species even when the outcome is positive. Given the status of FYLF in each watershed (public as well as private) is not fully known, the presence of FYLF within 3 miles of the project boundary, the Bear Creek watershed being over threshold for cumulative watershed effects, and the unpredictable outcome of prescribed fire a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.” determination was reached.
Determination of Effects for FYLF

It is my determination that Alternative 4 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.

Direct, Indirect, and Cumulative Effects to FYLF for Alternative – 5 (16 inch DBH Limit and Snag Recruitment) Alternative 5 proposes to retain trees over 16 inches that would have otherwise been removed. In addition, trees over 16” would be girdled or killed in some way in order to actively recruit more large snags, or such trees would be felled to provide large downed log structure. Direct, indirect and cumulative effects to FYLF for Alternative 5 are similar to Alternative 1. The difference in alternatives is that trees greater than 16 inches that would have been removed under Alternative 1 would be left onsite and intentionally dispatched to promote snag development or felled to create coarse woody debris on the ground to enhance wildlife habitat. The effects to FYLFs from project related activities (Table 13) by removing trees up to this size class would be similar to the effects listed for Alternative 1. However, canopy cover in, and adjacent to, perennial and intermittent RCAs would not likely experience a reduction in stream shading, an increase in solar radiation input, or a reduction in stream nutrient input from needle cast since ground-based equipment would still be excluded from these buffer zones (300 ft/150 ft, respectively). Ephemeral channels, with narrower buffers than intermittent streams, often lack riparian vegetation as well as habitat structure required for FYLF would also not result in any adverse effects. Increased coarse woody debris on the ground in, or adjacent to, RCAs may disrupt surface water runoff and impound sediment resulting in less sediment delivery to streams. Increased coarse woody debris would likely promote cover habitat for FYLFs in streamside riparian zones. Future recruitment of large woody debris (snags) to streams from large (16 inch and greater) trees retained by dispatching or felling in RCAs would also likely increase stream habitat under this alternative by promoting pool habitat for FYLF where trees cross streams.

Effects of Alternative 5 to FYLF Discussion:
Under Alternative 5 FYLF would experience similar direct, indirect and cumulative effects as Alternative 1. However, snag retention, promotion is likely to provide an overall benefit to FYLF by promoting coarse woody debris in the vicinity of RCAs and create habitat via future large woody debris recruitment in streams that will result in an increase in habitat complexity (e.g., pool formation). All other activities listed under Alternative 1 would still occur, still Alternative 5 is less likely to impact FYLF or its habitat than Alternative 1.

Conclusions: When considered with past, present, and reasonably foreseeable future activities, any cumulative impacts to FYLF or its preferred habitat as a result of implementing Alternative 5 of the Tobacco Gulch ERP are expected to be ‘low’ for the following reasons:
- Intentional dispatching of trees to promote snag retention and thus facilitate future FYLF habitat.

Overall, the actions of Alternative 5 will likely benefit FYLF from a reduction in wildfire risk and restoration of riparian habitat through prescribed fire. Since response of amphibians depends on the type and magnitude of disturbance, the amount and configuration of remaining habitat, as well as their life-history characteristics project activities may still impact this species even when the outcome is positive. Given the status of FYLF in each watershed (public as well as private) is not fully known, the presence of FYLF within 3 miles of the project boundary, the Bear Creek watershed being over threshold for cumulative watershed effects, and the
unpredictable outcome of prescribed fire a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.” determination was reached.

Determination of Effects

It is my determination that Alternative 5 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.

Summary of Determination of Effects

Foothill yellow – legged frog

Alternative 1 (Proposed Action)

It is my determination that Alternative 1 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.

Alternative 2 (No Action)

It is my determination that Alternative 2 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.

Alternative 3 (Non – Commercial)

It is my determination that Alternative 3 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.

Alternative 4 (Limited Herbicide)

It is my determination that Alternative 4 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.

Alternative 5 (Snag Retention)

It is my determination that Alternative 5 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.
Western Pond Turtle
Actinemys marmorata

Species Account

**Distribution, Abundance, and Habitat**
The western pond turtle, one of only two species of freshwater turtle native to west coast of the United States, found from sea level to approximately 1,525 m (5,000 ft) in elevation; and is uncommon to common throughout California. Western pond turtles are habitat generalists, occurring in a wide variety of permanent and intermittent aquatic habitats and found in a variety of habitat types including ponds, lakes, streams, irrigation ditches and semi-permanent pools of intermittent streams. Most populations in the Sierra Nevada are restricted to smaller stream habitats.

**Species and Habitat Account**
The complete species account for the Western Pond turtle (WPT) can be obtained from the Eldorado National Forest (ENF) Headquarters Office in Placerville, California.

**Existing surveys and sightings**
According to the ENF database, there are eight WPT sightings within the Tobacco Gulch ERP project boundary. A Geographic Information System (GIS) identified approximately 3,131 acres (33 percent of the overall project area) of suitable nesting habitat below 5,000 ft (Figures 1 and 2). Approximately, 2,508 acres (86 percent of total treatment units) of WPT nesting habitat will have project activities occurring directly within these areas.
Figure 1. Tobacco Gulch Project boundary (North) with western pond turtle suitable nesting habitat. Nesting habitat shown as orange polygons w/ slash lines. Solid purple lines indicate project area boundary, while purple polygons within project lines distinguish treatment units. Orange circles with black dots indicate western pond turtle sighting.
Direct and Indirect Effects to WPT for Alternative 1

WPTs have been detected within the project area boundary, suitable habitat as well as nesting habitat (Figures 1 and 2) is widespread in the analysis area, and therefore, WPT has the potential to be affected by the project activities for Alternative 1 listed in Table 15. Effects from timber harvest, road related activities, fuels reduction, prescribed burning and herbicide application under Alternative 1 are also possible since treatments will be occurring within, and immediately adjacent to RCAs. WPTs are highly associated with permanent water in ponds, water drafting locations (e.g., guzzlers), and stream channels, however, they will seek out and use upland habitats to escape peak flow events in winter/early spring as well as dry out periods during late summer/early fall (Table 14). The greatest effect to WPT would most likely be from crushing of individuals during timber harvest as well as fuel reduction activities during nesting, incubation, and hatching periods. Direct and indirect effects to WPT or habitat are expected to be minimal for the following reasons. Mechanical ground-based equipment activity will not be occurring within 300 feet of perennial and special aquatic features; and not within 150 feet of intermittent features. In additions, such equipment will be limited to operating near ephemeral channels as follows: 25 foot buffer on slopes less and 35 percent, 50 foot buffer on slopes 35-70
percent, and 75 foot buffer on slopes greater than 70 percent slope. Fire ignition distances during prescribed burning activity will also be limited (see Tables 3 & 4) within Riparian Conservation Areas (RCAs), however fire will be allowed to back burn into RCAs to meet fuels and habitat restoration objectives.

The effects of herbicide application and its effects on WPTs is not well understood, but believed to be low since their skin is not as permeable as amphibians. Herbicide treatments are often intended to stop the spread of invasive plant species as well as monotypic species of plants (e.g., scotch broom), which could both result in the reduction of nesting and cover habitat for WPT. The use of herbicides in the Tobacco Gulch project area that are experiencing overgrowth and invasive vegetation types will likely result in a net increase of suitable nesting habitat. Based on the hazard quotients listed in Table 9 for sensitive and tolerant fish species, WPT populations might be affected if water containing became contaminated under an accidental spill or worst case scenario. Since this scenario is not part of planned project activities, is minimized through the use of Best Management Practices (BMPs), and low risk of mortality under proper application, effects to WPT under this situation are not discussed in detail.

Based on the known seasonal movements of WPTs (Table 14), the presence of WPT within the project area, and the amount of suitable nesting habitat (3,131 acres), this species has the potential to be affected by project activities listed in Table 15 at all lifestages from the actions under Alternative 1 including timber harvest, road construction/reconstruction, fuels reduction, prescribed fire, and herbicide application.

Table 14. Seasonal movements of western pond turtles and potential disturbance.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
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<th>May</th>
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<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<td>Disturbance to:</td>
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<td>Nesting individuals</td>
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<td>Eggs</td>
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These impacts are largely dependent on the time of year they occur and may differ between male and female WPTs as well as juvenile or hatchlings. Male WPTs have large home ranges and may wander within a given watercourse for several miles regularly (Reese 1996). Female WPTs have been documented to deposit eggs in nests as far as 0.25 mi. from water in open sunny areas on hillslopes, generally with a south to southwest facing aspect² (Reese and Welsh 1997).

Threats to adult WPTs, nests, and hatchlings from proposed activities include crushing, disturbance from harvesting equipment, piling, road related activities, prescribed fire and herbicide application and are listed in Table 15. WPTs move into upland slopes for overwintering to avoid high flows and in summer to avoid desiccation when streams dry up.

Table 15. Direct and Indirect Threats to Western Pond Turtles from Project Activities under Alternative 1.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Direct Effects</th>
<th>Indirect Effects</th>
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</table>
| Timber Harvest – commercial thinning and hazard tree removal | Crushing of individual WPTs and nests from harvest equipment, tractor piling. | • Harassment of by noise and ground vibration of all lifestages.  
• Removal of downed woody debris for cover habitat of adults and hatchlings |

² It should be noted that various studies have recorded considerable variances in distances western pond turtles travel overland away from the stream channel.
<table>
<thead>
<tr>
<th>Tobacco Gulch Ecological Restoration Project - BE</th>
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<tbody>
<tr>
<td><strong>Road Construction, reconstruction, and maintenance. Road decommissioning and landing obliteration</strong></td>
<td><strong>Roads within RCAs</strong></td>
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<td>and falling timber.</td>
<td>Crushing or disturbance of individual WPTs and nests from road equipment on roads where turtles might be under cover materials, especially on overgrown roads.</td>
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<tr>
<td><strong>Fuels Treatment - non-commercial thinning, machine piling and mastication</strong></td>
<td>Crushing or disturbance of individual WPTs from road equipment on roads where turtles might be under cover materials, especially on</td>
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overgrown roads.
Harassment by noise and ground vibration

- Loss of canopy structure may lead to warming of nests on hillslopes and earlier drying of streams in riparian areas

Prescribed fire – pile burning, understory burning, dozer and hand fire lines
Crushing or disturbance of individual WPTs from dozer equipment where turtles might be under cover material or nests may be present.

- Reduction in habitat quality due to water chemistry changes from ignition fuels, accidental fuel spill, and ash input into streams.
- High – severity areas of fire (e.g., spotting) in riparian areas resulting in decreased habitat suitability.

Herbicide Use
Mortality from direct application to an individual WPT.
Mortality to WPT from misapplication or spill in contact with water, or spill on WPT nest.

- Mortality and decreased growth as a result of exposure, ingestion of contaminated forage and prey (macrophytes and insects).
- Decreased growth due to reduction in the amount of forage base (macrophytes and insects) from application.

1Risk of direct and indirect effects to aquatic species is dependent upon: chemical type, amount of chemical, location of application, adjuvants, colorants, timing, spray drift, spill and leaching into groundwater.

Cumulative Effects to WPT for Alternative 1 (Proposed Action)
A cumulative effect represents the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions.” (40 CFR 1508.7). The cumulative effects analysis presented here for WPT does not attempt to quantify the effects of past management or human actions by adding up all prior actions on an action-by-action basis. Current conditions within the Tobacco Gulch ERP area have been impacted by innumerable actions over the last century (and beyond) resulting in a very dynamic landscape. In addition, assessing cumulative effects in fire excluded or otherwise altered forests is extremely difficult. Trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. By looking at current conditions, we are sure to capture all the residual effects of past human actions as well as natural events, regardless of which particular action or event contributed to those effects. For these reasons, the analysis of past actions in this document is based on current environmental conditions. Assessing how, as a result of implementing, or not implementing the Tobacco Gulch ERP will contribute to cumulative effects on WPT or its habitat using the current existing conditions (and not a historic reference condition) as a baseline is the goal of this analysis.
Past disturbances: management activities that have the most impact on streams and watersheds within the Tobacco Gulch ERP area include gold mining, off-highway vehicle recreation, multiple logging events, increased road density, and grazing. All of which have increased sediment delivery to streams and negatively altered aquatic habitat and hydrologic conditions, which in turn, determines the presence and/or absence of aquatic dependent species within, adjacent to, and downstream of the proposed project. During the last decade, protective measures for streamside zones in timber harvest areas have become more restrictive. Although timber harvest on private lands had buffers next to streams, the intensity and size of past timber harvest activities has resulted in fragmentation of habitat for many species making National Forest System lands increasingly important for sustaining habitat for aquatic and riparian-dependent species.

Additionally, cumulative effects to riparian systems due to anthropogenic disturbance resulting from recreational activities near or in streams in the past is believed to have adversely affect threatened, endangered, and sensitive aquatic species through removal of riparian vegetation and/or the accumulation of sediment. In both the short and long term, amphibian and aquatic-dependent reptile populations could be adversely affected by past collection of individuals or by anthropogenic habitat disturbances such as off-highway vehicle use in and adjacent to streams.

Based on historic accounts, it appears that one of the major causes in the decline of WPT populations was extensive commercial harvest of the species as a food source. From approximately the 1870s to the 1930s, WPTs were harvested commercially; millions were sold in San Francisco Markets for human consumption (Ashton and others 1997). And, although there has been a ban on the sale and/or exhibition of native reptiles and amphibians since the 1980s, illegal collection of turtles has occurred (Ashton and others 1997). Deliberate shooting, incidental catch by fisherman, predation by non-native species, water contamination and habitat loss or alteration are all major threats to WPT populations (Holland 1994). Furthermore, since WPTs need to overwinter and deposit eggs in terrestrial habitats this makes them more susceptible to management activities such as timber harvest, road construction, mastication as well as other encounters with motorized vehicles.

Present disturbances within the project area include human-related activities such as, dispersed recreation, fuels reduction, prescribed burning, unauthorized road use, off-highway vehicle use, and recreational gold mining. Natural processes include erosion, stream aggradation as well degradation mainly as a result of short-duration episodic climatic events (examples, heavy rains or rain-on-snow events).

Reasonably foreseeable future disturbances include human activities such as timber harvest, fuels reduction, road re-construction, road maintenance, road decommissioning, off-highway vehicle use, recreational mining will continue to take place within the Tobacco Gulch ERP area. The level of recreational use on all National Forest System lands is expected to continue and increase temporally as the human population continues to increase. Increases in dispersed camping along streams, and unmaintained roads as well as trails, particularly within the floodplain and adjacent riparian areas of streams, have the most potential to adversely affect aquatic and riparian habitats.

The California Department of Forestry website (CDF 2012) was checked for planned timber harvest plans on private lands in the watersheds where this project is located. The timber harvest plan listing dated 16 March 2012 indicated one timber harvest plans within the Bear Creek watershed area analyzed in this document. The Gear Creek Ranch (THP 4-12-001-ELD) within the vicinity of the Tobacco Gulch ERP proposed harvesting 347 acres with a combination of shelterwood and group selection harvest has been approved by the state of California. No other known Timber Harvest Plans (THPs) are under preparation (http://www.fire.ca.gov/resoure_mgt/resource_mgt_forestpractice_thpstatus.php last visited 3/16/2012).
Any timber activities being planned in the future by the USDA Forest Service will follow the standards and guidelines established under the Sierra Nevada Forest Plan Amendment (USDA Forest Service 2004a). Under these standards and guidelines, the effects of future sales in the project area are expected to maintain and restore the species composition and structural diversity of plant and animal communities in riparian areas.

**Effects of Alternative 1 to WPT Discussion:**

Recovery of the watersheds within the Tobacco Gulch ERP will largely depend on the gradual reduction of sediment into streams and may take decades under the current existing conditions. These long-term and larger scale factors often addressed in cumulative watershed effects analyses highlight the value of addressing activities beyond the scope of the Tobacco Gulch ERP.

In the Sierra Nevada, the effects of human-related activity including historic: mining, logging, road building, grazing, recreation along with other factors including: habitat degradation, climate change, and introduced non-native species, as well as the synergistic interactions among these factors, may all have been causes for the decline of western pond turtles. Understanding the extent to which these factors may have affected WPT in the watersheds associated with the Tobacco Gulch ERP area is beyond the scope of this analysis; so too is an analysis determining the extent to which these factors will continue to effect local WPT populations. However, the connected actions of the Tobacco Gulch ERP with these other factors in determining whether a trend from current baseline conditions will occur is the goal of this analysis.

Direct and indirect actions with the potential to impact WPT have been identified and disclosed. The degree in which these actions will affect individual turtles largely depends on the timing and duration of events, resulting impacts and the time it takes to recover to a pre-condition. For the Tobacco Gulch ERP this trend is only expected to last 1-2 years post-treatment.

**Conclusions:** Given 1) the smaller scale of the Tobacco Gulch ERP within the larger watersheds identified, 2) detections of WPT within the Tobacco Gulch ERP, 3) the short duration of project activities as well as short-duration of post-project effects, 4) established aquatic and stream buffer exclusion zones designed for the Tobacco Gulch ERP, and the 5) the amount of suitable nesting habitat (3,131 acres), a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for western pond turtle.” determination was reached.

**Determination of Effects**

*It is my determination that Alternative 1 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.*
Direct, Indirect and Cumulative Effects to WPT for Alternative – 2 (No Action)
Under the No Action Alternative, none of the proposed silvicultural treatments, road construction/reconstruction, noxious weed herbicide treatments, fuels reduction treatments, or prescribed burning would be implemented. Other management projects activities from prior decisions would still occur including road maintenance, trail maintenance, fire suppression.

Under the No Action alternative, fuels would not be reduced, but would continue to accumulate. The risk for high intensity wildfire would remain or increase, with the possibility of stand replacement mortality for much of the project area. No action could lead to a greater risk of erosional effects to aquatic features during periods of increased run-off and snowmelt in the years following a high severity wildfire than Alternative 1, Alternative 3, Alternative 4, and Alternative 5.

The hydrologic response to a high severity wildfire is increased erosion rates increase by two or more magnitudes for several years and returns to near pre-wildfire levels within four or five years. However, the effects to aquatic features and beneficial uses of water both within and downstream of a high severity wildfire are difficult to predict and depend on many factors. The single most important factor is often the size of the rainfall event that occurs during the first several years after the wildfire when the ground is most vulnerable to accelerated runoff and erosion.

Tree mortality (snags) in riparian zones as a result of wildfire may contribute to large woody debris (LWD) recruitment that is lacking in most drainages and remain elevated for the next 10 – 15 years post-wildfire (Gresswell 1999). However, high-severity wildfire is capable of consuming and subsequently removing in-channel LWD (Minshall and others 1997). The removal of LWD from channels post high-severity wildfire often leads to erosion, increased sediment yields and recovery time (Debano and others 1996).

**Effects of Alternative 2 to WPT Discussion:**
There would be no direct, indirect or cumulative effects to WPT, its habitat, or nesting habitat as the result of project activities not being implemented under Alternative 2. Potential effects to WPT from wildfire under Alternative 2 could be expected since WPTs are present and the amount of potentially suitable nesting habitat. Furthermore, the lack of low-intensity prescribed burning as well as lack of herbicide treatment of monotypic noxious weeds may reduce the amount of suitable nesting habitat.

**Conclusions:** Given 1.) the lack of any timber harvest, mastication, road related activities, herbicide treatments, as well as fuels reduction and prescribed burning treatments occurring in the Tobacco Gulch ERP, and 2.) the remaining potential for wildfire and post-wildfire effects in an untreated landscape, especially high-intensity wildfire risk and 3.) amount of suitable nesting habitat potentially disturbed by wildfire as well as loss of potentially suitability nesting habitat from lack of noxious weed treatments within the project area a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.” determination was reached.

**Determination of Effects**

> It is my determination that Alternative 2 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.

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Tobacco Gulch Ecological Restoration Project - BE
Direct, Indirect, and Cumulative Effects for Alternative 3 – (Non Commercial)
The Non-Commercial Alternative proposes to remove only those trees located in the commercial thinning units of the Proposed Action that are needed to meet to modify fire behavior on the landscape. In most stands proposed for commercial treatment, it has been determined that removal of intermediate and overtopped trees up to 12 inches in dbh, followed by tractor piling or mastication, and follow-up prescribed burning would achieve the minimum fuels objectives defined in the 2004 SNFPA. Direct, indirect and cumulative effects to WPT for Alternative 3 are similar to Alternative 1. The difference in alternatives is the removal of trees with a maximum diameter limit of 12 inches. The effects to WPTs from project related activities (Table 15) by removing trees in this size class would be similar to the effects listed for Alternative 1 since ground-based equipment would still be excluded from perennial and intermittent buffer zones (300 ft/150 ft, respectively).

Ephemeral channels, with narrower buffers than intermittent streams, often lack riparian vegetation as well as habitat structure required for WPT would also not result in any adverse effects. Increased future coarse woody debris on the ground in, or adjacent to, RCAs may disrupt surface water runoff and impound sediment resulting in less sediment delivery to streams and increased coarse woody debris would likely promote cover habitat WPTs in streamside riparian zones. Canopy cover in, and adjacent to, riparian conservation areas (RCAs) would not likely experience a reduction in stream shading or an increase in solar radiation since 12 inch diameter trees do not usually contribute to canopy structure, thus any effects (e.g., temperature increase) from a reduction in canopy should not be observable in streams.

Effects of Alternative 3 to WPT Discussion:
Under Alternative 3 WPT would experience similar direct, indirect and cumulative effects as Alternative 1 since ground-based equipment activity would still be occurring, although excluded from perennial and intermittent buffer zones (300 ft/150 ft, respectively). Although retention of large trees over 12 inches DBH adjacent to RCA may provide an overall benefit to WPT by promoting coarse woody debris resulting in improved habitat complexity (example pool formation), maintaining dense canopies on low-gradient south slopes may reduce habitat suitability for WPTs as well as reduce nesting habitat that rely on light penetration to the ground for temperature regulation. All other activities listed under Alternative 1 would still occur, making Alternative 3 likely to impact WPT, its habitat, or nesting habitat similarly as Alternative 1.

Conclusions: Given 1) the retention of large trees to promote and facilitate future WPT habitat, but also potentially reduce light penetration on dense south slopes, 2) similar effects as listed under alternative 1 concerning ground-based and other activities, 3) the amount of suitable WPT nesting habitat (3,131 acres) where project activities will be occurring a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.” determination was reached.

Determination of Effects

It is my determination that Alternative 3 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.

Direct, Indirect, and Cumulative Effects to WPT for Alternative 4 – (Limited Herbicide)
Direct, indirect, and cumulative effects to WPT for Alternative 4 are similar to Alternative 1. The difference in alternatives is the limited use of herbicides, specifically the elimination of Glyphosate (Rodeo or equivalent). Herbicide application would be limited to Imazapyr (Arsenal) and Chlopyralid (Transline) to treat scotch broom, rush skeletonweed, and yellow starthistle. Since little to no information exists on the effects of herbicides on turtles it is difficult to predict what the effects and risks of herbicide use to WPT would entail. Some generalization using existing data on fish can be made, but should be noted that information used in this context is speculative. Glyphosate has a hazard quotient (HQ) rating of 4.0 for sensitive fish in an accidental
worst case scenario/accidental spill, therefore, the perceived risk to individual WPTs is low since turtles do not osmoregulate in the same manner as fish, meaning that being in direct contact with contaminated water or soil will not necessarily result in uptake by WPT. Triclopyr, which would also not be used under Alternative 4 has a HQ of 48 for tolerant fish. It is difficult to predict what the effects to WPT would be under a worst case scenario/accidental spill for Triclopyr, but it seems plausible that individual WPTs could be affected if contaminated water is ingested. For both Glyphosate and Triclopyr there is an increased risk that an accidental spill could have negative consequences for eggs within nest locations in upland environments where an accidental spill is more likely to occur and come in direct contact with eggs as well as contaminate soils. Glyphosate readily binds to soil particles and is less likely to mobilize during precipitation events, however, Triclopyr and its degradants including TCP, a highly toxic chemical to fish and amphibians, may persist in soils and percolate into groundwater. Since the hazard quotients (HQ) for Imazapyr (HQ = 0.8) and Chlopyralid (HQ = 0.0004) listed in Table 9 does not indicate an elevated risk from a worst case scenario/accidental spill for sensitive species of fish, the likelihood WPTs would be affected is low. This information indicates that potential, direct, indirect and cumulative effects to WPT, through a reduction in herbicides as a result of limited use under Alternative 4 would likely result in less effects to WPT than Alternative 1.

Effects of Alternative 4 to WPT Discussion:
Under Alternative 4 WPT would experience similar direct, indirect and cumulative effects as listed under Alternative 1. However, under Alternative 4 there would be no application of glyphosate or triclopyr, two herbicides with hazard quotients above one for fish. Any potential effects to WPT from the use of these herbicides under Alternatives 1, 3, & 5 would be greatly reduced under Alternative 4.

Conclusions: Given 1) the elimination of glyphosate and triclopyr from use, 2) similar effects as listed under alternative 1 concerning ground-based and other activities, 3) presence of WPT in the project area, 4) the amount of suitable WPT nesting habitat (3,131 acres) where project activities will be occurring a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.” determination was reached.

Determination of Effects

It is my determination that Alternative 4 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.

Direct, Indirect, and Cumulative Effects to WPT for Alternative – 5 (Snag Recruitment)
Direct, indirect and cumulative effects to WPT for Alternative 5 are similar to Alternative 1. The difference in alternatives is that Alternative 5 proposes to retain trees over 16 inches that would have otherwise been removed. In addition, trees over 16” would be girdled or killed in some way in order to actively recruit more large snags, or such trees would be felled to provide large downed log structure. The effects to WPTs from project related activities (Table 15) by removing trees up to this size class would be similar to the effects listed for Alternative 1. Canopy cover in, and adjacent to, RCAs may experience a reduction in stream shading, an increase in solar radiation, and a reduction in stream nutrient input from needle cast. Since 16 inch diameter trees and greater likely contribute to canopy structure in RCAs, this alternative could result in effects such as stream temperature increases. An increase in solar radiation under Alternative 5 could result in an increase in suitable nesting habitat for WPT since sunlight sites are preferred. Additionally, increased solar radiation in stream channels would likely promote basking habitat for WPT, but may also result in earlier stream drying. Increased coarse woody debris on the ground may disrupt surface water runoff and impound sediment resulting in less sediment delivery to streams. Increased coarse woody debris would likely promote cover habitat for WPTs in riparian zones as well as upland habitats outside of riparian areas. Future recruitment of large woody
debris (snags) to streams from large (16 inch and greater) trees retained by dispatching or felling in RCAs would likely increase stream habitat under this alternative by promoting pool habitat for WPT where trees cross streams.

**Effects of Alternative 5 to WPT Discussion:**
Under Alternative 5 WPTs would experience similar direct, indirect and cumulative effects as Alternative 1. However, snag retention and promotion is likely to provide an overall benefit to WPT by promoting coarse woody debris in the vicinity of RCAs, create habitat via future large woody debris recruitment in streams that will result in an increase in habitat complexity (example: pool formation), and increase solar input preferred for basking as well as nest selection. All other activities listed under Alternative 1 would still occur. Alternative 5 is less likely to impact WPT or its habitat than Alternative 1.

Conclusions: Given 1) the intentional dispatching of trees to promote snag retention and thus facilitate future WPT habitat as well as increase solar input, 2) the presence of WPT in the project area, 3) similar effects as listed under alternative 1 concerning ground-based activities, 4) the amount of suitable WPT nesting habitat (3,131 acres) where project activities will be occurring a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.” determination was reached.

**Determination of Effects**

*It is my determination that Alternative 5 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.*

**Summary of Determination of Effects**

**Western Pond turtle**

**Alternative 1 (Proposed Action)**

*It is my determination that Alternative 1 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.*

**Alternative 2 (No Action)**

*It is my determination that Alternative 2 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.*

**Alternative 3 (Non – Commercial)**

*It is my determination that Alternative 3 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.*

**Alternative 4 (Limited Herbicide)**
It is my determination that Alternative 4 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.

Alternative 5 (Snag Retention)

It is my determination that Alternative 5 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.
Hardhead
*Mylopharodon conocephalus*

Species Account

**Distribution, Abundance, and Habitat**
Historically, hardhead have been regarded as a widespread and locally abundant species in foothill streams, but their specialized habitat requirements, combined with widespread alteration of downstream habitats, have resulted in isolation and localization of populations (Moyle 2002). Hardhead minnows in the Eldorado National Forest are known to reside in the Middle Fork American River above and below Ralston afterbay dam, the South Fork American River (SFAR) below Silver Creek, and the Mokelumne River. They prefer clear, deep pools with sand-gravel-boulder substrates and slow water velocities (Moyle and Nichols 1973, Knight 1985, Moyle and Baltz 1985). In streams, adult hardhead tend to remain in the lower half of the water column, rarely moving into the upper levels (Knight 1985), while juveniles concentrate in shallow water close to the stream edges (Moyle and Baltz 1985). Primarily bottom feeders, hardheads forage for benthic invertebrates and aquatic plant material in quiet water. They will occasionally feed on plankton and surface insects. Smaller fish feed primarily on mayfly larvae, caddis fly larvae, and small snails, whereas larger fish feed mainly on aquatic plants (especially filamentous algae), as well as crayfish and other large invertebrates (Reeves 1964). Hardhead spawn by May-June in Central Valley streams and that the spawning season may extend into August in the foothill streams of the Sacramento-San Joaquin drainage (Wang 1986).

**Species and Habitat Account**
The complete species and habitat account for hardhead (HH) minnow (*Mylopharodon conocephalus*) can be obtained from the Eldorado National Forest (ENF) Headquarters Office in Placerville, California.

**Existing Surveys and Sightings**
Hardhead are known to reside downstream of the project area in South Fork American River approximately 4 air miles from the southern project area boundary. Targeted surveys for HH on the ENF have not been carried out. The photo in the species account was taken in August, 2011 in Slab-Chili Reservoir approximately 4 air miles southeast of the Tobacco Gulch project area. It is unknown if HH occur within the Tobacco Gulch ERP area or even within the Rock Creek Drainage, the largest stream system within the project area. A natural fish barrier has been identified approximately one mile upstream from the confluence of Rock Creek and the SF American River. Whether or not this barrier prevents or historically prevented HH from entering the Rock Creek system is also unknown.

**Direct and Indirect Effects for Alternative 1**
Hardhead have not been surveyed within the project boundary and may be absent or limited due to the presence of non-native fish species (including trout), steep channel reaches, cascades, and waterfalls on the lower reaches
of Rock Creek that may act as natural dispersal barriers. HH are not adept at surpassing high gradient cascades and other natural barriers that some salmonids (trout and salmon) can overcome. Any effects to hardhead would likely be from resultant project activities affecting the South Fork American River approximately 4 air miles south of the project boundary. A list of the potential effects to HH can be found in (Table 16) Direct effects from timber harvest, road related activities, fuels reduction treatments, prescribed fire, and herbicide application are not expected since these activities will be occurring at least 4 miles away. The greatest risk of indirect effects to HH are likely only to occur from non-desirable outcomes from the application of prescribed fire or climatic events resulting in increased erosion rates post-project. Fire ignitions will be occurring in RCAs and allowed to further backburn into RCAs. Most burning is anticipated to be of low intensity, but since fire can have unpredictable results moderate or severe burned areas could result. Although not usually widespread, these higher severity burned areas could lead to sediment delivery during and shortly after precipitation events affecting downstream aquatic habitats over a larger area. Since HH are unsurveyed and have the potential to be present, in conjunction with project design features, any direct or indirect effects to HH and aquatic habitat are expected to be minimal for the following reasons. Mechanical ground-based equipment activity will not be occurring within 300 feet of perennial and special aquatic features; and not within 150 feet of intermittent features. In additions, such equipment will be limited to operating near ephemeral channels as follows: 25 foot buffer on slopes less and 35 percent, 50 foot buffer on slopes 35-70 percent, and 75 foot buffer on slopes greater than 70 percent slope. Fire ignition distances during prescribed burning activity will also be limited (see Tables 3 & 4) within Riparian Conservation Areas (RCAs), however fire will be allowed to back burn into RCAs to meet fuels and habitat restoration objectives. The greatest threat to HH would most likely be from an accidental spill of Glyphosate or Triclopyr directly to water. Based on the hazard quotients listed in Table 9 for sensitive and tolerant fish species under this scenario HH populations could be affected if water were to become contaminated. Under an accidental spill or worst case scenario for Glyphosate, sensitive fish had a hazard quotient rating of 4.0, while Triclopyr had a hazard quotient rating of 48 for tolerant fish suggesting that effects to HH would be likely. Since this scenario is not part of planned project activities and is minimized through the use of Best Management Practices (BMPs), effects to HH under this situation are not discussed in detail. Glyphosate readily adheres to soil particles so it is not likely to enter groundwater or be mobilized after precipitation events, therefore the risks to HH would be low under proper application. However, the chemical degradants of Triclopyr (e.g., TCP : 3,5,6 – trichloro – 2 – pyridinol), which are known to be toxic to fish have the ability to persist in soil and potentially percolate through soil into ground water. Though this has not been documented in the risk assessments, there is still some cause for concern regarding the use of this chemical. Since mixing as well as application of Triclopyr will not be occurring within, or adjacent to, any perennial or intermittent RCA (300/150 feet, respectively), minimal effects to HH are expected under Alternative 1 when proper application is followed.

Table 16. Direct and Indirect Threats to Hardhead Minnow from Project Activities under Alternative 1.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Direct Effects</th>
<th>Indirect Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timber Harvest – commercial thinning</td>
<td>None</td>
<td>• Removal of downed woody debris that would normally inhibit sediment deposition into streams.</td>
</tr>
<tr>
<td>and hazard tree removal</td>
<td></td>
<td>• Reduction in microclimate structure that may lead to stream warming.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Changes in sedimentation rates to streams as a result of ground disturbance that can lead to reduced habitat suitability and reducing pool depth.</td>
</tr>
<tr>
<td>Activity</td>
<td>None</td>
<td>Effects</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| **Road Construction, reconstruction, and maintenance - road decommissioning and landing obliteration** | None                                                                 | - Increased peak flows from reduced infiltration and reduced water uptake by removed trees.  
- Loss of canopy structure and future large woody debris. |
| **Fuels Treatment – machine piling**                                    | None                                                                 | - Increased peak flows from reduced infiltration and reduced water uptake by removed trees and vegetation.  
- Changes in sedimentation rates to streams from lack of coarse woody debris that may alter pool depth.  
- Water chemistry changes as a result of ignition fuels and ash input into streams.  
- Loss of canopy structure resulting in increased solar input to streams.  
- Increase in large woody debris following fire in RCAs. |
| **Prescribed fire – pile burning, understory burning, dozer and hand fire lines** | None                                                                 | - Reduction in habitat quality due to water chemistry changes from ignition fuels, accidental fuel spill, and ash input into streams.  
- High – severity areas of fire (e.g., spotting) in riparian areas resulting in effects to stream suitability from sediment input after precipitation events. |
| **Herbicide Use**                                                       | None                                                                 | - Mortality and decreased growth as a result of interference with osmoregulation from residue entering waterways.  
- Mortality and decreased growth as a result of ingestion of contaminated forage and prey base.  
- Mortality and decreased growth due to reduction or disruption of forage and prey base. |

1Risk of direct and indirect effects to aquatic species is dependent on: chemical type, amount of chemical, location of application, adjuvants, colorants, timing, spray drift, spill, and leaching into groundwater.
Cumulative Effects to HH for Alternative 1

A cumulative effect represents the “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions.” (40 CFR 1508.7). The cumulative effects analysis presented here for HH does not attempt to quantify the effects of past management or human actions by adding up all prior actions on an action-by-action basis. Current conditions within the Tobacco Gulch ERP area have been impacted by innumerable actions over the last century (and beyond) resulting in a very dynamic landscape. In addition, assessing cumulative effects in fire excluded or otherwise altered forests is extremely difficult. Trying to isolate the individual actions that continue to have residual impacts would be nearly impossible. By looking at current conditions, we are sure to capture all the residual effects of past human actions as well as natural events, regardless of which particular action or event contributed to those effects. For these reasons, the analysis of past actions in this document is based on current environmental conditions. Assessing how, as a result of implementing, or not implementing the Tobacco Gulch ERP will contribute to cumulative effects on HH or its habitat using the current existing conditions (and not a historic reference condition) as a baseline is the goal of this analysis.

Past disturbances: management activities that have the most impact on streams and watersheds within the Tobacco Gulch ERP area include gold mining, off-highway vehicle recreation, multiple logging events, increased road density, and grazing. All of which have increased sediment delivery to streams and negatively altered aquatic habitat and hydrologic conditions, which in turn, determines the presence and/or absence of aquatic dependent species within, adjacent to, and downstream of the proposed project. During the last decade, protective measures for streamside zones in timber harvest areas have become more restrictive. Although timber harvest on private lands had buffers next to streams, the intensity and size of past timber harvest activities has resulted in fragmentation of habitat for many species making National Forest System lands increasingly important for sustaining habitat for aquatic and riparian-dependent species.

Additionally, cumulative effects to riparian systems due to anthropogenic disturbance resulting from recreational activities near or in streams in the past is believed to have adversely affect threatened, endangered, and sensitive aquatic species through removal of riparian vegetation and/or the accumulation of sediment. In both the short and long term, fish populations could be adversely affected by past collection of individuals or by anthropogenic habitat disturbances such as the construction of rim dams, water diversions, water extraction, mining, and off-highway vehicle use.

Based on historic accounts, it appears that one of the major causes in the decline of HH was the construction of rim dams and the introduction of non-native fish that compete as well as prey upon HH. Populations became isolated by the presence of dams and habitat upstream of dams likely became increasingly unsuitable do to mining, road construction, and other activities that increased sediment yield into streams.

Present disturbances within the project area include human-related activities such as, dispersed recreation, fuels reduction, prescribed burning, unauthorized road use, off-highway vehicle use, and recreational gold mining. Natural processes include erosion, stream aggradation as well degradation mainly as a result of short-duration episodic climatic events (examples, heavy rains or rain-on-snow events).
Reasonably foreseeable future disturbances include human activities such as timber harvest, fuels reduction, road re-construction, road maintenance, road decommissioning, off-highway vehicle use, recreational mining will continue to take place within the Tobacco Gulch ERP area. The level of recreational use on all National Forest System lands is expected to continue and increase temporally as the human population continues to increase. Increases in dispersed camping along streams, and unmaintained roads as well as trails, particularly within the floodplain and adjacent riparian areas of streams, have the most potential to adversely affect aquatic and riparian habitats.

The California Department of Forestry website (CDF 2012) was checked for planned timber harvest plans on private lands in the watersheds where this project is located. The timber harvest plan listing dated 16 March 2012 indicated one timber harvest plans within the Bear Creek watershed area analyzed in this document. The Gear Creek Ranch (THP 4-12-001-ELD) within the vicinity of the Tobacco Gulch ERP proposed harvesting 347 acres with a combination of shelterwood and group selection harvest has been approved by the state of California. No other known Timber Harvest Plans (THPs) are under preparation (http://www.fire.ca.gov/resource_mgt/resource_mgt_forestpractice_thpstatus.php last visited 3/16/2012).

Any timber activities being planned in the future by the USDA Forest Service will follow the standards and guidelines established under the Sierra Nevada Forest Plan Amendment (USDA Forest Service 2004a). Under these standards and guidelines, the effects of future sales in the project area are expected to maintain and restore the species composition and structural diversity of plant and animal communities in riparian areas.

Effects of Alternative 1 to HH Discussion:
Recovery of the watersheds within the Tobacco Gulch ERP will largely depend on the gradual reduction of sediment into streams and may take decades under the current existing conditions. These long-term and larger scale factors often addressed in cumulative watershed effects analyses highlight the value of addressing activities beyond the scope of the Tobacco Gulch ERP.

In the Sierra Nevada, the effects of human-related activity including historic: mining, logging, road building, grazing, recreation along with other factors including: new emergent diseases, pesticide use, habitat degradation, climate change, and introduced non-native species, as well as the synergistic interactions among these factors, have all been suggested as causes for the decline of amphibians and reptiles. Understanding the extent to which these factors may have affected HH in the watersheds associated with the Tobacco Gulch ERP area is beyond the scope of this analysis; so too is an analysis determining the extent to which these factors will continue to effect local HH populations. However, the connected actions of the Tobacco Gulch ERP with these other factors in determining whether a trend from current baseline conditions will occur is the goal of this analysis.

Direct and indirect actions with the potential to impact HH have been identified and disclosed. The degree in which these actions will affect individual fish largely depends on the timing and duration of events, resulting impacts and the time it takes to recover to a pre-condition. For the Tobacco Gulch ERP this trend is only expected to last 1-2 years post-treatment.

Conclusions: Given 1) the smaller scale of the Tobacco Gulch ERP within the larger watersheds identified, 2) the lack of HH specific surveys within the Tobacco Gulch ERP, 3) the short duration of project activities as well as short-duration of post-project effects, 4) established aquatic and stream buffer exclusion zones designed for the Tobacco Gulch ERP (Tables 3 and 4), and 5) the potential for suitable habitat within the project boundary a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.” determination was reached.
Determination of Effects

It is my determination that Alternative 2 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.

Direct, Indirect and Cumulative Effects to HH for Alternative – 2 (No Action)
Under the No Action Alternative, none of the proposed silvicultural treatments, road construction/reconstruction, noxious weed herbicide treatments, fuels reduction treatments, or prescribed burning would be implemented. Other management projects activities from prior decisions would still occur including road maintenance, trail maintenance, fire suppression.

Under the No Action alternative, fuels would not be reduced, but would continue to accumulate. The risk for high intensity wildfire would remain or increase, with the possibility of stand replacement mortality for much of the project area. No action could lead to a greater risk of erosional effects to aquatic features during periods of increased run-off and snowmelt in the years following a high severity wildfire than Alternative 1, Alternative 3, Alternative 4, and Alternative 5.

The hydrologic response to a high severity wildfire is increased erosion rates increase by two or more magnitudes for several years and returns to near pre-wildfire levels within four or five years. However, the effects to aquatic features and beneficial uses of water both within and downstream of a high severity wildfire are difficult to predict and depend on many factors. The single most important factor is often the size of the rainfall event that occurs during the first several years after the wildfire when the ground is most vulnerable to accelerated runoff and erosion.

Tree mortality (snags) in riparian zones as a result of wildfire may contribute to large woody debris (LWD) recruitment that is lacking in most drainages and remain elevated for the next 10 – 15 years post-wildfire (Gresswell 1999). However, high-severity wildfire is capable of consuming and subsequently removing in-channel LWD (Minshall and others 1997). The removal of LWD from channels post high-severity wildfire often leads to erosion, increased sediment yields and recovery time (Debano and others 1996).

Effects of Alternative 2 to HH Discussion:
There would be no direct, indirect or cumulative effects to HH or its habitat as the result of project activities not being implemented under Alternative 2. Potential effects to HH from wildfire under Alternative 2 cannot be discounted since the presence of HH within the project area is unknown and suitable habitat likely exists within Tobacco Gulch ERP area.

Conclusions: Given 1) the lack of any timber harvest, mastication, road related activities, herbicide treatments, as well as fuels reduction and prescribed burning treatments occurring in the Tobacco Gulch ERP, and 2) the remaining potential for wildfire and post-wildfire effects in an untreated landscape, especially high-intensity wildfire risk, 3) lack of detailed surveys for HH within the project area, and 4) presence of hardhead within 4 air miles of the project area, a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.” determination was reached for FYLF under Alternative 2.

Determination of Effects

It is my determination that Alternative 2 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.
Direct, Indirect and Cumulative Effects to HH for Alternative – 3 (Non - Commercial)
The Non-Commercial Alternative proposes to remove only those trees located in the commercial thinning units of the Proposed Action that are needed to meet to modify fire behavior on the landscape. In most stands proposed for commercial treatment, it has been determined that removal of intermediate and overtopped trees up to 12 inches in dbh, followed by tractor piling or mastication, and follow-up prescribed burning would achieve the minimum fuels objectives defined in the 2004 SNFPA. Direct, indirect and cumulative effects to HH for Alternative 3 are similar to Alternative 1. The difference in alternatives is the removal of trees with a maximum diameter limit of 12 inches. The effects to HH from project related activities (Table 16) by removing trees in this size class would be similar to the effects listed for Alternative 1 since ground-based equipment would still be excluded from perennial and intermittent buffer zones (300 ft/150 ft, respectively). Increased future coarse woody debris on the ground in, or adjacent to, RCAs may disrupt surface water runoff and impound sediment resulting in less sediment delivery to streams and increased coarse woody debris would likely promote water quality for HH. Canopy cover in, and adjacent to, riparian conservation areas (RCAs) would not likely experience a reduction in stream shading or an increase in solar radiation since 12 inch diameter trees do not usually contribute to canopy structure, thus any effects (e.g., temperature increase) from a reduction in canopy should not be observable in streams and benefit HH.

Effects of Alternative 3 to HH Discussion:
Under Alternative 3 HH would experience similar direct, indirect and cumulative effects as Alternative 1. Ground-based equipment would still be excluded from perennial and intermittent buffer zones (300 ft/150 ft, respectively). Retention of large trees over 12 inches DBH adjacent to RCA may provide an overall benefit to HH by promoting coarse woody debris in the vicinity of streams and create habitat via future large woody debris recruitment in streams that will result in an increase in habitat complexity (example: pool formation), increases in macroinvertebrate prey as well as increase water quality. All other activities listed under Alternative 1 would still occur, making Alternative 3 less likely to impact HH or its habitat than Alternative 1.

Conclusions: Given 1) the retention of large trees to promote and facilitate future HH habitat, 2) similar effects as listed under alternative 1 concerning ground-based and other activities, 3) the lack of focused surveys for HH within the project area, and 4) presence of HH within 4 air miles of the project boundary a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.” determination was reached.

Determination of Effects

*It is my determination that Alternative 3 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.*

Direct, Indirect, and Cumulative Effects to HH for Alternative – 4 (Limited Herbicide)
Direct, indirect, and cumulative effects to HH for Alternative 4 are similar to Alternative 1. The difference in alternatives is the limited use of herbicides, specifically the elimination of Glyphosate (Rodeo or equivalent). Herbicide application would be limited to Imazapyr (Arsenal) and Chlopyralid (Transline) to treat scotch broom, rush skeletonweed, and yellow starthistle. Since the hazard quotients (HQ) for Imazapyr (HQ = 0.8) and Chlopyralid (HQ = 0.0004) listed in Table 9 do not indicate an elevated risk from a worst case scenario accidental spill for sensitive species of fish, while the inclusion of Glyphosate (HQ = 4.0) for sensitive fish, and Triclopyr (HQ = 48) for tolerant fish do indicate potential, direct, indirect and cumulative effects to HH, a reduction in potentially hazardous herbicides as a result of limited use for Alternative 4 would likely result in less potential herbicide effects to HH.
**Effects of Alternative 4 to HH Discussion:**
Under Alternative 4 HH would experience similar direct, indirect and cumulative effects as listed under Alternative 1. However, under Alternative 4 there would be no application of glyphosate or triclopyr, two herbicides with hazard quotients above one for fish. Any potential effects to HH from the use of these herbicides under Alternatives 1, 3, & 5 would be greatly reduced under Alternative 4.

Conclusions: Given 1) the elimination of glyphosate and triclopyr from use, 2) similar effects as listed under alternative 1 concerning ground-based and other activities, 3) the lack of focused surveys for HH within the project area, and 4) presence of HH within 4 air miles of the project boundary a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.” determination was reached.

**Determination of Effects**

*It is my determination that Alternative 4 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.*

**Direct, Indirect, and Cumulative Effects to HH for Alternative – 5 (Snag Recruitment)**
Alternative 5 proposes to retain trees over 16 inches that would have otherwise been removed. In addition, trees over 16” would be girdled or killed in some way in order to actively recruit more large snags, or such trees would be felled to provide large downed log structure. Direct, indirect and cumulative effects to HH for Alternative 5 are similar to Alternative 1. The effects to HH from project related activities (Table 16) by removing trees up to this size class would be similar to the effects listed for Alternative 1. Canopy cover in, and adjacent to, RCAs may experience a reduction in stream shading, an increase in solar radiation, and a reduction in stream nutrient input from needle cast. Since 16 inch diameter trees and greater likely contribute to canopy structure in RCAs, this alternative could result in effects such as stream temperature increases. Increased coarse woody debris on the ground may disrupt surface water runoff and impound sediment resulting in less sediment delivery downstream. Increased coarse woody debris and sediment reduction would likely promote water quality for HH, but a reduction in canopy resulting in increased water temperature would not likely benefit HH downstream.

**Effects of Alternative 5 to HH Discussion:**
Under Alternative 5 HH would experience similar direct, indirect and cumulative effects as Alternative 1. Snag retention and promotion is likely to provide a benefit to HH by promoting habitat via future large woody debris recruitment in streams that will result in an increase in habitat complexity (example pool formation) that HH rely upon. However, net increases in solar radiation from canopy reduction resulting in increased stream temperature would not favor HH. All other activities listed under Alternative 1 would still occur. Alternative 5 is likely to impact HH or its habitat similarly to Alternative 1.

Conclusions: Given 1) the proposed project being within the HH range, 2) proximity of known HH populations to the project area, and 3) the lack of detailed surveys for HH within the project area, 4) similar effects as listed under alternative 1 concerning ground-based and other activities, a “may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.” determination was reached.
Determination of Effects

It is my determination that Alternative 5 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.

Summary of Determination of Effects

Hardhead minnow

Alternative 1 (Proposed Action)

It is my determination that Alternative 1 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.

Alternative 2 (No Action)

It is my determination that Alternative 2 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.

Alternative 3 (Non–Commercial)

It is my determination that Alternative 3 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.

Alternative 4 (Limited Herbicide)

It is my determination that Alternative 4 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.

Alternative 5 (Snag Retention)

It is my determination that Alternative 5 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.
VI. Summary of Determinations

Alternative 1 (Proposed Action)

It is my determination that Alternative 1 of the Tobacco Gulch Ecological Restoration Project may affect but is not likely to adversely affect the California red-legged frog.

It is my determination that Alternative 1 of the Tobacco Gulch Ecological Restoration Project will not affect critical habitat designated for the California red-legged frog.

It is my determination that Alternative 1 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.

It is my determination that Alternative 1 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.

It is my determination that Alternative 1 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.

Alternative 2 (No Action)

It is my determination that Alternative 2 of the Tobacco Gulch Ecological Restoration Project may affect but is not likely to adversely affect the California red-legged frog.

It is my determination that Alternative 2 Tobacco Gulch Ecological Restoration Project will not affect critical habitat designated for the California red-legged frog.

It is my determination that Alternative 2 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.

It is my determination that Alternative 2 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.

It is my determination that Alternative 2 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.

Alternative 3 (Non – Commercial)

It is my determination that Alternative 3 of the Tobacco Gulch Ecological Restoration Project may affect but is not likely to adversely affect the California red-legged frog.

It is my determination that Alternative 3 Tobacco Gulch Ecological Restoration Project will not affect critical habitat designated for the California red-legged frog.
It is my determination that Alternative 3 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-frog.

It is my determination that Alternative 3 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.

It is my determination that Alternative 3 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.

Alternative 4 (Limited Herbicide)

It is my determination that Alternative 4 of the Tobacco Gulch Ecological Restoration Project may affect but is not likely to adversely affect the California red-legged frog.

It is my determination that Alternative 4 Tobacco Gulch Ecological Restoration Project will not affect critical habitat designated for the California red-legged frog.

It is my determination that Alternative 4 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.

It is my determination that Alternative 4 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.

It is my determination that Alternative 4 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.

Alternative 5 (Snag Recruitment)

It is my determination that Alternative 5 of the Tobacco Gulch Ecological Restoration Project may affect but is not likely to adversely affect the California red-legged frog.

It is my determination that Alternative 5 Tobacco Gulch Ecological Restoration Project will not affect critical habitat designated for the California red-legged frog.

It is my determination that Alternative 5 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the foothill yellow-legged frog.

It is my determination that Alternative 5 the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the western pond turtle.
It is my determination that Alternative 5 of the Tobacco Gulch Ecological Restoration Project may affect individuals, but is not likely to result in the trend toward Federal listing or loss of viability for the hardhead minnow.

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VII. Appendices
Appendix A
Maps of the Tobacco Gulch Project Area

Map 1. Tobacco Gulch Ecological Restoration Project Area, Georgetown Ranger District, El Dorado County, CA.
Map 2. Northern treatment units for the Tobacco Gulch Ecological Restoration Project with California red-legged frog potential breeding habitat and recorded observations.
Map 3. Southern treatment units for the Tobacco Gulch Ecological Restoration Project with California red-legged frog potential breeding habitat and recorded observations.
Map 4. 7th field watersheds (HUC 14) and riparian exclusion zones for the northern units of the Tobacco Gulch Ecological Restoration Project relative to treatment units and California red-legged frog recorded observations. Exclusion zones shown are for perennial (300 ft.) and intermittent (150 ft.) streams. Exclusion buffers for ephemeral streams are not shown and vary with percent slope (<35% slope = 25 ft., 35-70% slope = 50 ft., >70% slope = 75 ft.).
Map 5. 7th field watersheds (HUC 14) and riparian exclusion zones for the southern units of the Tobacco Gulch Ecological Restoration Project relative to treatment units and California red-legged frog recorded observations. Exclusion zones shown are for perennial (300 ft.) and intermittent (150 ft.) streams. Exclusion buffers for ephemeral streams are not shown and vary with percent slope (<35% slope = 25 ft., 35-70% slope = 50 ft., >70% slope = 75 ft.).
Map 6. Extent of the Limited Operating Period (north) surrounding known occupied or breeding sites for the California red-legged within the Tobacco Gulch Ecological Restoration Project.
**Map 7.** Extent of the Limited Operating Period (south) surrounding known occupied or breeding sites for the California red-legged within the Tobacco Gulch Ecological Restoration Project.