

Watershed and Fisheries Restoration Program

Biological Assessment

Appendices

July 2015

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Appendix A: Maps and Baseline Information

Multiple flood events, but most notable the 1964 flood, had major effects on many of the watersheds within the Forest including tributaries to the Klamath and Trinity Rivers such as Bluff, Red Cap, Horse Linto, and Willow Creek watersheds and other larger watersheds such as the Salmon, South Fork Trinity River and Mad River watersheds. Much of this information was captured in the Watershed Analysis (A-2) completed as part of the Aquatic Conservation Strategy.

Appendix A-1: Maps

Five hardcopy maps are provided along with the geodatabase used to create the maps.

Figure 1: Overall Location Map showing the Forest boundary in relation to watershed boundaries and the SONCC, NC and CC populations (smaller version found on page 13 of the WFRBA).

Figures 2-5: displays the following information by District:

- ESA listed fish distribution including locations that could potentially be occupied in certain flow conditions.
- Proposed locations for Instream Activities with the potential for the use of Heavy Equipment in some portion of the identified reaches. Instream activities in these locations would also include a significant hand crew portion. (Additional information on the Forest wide Aquatic Restoration proposed suite of projects in Appendix G-1).
- Current National Forest Transportation System roads and motorized trails identified by operation maintenance level¹.
 - Appendix A-3 summarizes the status of the roads and motorized trail analysis under the Travel Management Rule ((36 CFR 212) that is reflected on these maps.
 - Future Travel Management decisions could result in further decommissioning, upgrading, and storm-proofing under this consultation resulting in a shift in road maintenance (See Appendix G-2 for the Smith River National Recreation Area Restoration and Motorized Travel Management FEIS summary)
 - Appendix G-2 lists the road maintenance activities that would occur on NFTS roads, and the process by which proposed road maintenance activities would be reviewed on an annual basis to identify site specific mitigations and best management practices.

¹For a definition of operational maintenance levels, see Appendix G – 3, Road Maintenance CE Proposal

Appendix A-2: Watershed Analysis Documents and Information Sources

Listed below are Watershed Analysis completed as part of the Aquatic Conservation Strategy (LRMP IV-44), recent Environmental Documents that update these WAs, and TMDL listing documents and implementation plans. These documents provide historic and current information on watersheds where restoration actions may occur.

Recovery Plans

Southern Oregon/Northern California Coasts Coho Salmon Recovery Plan (September 2014)

Public Draft Coastal California Multispecies Recovery Plan – NC and CC Steelhead, CC Chinook (October 2015)

CDFW Coho Recovery Strategy (February 2004)

Forest Wide Analysis – Aquatic Focused

Six Rivers National Forest Land and Resource Management Plan, 1995

Watershed Condition Framework (2012) (See Appendix A-4 below)

Smith River

SONCC coho salmon, KMP steelhead, SOCC Chinook Salmon, Coastal Cutthroat

Smith River Landscape/Watershed Analysis	October 1995
Smith River Travel Management Draft EIS	April 2014
Smith River Travel Management Final EIS	In Progress 2016

Klamath River

SONCC coho salmon, KMP steelhead, UKTR Chinook salmon,

Red Cap WA	October 1995
Ishi-Pishi/Ukonom WA	July 1998
Lower Middle Klamath WA	March 2003
Orleans Transportation & Restoration EA	February 2007
Orleans Community Fuels/Vegetation EIS	June 2008
Klamath River TMDL – Sediment/siltation Dissolved Oxygen, Temperature, Nutrients	September 2019

Trinity River

SONCC coho salmon, KMP steelhead, UKTR Chinook salmon,

Grouse Creek WA	October 1995
Multiple Watershed Road NEPA	1996, 1997, 1998
South Fork Trinity WA	June 1999
Horse Linto, Mill, TishTang Creeks WA	March 2000
Mainstem Trinity River WA	May 2003
LT/MR Travel Management EIS	February 2010
Trinity River TMDL – Sediment	December 2001
South Fork Trinity TMDL – Sediment	December 1998

Eel River (including Van Duzen)

SONCC coho salmon, NC steelhead, CC Chinook salmon

North Fork Eel WA	June 1996
Van Duzen WA	January 1998
North Fork Eel Grazing Allotment EIS	December 2005
LT/MR Travel Management EIS	February 2010
North Fork Eel TMDL (lower) –Sediment/Temp	December 2002
North Fork Eel TMDL (upper) – Temperature	December 2002
Middle Mainstem Eel River TMDL– Temp/Sed	December 2005
Van Duzen TMDL – Sediment	December 1999
Mad River RD Transportation Plan	In Progress 2016

Mad River

SONCC coho salmon, NC steelhead, CC Chinook salmon

Pilot Creek WA	June 1994
Upper Mad River WA	January 1998
Little Doe/Low Gulch Timber Sale EIS	August 2007
Pilot Creek Off Highway Vehicle EA	1997
LT/MR Travel Management EIS	February 2010
Beaverslide Vegetation and Fuels EIS	November 2009, October 2011
Kelsey Vegetation and Fuels EIS	March 2014
Mad River Assessment– mainstem – RCAA	2013
Mad River TMDL – Sediment and Turbidity	December 2007
Mad River RD Transportation Plan	In Progress 2016

Remaining Watershed Analyses

Bluff Creek WA – In progress
Blue Creek WA
Middle Mad River WA

Appendix A-3: Transportation Planning

The Forest Service is currently engaged in a nationwide effort to identify the minimum road networks needed on national forests for resource management and visitor access. This effort is being implemented under the Travel Management Rule Subpart A (36 CFR, part 212). Roads on NFS lands are assessed through the travel management process both in terms of the benefits provided and the risks to natural resources, including water quality. Decisions as to whether a road will or will not be retained in the NFS road network will be made at the forest level by the forest supervisor.

Transportation Planning Status

The following sections provide an update on transportation planning (e.g., Inventory, Transportation Analysis Process and NEPA) from 1997 through to 2015. This summary includes transportation planning efforts prior to and subsequent to the Transportation Rule (Subpart A and B). The following table summarizes transportation planning efforts to date.

Subpart A: Requires agency to conduct a travel analysis process (TAP) to evaluate the road and trail system in order to: identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands; identify roads for decommissioning, and evaluate unneeded roads that might be converted to other uses (i.e., trails)

Subpart B: Involves the designation of roads and trails for motor vehicle use, including designation by vehicle class and season of use. The Travel Management Rule requires the clear identification of roads and trails open for motor vehicle use by means of a motor vehicle use map.

Six Rivers National Forest Transportation Planning Status by Ranger District

Watershed	Road-Watershed Risk Inventory	Transportation Analysis (TAP)	NEPA Status
Smith River National Recreation Area (NRA) Ranger District (RD)			
North, Middle and South Fork Smith	All roads on Middle and South Fork Smith inventoried for watershed risks– final report 2003	Smith River Roads Analysis - completed 2005; Subpart A and B in progress	NRA Travel Management DEIS completed April 2014 FEIS on Subpart A and B – in progress.
Goose Creek – recently acquired lands	Road risk inventory completed - 2012	Not started	Not started
Lower Trinity/Orleans/Ukonom Ranger Districts and Management Unit			
Lower Trinity River including watersheds such Horse Linto, Mill, and Tish Tang watersheds	All roads in the Mill, Tish Tang, and Horse Linto watersheds – completed by 1995	Prior to Subpart A – completed via NEPA	EA completed 1997 and implemented.

Watershed	Road-Watershed Risk Inventory	Transportation Analysis (TAP)	NEPA Status
South Fork Trinity and Willow Creek	All roads in the South Fork Trinity in 1995 and again in 2004	Prior to Subpart A - completed via NEAP	EA completed 1998-2000 and implemented
Grouse Creek	All roads in the watershed in 1993-95	Prior to Subpart A - completed via NEPA	EA completed 1996 and implemented 1997
Bluff, Camp, Red Cap, Slate watersheds and tributaries	All roads completed 2000-2004	Subpart A and B – completed 2006	EA completed in 2007 and fully implemented
East Ishi Pishi watersheds including Rock, Ti, Stanshaw, Irving watersheds	Conducted in 1998 -	Prior to Subpart A - completed via NEPA for both Subpart B and A	EA completed in 2007 and fully implemented
West Ishi Pishi watersheds including		Subpart B completed by Klamath National Forest 2010, Subpart A completed 2013	On hold
Mad River Ranger District			
Mad River, Van Duzen and North Fork Eel	Completed in 2011	Subpart B completed in 2010; Subpart A District-wide starting 2015	Not started
Upper Mad River	2012	Project specific TAPs for Kelsey Peak and Beaverslide vegetation management projects	In Progress – NFTS roads identified for decommissioning after project completions

Appendix A-4: Population and Watershed Spreadsheets

An electronic version of an Excel Workbook was provided to NMFS as part of this consultation with the following spreadsheets:

This workbook contains 6 tabs

Tab 1 – Read Me – Brief description of each spreadsheet

Tab 2 - Summary by Major Rivers:

- List of Rivers
- ESA Species
- Diversity Strata
- Forest Service Sensitive Anadromous Species

Tab 3 – Summary by Diversity Strata

- Species Present on USFS lands
- List of Populations

Tab 4 Summary by Populations and Rivers and whether or not the population is found on SRNF or downstream.

- Diversity Stratum
- Species
- List of Rivers

Tab 5 Stresses and Threats by Watershed and by Species

- Key limiting Stresses and Threats, including identification of those threats or stresses the Forest Service does not influence through management.
- % Forest Service Lands by Watershed

Tab 6 Results of Watershed Condition Framework at the 12HUC (aka 6th field HUC)

- This provides added information to environmental baselines and identification of watersheds in need of restoration actions.

Appendix B: Direction and Guidance

This appendix includes current direction and guidance for the Watershed and Fisheries Restoration Program. The following direction and guidance is from multiple sources (USFS, NMFS, Clean Water Act) with the overarching purpose of protecting water quality and minimizing impacts to listed salmonids. Many of these documents have overlapping or complementary direction which together shape potential actions and ensure the decision making process will result in minimal impact to aquatic resources.

Included in Appendix B are:

Appendix B-1: Law, Policy and Regulations

Two tables that summarize and provide citations for laws, handbooks and regulations that provides direction on management of aquatic resources on National Forest System Lands. Most of this direction is non-discretionary.

Appendix B-2: Best Management Practices

The National Best Management Practices (2013) and the Pacific Southwest Region (Region 5) Best Management practices (2012) that would apply to watershed restoration actions on SRNF. Region 5 is currently under both directions and the more conservative practice would apply.

Appendix B-3: Forest Service Policies/Guidance Documents

- Region 5 Hazard Tree Guidance
- Six Rivers National Forest Wet Weather Operations

Appendix B-4: National Marine Fisheries Service Guidance Documents

The following documents provide guidance to minimize impacts to listed salmonids. Activities under the WFRBA would comply with these specifications. Variances to these guidelines would be addressed via the “variance process” during project notification.

- NOAA/NMFS Water Drafting Specifications, 2001
- NOAA/NMFS Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act, June 2000
- NOAA/NMFS (Southwest Region) Guidelines for Salmonid Passage at Stream Crossings, 2001

Appendix B-1: Land and Resource Management Plans

Table 1. List of Law Policy and Direction that influence Watershed and Fisheries Program

Law, Policy and Direction	What	How	Who - Primary	QC/QA
LRMP - SRNF & KNF	Provides standards and guidelines that are intended to minimize impacts to resources - non-discretionary unless a plan amendment is done.	Applicable S&Gs incorporated into Proposed Action	All IDT	SO NEPA staff review of Project. IDT Leaders, team members coordinate with Forest Program Managers,
National Environmental Policy Act - Project Design Features	During NEPA, Additional actions to protect or minimize impacts to resources can be added. All PDFs/minimization measures for this Program consultation were reviewed by hydrologists, fish biologists, and geologists.	During the NEPA process specialists identify these PDFS based on the type of actions and the specifics of the location - Site specific exceptions to PDFs possible.	Fish bios, hydros, soils, geologist, wildlife, timber, fuels, etc. Level 1/Program Managers review of exceptions via Tier Form.	Primary person is project leader - responsible for ensuring all minimization measures get into the contract and then that the contract is implemented. BMPEP also is part of the QC/QA
Handbooks & Manuals	Provides direction on how resources are managed and what analysis is necessary. 2500 – Watershed Management 2600 – Fisheries Management	Resource specialists include direction when applicable	All IDT	SO NEPA staff review of Project. IDT Leaders, team members coordinate with Forest Program Managers.

Law, Policy and Direction	What	How	Who - Primary	QC/QA
Contracting Handbook	Direction/Contract language for putting out a contract to get the actions done.	PA and design features (including S&Gs) are put into standard contracting language for advertising	Contracting Officer , CO Reps,	This is what holds the contractor accountable for implementing the project. FS reps are present at all stages of on the ground work, monitoring and bringing in specialists if issues arise.
National Best Management Practices for Water Quality Management on National Forest System Lands - Technical Guide (April 2012) <u>See below for overlap between National and R5 BMPs</u>	National letter of intent that core Best Management Practices are being developed and that this technical guide would be incorporated into new planning efforts (April 30, 2012)	National directives (mandatory) are being developed that will require FS actions to include.	Physical scientists in conjunction with IDT members	National standardized monitoring protocols that will feed into a national data base structure to track the effectiveness of the best management practices.
Best Management Practices Soil and Water Conservation Handbook FSH 2509.22 - Chapter 10 (Updated 12/5/2011) <u>See below for BMPs relating to restoration</u>	FSM 2532 directs that BMPs will be used to control nonpoint source pollution related to all management actions with the potential to affect water quality on NFS lands. Implementing BMPS are how the FS complies with Clean Water Act and the CA Porter-Cologne Water Quality Control Act with associated Basin Plans	The programmatic BMPs described in this handbook are intended to lead to on-the-ground site specific BMP prescriptions. These BMPs are incorporated into the Proposed Action.	Hydrologist as part of the IDT	BMPEP program at the Regional scale, project specific as determined in the NEPA project

Law, Policy and Direction	What	How	Who - Primary	QC/QA
<p>BMP Evaluation Program (Region-Wide Report available on Request)</p>	<p>A Regional process that requires randomly selected projects are reviewed and those programs that are "not meeting" have new BMPs created. Based on BMP effectiveness monitoring from 2003 to 2007, road and range BMPs were updated in 2011. New BMPs were also developed for OHVs.</p>	<p>Regional targets - randomly selected sites - long term database on how well projects have been implemented and how effective are the BMPs</p>	<p>Hydrologists, earth scientists,</p>	<p>This is a QC/QA program. Also, long term instream monitoring at the 6th field is required - if no instream site, then project specific instream is required.</p>
<p>Wet Weather Operating Guidelines</p>	<p>In order to allow flexibility to contractors and still protect the road investment as well as prevent impacts to water quality, these guidelines were created to outline additional protective measures in the event a contractor chooses to operate in wet weather.</p>	<p>During the NEPA process, roads are ID that the contractor would need to rock if decision to haul during wet weather was made.</p>	<p>Hydrologist, Road engineers, Contract Reps</p>	<p>During the season identified as "Wet Weather" NOAA transitional emails can be used. Ground disturbing activities outside NOS are reported weekly with weather forecast to Level 1</p>
<p>Recovery Plans</p> <p><u>See Appendix D for how Fish and Watershed Program address coho recovery actions</u></p>	<p>Final SONCC Coho (2014)</p> <p>Draft Multi-species Plan (NC steelhead and CC chinook),</p> <p>Northern Spotted Owl (2012)</p>	<p>Recommend actions to benefit species as well as for wildlife, limit the amount of activity in TE habitat</p>	<p>Fish & Wildlife (and Botany in the SRNRA)</p>	<p>Consultation Process, Level 1 review of projects, Project Tier Form (Appendix L) for consistency and site specific review for unique circumstances</p>
<p>Endangered Species Act as amended</p>	<p>Requires Federal agencies to consult on actions that may affect listed or proposed species. Section 7a has been interpreted that Federal agencies have a mandate to conserve or recover listed species</p>	<p>Aquatic Conservation Strategy, Restoration actions, consultation</p>	<p>Fisheries, hydrologists</p>	<p>Level 1,</p>

Law, Policy and Direction	What	How	Who - Primary	QC/QA
Magnuson Stevens Act as amended	Requires Federal agencies to consult on actions that may affect habitat for coho and chinook. Uses Section 7a process for consultation	Aquatic Conservation Strategy, Restoration actions, consultation	Fisheries, hydrologists	Level 1 Annual Coordination Meeting
Clean Water Act, CA Porter-Cologne Water Quality Control Act	In response to these laws, the Forest Service manuals directs that BMPS will be sued to control nonpoint source pollution related to all management actions with the potential to affect water quality on NFS lands (FSM 2532)	Proposed Water Quality Waiver Process with required project checklists and annual monitoring report requirements	Hydrology and fisheries	BMP, NCWQCB Six Rivers North Coast Waiver Monitoring and Reporting Water Quality Plan. Checklists for actions that potentially discharge sediment
Wild & Scenic River Act	For wild and scenic river corridors, must protect the free flowing nature of the river and the outstanding remarkable values for which it was listed - for SRNF anadromous fish are the only ORV	All projects proposed in a WSR corridor must be reviewed to this standard. (Section 7 of the WSR act)	Fish, Recreation, Line	QC/QA – no specific monitoring for WSR – Actions and their effects are analyzed in NEPA
Smith River National Recreation Act	In 1990 Congress established the Smith River National Recreation Area to ensure the preservation protection a, enhancement of the Smith River's wild and scenic rivers and ecological diversity.	Actions proposed in the SRNRA must be consistent with the Act first, and then the Forest Plan	NRA Biologists, hydrologists, Planning	NRA staff IDT review, NEPA Staff review, monitoring through BMPEP program

Table 2. List of LRMP Standards and Guidelines that Apply to the Watershed and Fisheries Program

Category	Source	Where	What
Riparian Reserve Designation	Land Allocation IV 44-45	Riparian	Riparian Reserves have been designated along fish-bearing, perennial non-fishing bearing, intermittent, and ephemeral with scour stream channels within or adjacent to proposed commercial harvest units. The designation of these reserves conform to the interim Riparian Reserve width guidelines for Riparian Reserves (LRMP IV-44-45); the widths correspond to a slope distance of 160 feet from the edge of the channel for perennial non-fish bearing, intermittent, and ephemeral streams (signs of annual scour or deposition), and a slope distance of 320 feet for fish-bearing streams. Unstable and potentially unstable areas including earthflows are also included.
Riparian Reserve Designation	Land Allocation IV 44-45	Riparian	Riparian Reserves follow the Six Rivers LRMP standard and guideline for buffers on either side of permanently flowing non-fish bearing stream, including intermittent and ephemeral streams (LRMP IV-44 and 110). Riparian Reserve boundaries are not modified, however selected management activities are allowed within the riparian reserves to better meet ACS objectives and meet LRMP standards and guidelines (LRMP IV-44, 110).
Hazard	IV- 46	Within IRR	Fell trees in RR when they pose a safety risk. Keep felled trees on site when needed to meet coarse woody debris objectives
Water drafting	IV- 46	Within IRR	Locate water drafting sites to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows need to maintain riparian resources , channel conditions and fish habitat.
Roads	IV- 49	Within IRR	Avoid wetlands entirely when constructing new roads
Roads	IV- 49	Within IRR	Complete WA prior to construction of new roads or landings in RR
Roads	IV- 49	Within IRR	Minimize disruption of natural hydrologic flow paths, including diversion of streamflow, and interception of surface and subsurface flow.
Roads	IV- 49	Within IRR	Minimize sediment delivery to streams from roads - outsloping is preferred
Roads	IV-111	Project wide	No net increase in roads in Key watersheds
Roads - Temp	IV-115	Project wide	Temporary roads will be obliterated and rehabilitated
Thinning	IV- 49	Within IRR	Apply silvicultural practices for Riparian Reserves to control stocking, reestablish and manage stands, and aquire vegetation characteristics needed to attain ACSO
Thinning	IV- 49	Within IRR	Salvage trees only when WA determines that present & future coarse woody debris are met and other ACSO are not adversely affected
Watershed	IV- 71	Project wide	BMPs will be determined on a site-specific basis during project-level NEPA. The BMPs will be incorporated into implementation documents

Category	Source	Where	What
Soil	App L-1	Project wide	Highly erodible soils ground cover should be in excess of 90%. Skid road, trails, temporary roads, and landings would be tilled to the depth of 18" or more, straw mulched or re-spread slash and planted.
Soil	App L-1	Project wide	Large woody material is at least 5 logs per acre in contact with the soil surface. Desired logs are about 20" in diameter and about 10 feet long- attempt to protect from burning and mechanical disturbance
Soil	App L-1	Project wide	Soil porosity is at least 90% if total porosity found under undisturbed or natural conditions
Soil	App L-1	Project wide	At the endline of project activities, a layer of litter and duff should occur over at least 50% of the activity area (LRMP Appendix L).
Soil	App L-1	Project wide	Large woody material is at least 5 logs per acre in contact with the soil surface. Desired logs are about 20" in diameter and about 10 feet long- attempt to protect from burning and mechanical disturbance
Recreation	IV-49	Project wide	For existing recreation facilities within Riparian Reserves, evaluate and mitigate impact to ensure that these do not prevent, and to the extent practicable contribute to, attainment of ACS objectives
Recreation	IV-49	Project wide	Adjust dispersed and developed recreation practices that retard or prevent attainment of ACS objectives. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective, eliminate the practice or occupancy.

Appendix B-2: Best Management Practices

R5 FSH 2509.22 - Soil and Water Conservation Handbook – Chapter 10 Water Quality Management Handbook (December 10, 2011)

This section describes the Forest Service programmatic BMP guidance and describes procedures for developing site-specific BMP prescriptions using the guidance contained in the Water Quality Management Handbook. The programmatic BMPs described in this handbook are intended to lead to on-the-ground site-specific BMP prescriptions, but are not intended to be such prescriptions themselves. The programmatic BMPs described below include practices and standards, rather than specific erosion-control structures that would be included in site-specific BMPs. This distinction is important because confusion has resulted from using the term “BMP” to describe both performance standards and specific structures or prescriptions.

Based on BMP implementation and effectiveness monitoring from 2003 to 2007 (USFS 2008), BMPs for Road Management (2.1 to 2.13) and Range Management (8.1 to 8.3) were reviewed and revised. New BMPs were developed for Off-Highway Vehicles (4.7.1 to 4.7.9). All other BMPs are identical to those in the previous Water Quality Management Handbook (USFS 2000). Some formatting changes have been made to improve consistency in this document. Some disparities in the amount of detail and format remain apparent between groups of new and revised BMPs and the BMPs that were retained from the original 1981 handbook.

All BMPs are intended to be dynamic and to undergo periodic review and revisions to ensure that they incorporate the best available information and techniques.

As noted above, the programmatic BMPs described in this Water Quality Management Handbook are performance standards. They are neither detailed prescriptions nor solutions to specific nonpoint pollution sources. Rather, they are action-initiating mechanisms, processes, and practices that call for the development of site-specific detailed prescriptions that are designed at the project scale during planning. Development of prescriptions is aided by results from ongoing monitoring, and may also follow direction developed at the national forests.

A new procedure in this Water Quality Management Handbook is the inclusion of an On-Line Library, which includes reference materials for specific pollution-control techniques. National forest interdisciplinary teams are required to use techniques selected from these references when appropriate, or provide specific measures with equivalent or greater protection for water quality. The erosion control plans described in BMP 2.13 are required to rely on techniques described in one or more of the references in the On-Line Library.

BMPs should be used when appropriate for activities other than the primary activity for which they were developed. For example, BMPs 1.8 and 1.19, which deal with designation and protection of streamside management zones, are included with the Timber Management BMPs, but may and should be used for other types of activities and projects that may affect riparian zones, including engineering, recreation, and range management.

The BMPs are dynamic and always subject to improvement and development. Monitoring and evaluation of existing practices may disclose areas where refinement is warranted. Research, academia, and administrative studies are continually evolving new methods and techniques applicable to water-quality protection. Provision has been made to allow for the continued

updating and refinement of the existing practices as well as development of new practices (see chapter 4 of the BMP handbook, Adaptive Management).

BMPs are grouped into subject areas based on the type of resource management or use activity:

1. Timber management
2. Road building and site construction
3. Mining
4. Recreation
5. Vegetation management
6. Fire suppression and fuels management
7. Watershed management
8. Range management

Each BMP includes the following sections:

- **Practice:** Includes the sequential number of the BMP and a brief title.
- **Objective:** Describes the desired results or attainment of the practice as it relates to water-quality protection.
- **Explanation:** Further amplifies the brief title and expresses how to apply the practice. Describes criteria or standards when applicable.
- **Implementation:** Describes where to apply the practice; who is responsible for application, direction, and supervision; and when to employ the practice.

Best Management Practices (BMPs) were developed to comply with Section 208 of the Clean Water Act. BMPs have been certified by the State Water Quality Resources Control Board and approved by the Environmental Protection Agency (EPA) as a way of protecting water quality from impacts stemming from non-point sources of pollution. These practices have been applied to forest activities and have been found to be effective in protecting water quality. Specifically, effective application of the R-5 USDA Forest Service BMPs has been found to maintain water quality that is in conformance with the Water Quality Objectives in the North Coast Region Water Quality Control Board's (NCRWQCB) Basin Plan.

Best Management Practices exist both at the Pacific Southwest Region (National Forests within California) level and newly developed at the National level. At some point, the Washington Office may determine that the National BMP override the Regional BMPs at which point they become obsolete. At this time, if one BMP is more conservative, it is the one placed into the design features of a project.

The following is a list of the primary BMPs that apply to the Watershed and Fisheries Program. Appendix D includes a summary of the BMP effectiveness program evaluations on SRNF.

National BMP #	Best Management Practices	Regional BMP #
	Road Management Activities	
Road-1	Travel Management Planning and Analysis	2.1
Road-2	Road Location and Design	2.2
Road-3	Road Construction and Reconstruction	2.3
Road-4	Road Operations and Maintenance	2.4
Road-5	Temporary Roads	
Road-6	Road Storage and Decommissioning	2.6 and 2.7
Road-7	Stream Crossings	2.8
Road-8	Snow Removal and Storage	
Road-9	Parking and Staging Areas	
Road-10	Equipment Refueling and servicing	2.11
Road-11	Road Storm-Damage Surveys	
n/a	Aggregate Borrow Areas	2.12
Veg-2	Erosion Control Plans (roads and other activities)	2.13
WatUses-3	Water Source Development and Utilization	2.5
	Aquatic Ecosystems Management Activities	
AqEco-1	Aquatic Ecosystems Improvement and Restoration Planning	7.1
AqEco-2	Operations in Aquatic Ecosystems	
AqEco-3	Ponds and Wetlands	7.3
AqEco-4	Stream Channels and Wetlands	
	Other	
Min-8	Minerals Site Reclamation	
Rec-4	Motorized and Non-motorized Trails	
	Water Quality Monitoring	7.6

Examples of Applicable Best Management Practices

The following are two examples of how Best Management Practices are used in project NEPA to identify site specific best management practices. For the complete list of BMPs and their objectives, see *Water Quality Management for Forest System Lands in California* (USDA Forest Service 2011 - This document has been provided electronically to NMFS in the Support Folder).

BMP 2-11 (Servicing and Refueling of Equipment): To prevent pollutants such as fuels, lubricants, bitumens and other harmful materials from being discharged into or near rivers, streams, and impoundments, or into natural or man-made channels.

Example BMP Development for Spill Prevention

- Equipment will not be refueled or serviced within 200 feet of a stream channel.
- Equipment in poor repair (particularly oil leaks and/or cracked old hydraulic lines) will not be allowed to operate in this project.
- A Spill Prevention, Containment and Counter-Measures Plan is required for this project. In the plan, contractors and sub-contractors will be required to take all reasonable precautions to prevent pollution of air, soil, and water. Contractors and/or sub-contractors shall furnish oil absorbing mats for use under all temporarily stationary equipment on the Klamath River floodplain or within 200 feet of a stream channel. Contractors and/or sub-contractors shall furnish oil absorbing mats for use under all equipment that must be serviced (because of mechanical problems) on the Klamath River floodplain or within 200 feet of a stream channel. Contractors and/or sub-contractors shall keep oil absorbing mats and pads on site in sufficient supply to absorb potential contaminants from active leaks and to soak up excess surface contaminants from the ground in the event of a spill.

BMP 7.1 – Watershed Restoration: To repair watershed conditions and improve water quality and soil stability.

Example BMP Development for Side Channel Construction

- A 70,000 lb excavator will be used to construct additional pool habitat on the O’Neil Creek alluvial delta/Klamath River Floodplain at the mouth of O’Neil Creek. This will be done by excavating large boulders from the floodplain of the Klamath River to extend, widen and deepen pond habitat connected to the alluvial delta at the mouth of O’Neil Creek. The pond will be excavated to a depth as great as 6 feet. A shallow bench, approximately one foot in depth, will also be excavated around the perimeter and along the northern portion of the proposed pond to create shallow water habitat and encourage growth of hydrophytic vegetation.
- Several large boulders will be left within the proposed pond to provide complexity and cover. Spoils (mainly boulders and cobble) from the excavation will be placed in linear rows along the edges of the created wetland habitat to improve the potential for created habitats to persist after large flood events (50-100 yr). The excavator will also be used to remove a boulder or boulder cascade at the mouth of O’Neil Creek that currently impedes salmonid access to O’Neil Creek during low flows during the warm summer months.

Appendix B-3: Forest Service Policies and Guidance Documents

Wet Weather Specifications: This 2012 version of the wet weather specifications are included in all contracts involving the potential for actions occurring during the wet season. Further discussion on seasonal work is described in the WFR BA on page 26 under “Wet Period/Timings”).

Hazard Tree Guidelines: The Six Rivers National Forest has adopted the April 2012 Region 5 document (report #RO-12-01), titled *Hazard Tree Guidelines for Forest Service Facilities and Roads in the Pacific Southwest Region* for all projects containing hazards tree abatement components. This document describes the criteria for identify a tree as a hazard to public safety.

These hazard tree guidelines provide a means to identify and abate hazard from trees that are likely to fail and cause injury to either people or property on Forest Service system roads or at Forest Service facilities (i.e. campgrounds, boat ramps, trailhead parking, summer home tracts, administrative sites, kiosks, information centers, etc.) in California. They are intended to provide consistent direction for hazard tree identification and abatement and their use is highly encouraged and fully supported by Forest Health Protection (FHP) staff.

These guidelines are included in the references folder. These Hazard Tree guidelines are modified for Six Rivers National Forest by the LRMP standard and guideline (IV-46) and indicated on page 27 of this WFRBA.

Wet Weather/Winter Operation Standards

_____ TIMBER SALE/ SERVICE CONTRACT/STEWARDSHIP
CONTRACT

Contract Number _____

WET WEATHER/WINTER OPERATION STANDARDS (3/23/98) (Revised 6/23/2010) (Revised 1/17/2012)

Timber Sale Contract (TSC) Provision B(T)5.12 – Use of Roads by Purchaser, states in part “. . . Purchaser is authorized to use existing National Forest roads . . . when such use will not cause damage to the roads or National Forest resources and when hauling can be done safely.” Provision B(T)6.31 – Operating Schedule states in part “Subject to B(T)6.6 and when the requirements of B(T)6.66 are met, Purchaser’s operations may be conducted outside Normal Operating Season.”

The Normal Operating Season (NOS) is specified for each sale in A16/AT13 (6/2006 contract) (A16/AT13 4/2004 contract) of the TSC. The wet weather/winter season normally begins October 16th and ends around May 14st. **The Forest Service will monitor ground conditions and make a determination when the wet weather/winter season has started and has ended.**

Logging operations may be conducted outside the Normal Operating Season however, certain Wet Weather Operation requirements must be met in order to have operations proceed during the period outside of the NOS. In addition to reviewing existing TSC language, Weather Weather/Winter Operation Standards (WWOps) must be reviewed by the Forest Service representatives and the Purchaser prior to commencing operations, and again before subsequent operational periods.

This document is designed to clarify TSC language related to WWOps and to facilitate consistent implementation across the Six Rivers National Forest (including the Ukonom District of the Klamath National Forest).

The following standards outline the specific WWOps criteria that will be used to determine when operations may begin, what monitoring is required during operations, and when operations should be suspended. These standards provide for additional measures that are needed to protect the transportation system, maintain water quality, and preserve the soil resource. If measures beyond these standards are necessary, they must be agreed upon by all parties and documented in writing. These criteria also apply within the NOS when prolonged periods of wet weather are encountered.

A. GENERAL STANDARDS

The Purchaser's representative shall notify the Forest Service 2 days before any operations begin on the Sale Area (B(T) 6.1.) The Forest Service Representative (FSR) and Engineering Representative (ER) will document start-up and shutdown of wet weather/winter operations. Purchaser's operations shall be conducted reasonably to minimize soil erosion. Equipment shall not be operated when ground conditions are such that an immediate threat of damage to National Forest resources will occur (such as excessive soil compaction and soil displacement (B(T)9.3)).

Purchasers operations will be suspended by delegated Forest Service personnel if monitoring reveals a an immediate threat of damage to National Forest resources (B(T)9.3)).

The operation shall be continually monitored by the Purchaser and the Forest Service, including: sale administration personnel, purchaser representatives, and resource specialists. Conditions may change as operations progress during the wet season. If detrimental effects to the transportation system, water quality, or soil resources are encountered by either party, immediate notification by either the Purchaser or Forest Service shall occur. The Purchaser and Forest Service will work together to develop actions necessary to alleviate these effects. All actions will be approved by the Forest Service.

1. No sediment flow into natural drainages resulting from Purchaser Operations (including roads, landings, skidding/yarding) will be permitted at any time. Placement of straw bales or other sediment-catching devices at the outlet of erosion control structures may be needed to control sediment discharge. The terms “ruts” and “rills” are used to describe road or landing degradation. These terms are described as:
 - **Ruts** – sunken tracks or grooves left by the passage of vehicles and expressed as vertically and/or laterally displaced road material
 - **Rills** – depressions in the surface caused by the washing away of material by running water

B. ROADS

1. ALL ROADS

Roads must be determined to be suited for wet weather hauling. Factors to consider include: surface and subsurface material, soil type, drainage condition, stream crossings, safety hazards, and volume to be hauled. If the roadway can be used safely and can support vehicles without causing unacceptable damage to the road surface, soil displacement, damage to drainage structures, and with no off-site sediment movement due to water flow, it can be used. If not, the road will remain closed.

Wet Conditions

- a. Required road work for pre-haul must be accomplished prior to the wet season. If placement of an aggregate surface is required for wet weather hauling it shall be accomplished before the surface becomes saturated.
- b. Areas where soil has been disturbed by project activities, within riparian zones must be stabilized after October 15th, prior to close of business, or if the National Weather Service forecast is a “chance” (30% or more) of rain within the next 24 hours, or at the conclusion of operations, whichever is sooner. Drainage structures must be in place and functioning prior to precipitation events.
- c. Roads constructed by the purchaser/contractor through riparian reserves shall be constructed to prevent the stream from flowing onto the road.
- d. Roads damaged by Purchaser’s operations during the wet season shall be repaired at the Purchaser’s expense. Repair work shall be accomplished when the Forest Service

determines that conditions are such that additional damage to the resources will not occur.

- e. The Forest Service will complete a condition survey prior to and after wet season haul to determine the extent of the damage, if any. The Forest Service will provide the Purchaser with a description of the work to be performed. The Purchaser shall have the option of 1) repairing the damaged areas to Forest Service specifications, or 2) pay the Forest Service to repair the damage through a service contract.
- f. During the wet season the Purchaser may be required to perform additional routine maintenance as required for the safe and efficient use of the road, e.g., slide removal, culvert and ditch cleaning, and rock blading. Maintenance requirements will be determined by the Forest Service.
- g. The Forest Service shall determine when the deposits should be increased based on the condition of the subgrade. As stated on the Surface Replacement Deposit Schedule C(T)5.35 Road and Water Supply Use in the TSC, Surface Replacement Deposits will be *TRIPLED* for all volume hauled during the wet weather/winter season outside the Normal Operating Season.

Snow and Frozen Conditions

- a. Snow plowing may be approved by the Forest Service if the action will not cause damage to the road surface or associated drainage structures. During winter operations a minimum of 6 inches of snow will remain on the road surface after plowing. This will facilitate freezing of the road surface during early and mid-winter. To facilitate drying of the road surface and subgrade, *normally in the spring*, roads can be plowed to within 3 inches of the road surface. Roads will be plowed full width.
 - 1. Areas for disposal of excess snow will be agreed upon prior to snowfall to ensure that sidecasted snow is not deposited in drainages.
 - 2. Caution should be taken to prevent displacing the road surface. No soil or aggregate will be intermixed with the sidecasted snow.
 - 3. Snow berms will be breached to allow proper road drainage. These outlets shall be spaced to prevent concentrated road surface flows (usually spaced a minimum of every 300 feet). Erosion control structures (straw bales or filter fence) may be required at the outlets to collect road generated sediment.
 - 4. When directed by the Forest Service, road alignments requiring snow removal will be marked on both sides along the entire alignment to facilitate plowing.
 - 5. If the road surface freezes, the road surface segments must remain completely frozen and must be able to support the weight of any vehicle that will be driven on it. If the road thaws, see below...
 - 6. When any part of the active road length thaws and mitigations, such as rocking, cannot be implemented to ensure water quality protection, the road will not be used. This will preclude the use of the road by **all** vehicles (including administrative) unless the activity can be restricted to that portion of the road that remains frozen.

2. NATIVE OR AGGREGATE SURFACE

Roads requiring special hauling restrictions will be listed in the contract Schedule of Operations.

- a. The road shall be properly graded and ditched. Grading shall not occur after the road surface becomes saturated.
- b. Sediment shall not be allowed to extend more than 20 feet from the outlet of a drive-able drainage dip or lead-off ditch. Placement of straw bales or other sediment-catching devices at the outlets of constructed drainages may be necessary to control sediment discharge.
- c. If more than 10 percent of the road length is rutted 2 inches in depth or greater, the Forest Service may direct that the road be closed. (Percentage will be determined in one mile increments if road is longer than one mile.) If the road is closed, Purchaser shall barricade and sign the road to keep out all vehicular traffic. The type of barricade shall be determined by the Forest Service. Signing shall meet MUTCD standards.
- d. Portions of roads that lie within riparian reserves shall be rocked and locations where road rocking is required to harden the road surface for wet weather haul will be designated in writing and flagged on-the-ground by the ER. The minimum depth of rock will be established by the Forest Service. Hauling shall not occur on the rocked surface until inspected and approved by the Forest Service.
- e. Where a native-surfaced road meets a paved road, the road must be rocked to a depth of 3 inches for a minimum of 300 feet to prevent tracking of mud onto the paved road. If, after rocking, mud is still being tracked onto the paved road, the wheels of the log trucks and all other Purchaser vehicles may either be washed before entering the paved road or the pavement would be washed free of soil at the end of each operating day or at a more often frequency determined by the FSR/ER to maintain a safe operational condition of the road.

C. HARVEST OPERATIONS

Purchaser's operations will be suspended by delegated Forest Service personnel if monitoring reveals a an immediate threat of damage to National Forest resources (such as excessive soil compaction and soil displacement (B(T)9.3)).

- a. As per C(T)6.6 – Erosion Prevention and Control, after September 15th erosion prevention and control work shall be done as promptly as practicable. Drainage structures are very difficult to construct when landings, temporary roads, skid trails, cable corridors, etc. are wet or have snow on them. Erosion structures **MUST** be in place and functioning prior to precipitation events (greater than 30% chance of rain).

Ground-based Logging Systems:

1. “Normal” unrestricted operations may occur when the soil is dry throughout the entire top 8 inches of the profile.
2. No operations shall occur during measurable precipitation events or when any of the top 4 inches of soil is moist or wet. (Refer Attachment 1 - Field guide for soil moisture)
3. Restricted operations, as defined below, may occur when the top 4 inches of soil is dry throughout, but the soil is moist or wet below. (Refer to the soil moisture field guide)
 - a. **Conventional equipment** (track laying or rubber-tired). Skidding may occur on designated skid trails spaced an average of 75 feet apart. Endlining shall be used to move material to the designated skid trails.
 - b. **Cut-to-length.** Processing of material by a harvester may occur on designated skid trails spaced an average of 40 feet apart. Harvesters may retrieve material from off of skid trails by limiting access to 1 or 2 passes over the same piece of ground. Forwarders shall be limited to designated skid trails covered with a minimum of 6 inches of slash.
 - c. **Feller-Buncher.** Feller-bunchers may retrieve material from off of skid trails by limiting access to 1 or 2 passes over the same piece of ground. Skidding equipment shall be limited to designated skid trails spaced an average of 75 feet apart.
4. Landings will be constructed to facilitate proper drainage and monitored to ensure that drainage is effective. Sediment shall not be allowed to extend past the landing.
5. If rocking is required for wet weather/winter operations, the landing shall be rocked before the surface becomes saturated.
6. Snow acts as a soil insulator. Unless extreme low temperatures are reached the soil will not freeze under snow. Normally these conditions are not met until the middle of winter, if at all. Unless otherwise agreed, a minimum of 6 inches of machine-compacted snow with a minimum water content of 2 inches is required for over-the-snow logging. If minimum snow depth and snow compaction requirements are not adhered to, soil compaction and/or displacement may occur.

REVIEWED BY:

Forest Service Representative

Purchaser’s Representative

Date

Date

Attachment 1

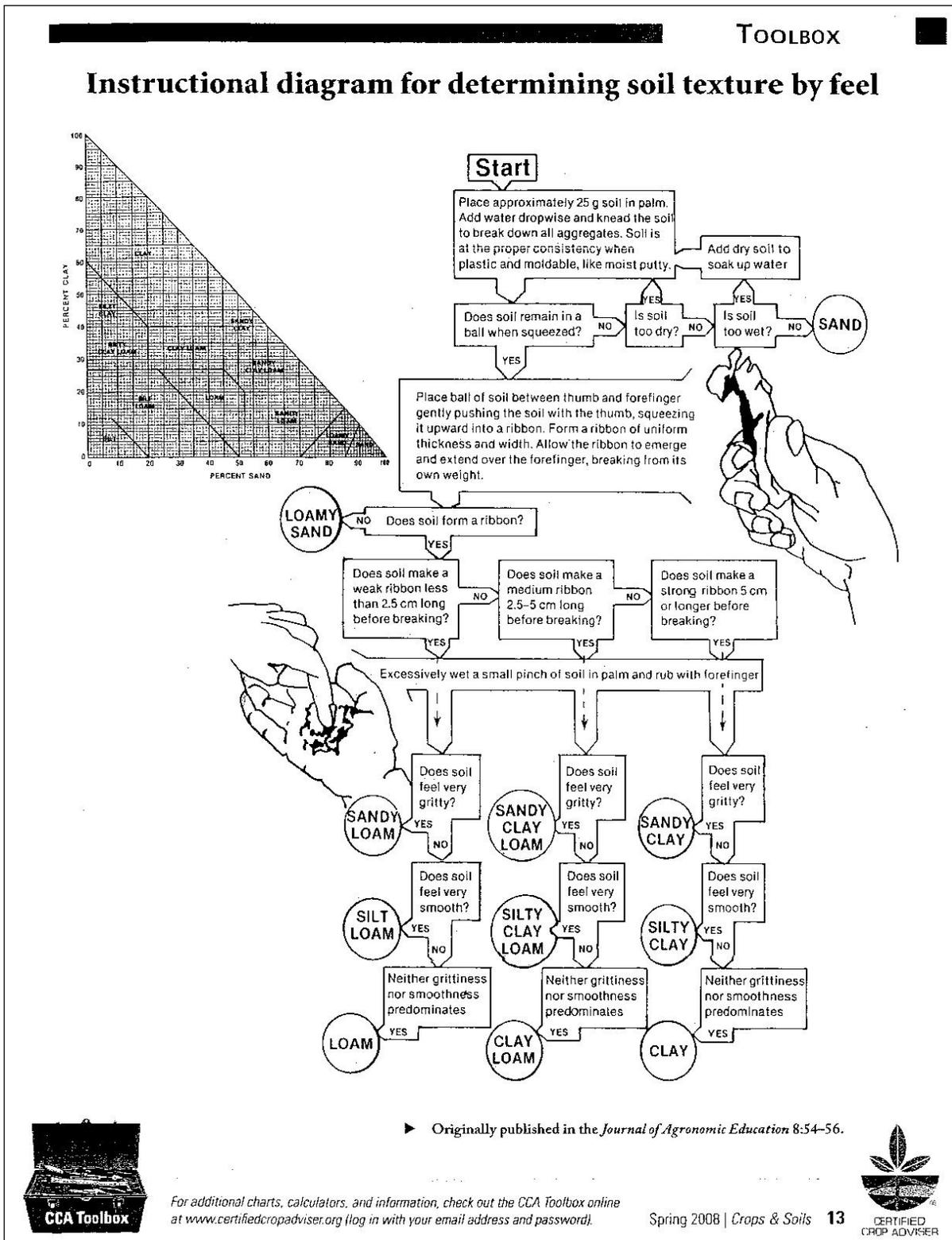


Figure 1 –Instructions for determining soil texture in the field

Steps to determine if soil is dry enough for logging operations

1. Dig a small pit and sample 4 to 6 inches below the mineral soil surface (below the surface litter).
2. To determine soil textures refer to Figure 1 for step by step instructions.
3. Collect enough soil to form a 1 to 2 inch ball by molding with hand pressure. Pick out excessive rock fragments & squeeze with 6 directional squeezes.
4. If a ball is formed that holds together after repeated tosses (1-2 feet in the air) then the soil is too wet for equipment operations.
5. Interpret results of soil texture using Field Guide to Soil Moisture Condition: Relative to Operability of Logging Equipment shown below in Figure 2.

Field Guide to Soil Moisture Conditions Relative to Operability of Logging Equipment (Soil Textural Group and Moisture Conditions)				
<u>Soil Moisture</u> (% increases downward)	<u>Coarse Soils</u> (coarse sand, loamy sand, fine sand, very fine sand)	<u>Light Soils</u> (sandy loam, fine sandy loam, very fine sandy loam)	<u>Medium Soils < 35% clay</u> (loam, silt loam, sandy clay loam, clay loam)	<u>Heavy Soils > 35 % clay</u> (heavy clay loam, silty clay loam, sandy clay silty clay, clay)
Dry Soils	Dry, loose, single grained, flows thru fingers	Dry, loose, flows thru fingers	Powdery, dry, sometimes slightly crusted but breaks down into powdery conditions	Hard, baked, cracked, sometimes has loose crumbs on surface
Slightly Moist Soils	Still appears dry, will not form a ball with pressure	Still appears to be dry, will not form a ball.	Somewhat crumbly, but will hold together from pressure. Ball breaks under repeated tossing.	Somewhat pliable, will form ball under pressure, not break upon tossing.
Moist Soils	Still appears dry, will not form a ball with pressure.	Tends to ball under pressure. Ball breaks under tossing.	Forms a ball, is very pliable, and will not break upon tossing At Plastic Limit.	Easily ribbons out between fingers, has a sticky feeling. > Plastic Limit.
Very Moist Soils	Tends to stick together slightly, sometimes forms a very weak ball. Breaks upon tossing.	Forms a weak ball, holds up upon tossing, will not slick. At Plastic Limit.	Forms a ball, is very pliable, and slicks readily if high in clay. > Plastic Limit.	Easily ribbons out between fingers, has a sticky feeling. > Plastic Limit.
Wet Soils	Upon squeezing, free water may appear. Wet outline is left on hand. Not plastic.	Upon squeezing, free water may appear. Wet outline is left on hand.	Can squeeze out free water. Wet outline and sticky.	Puddles and free water forms on surface. Sticky with wet outline.

Figure 2 – Soil Moisture Field Guide.

- **If current soil conditions are above solid black line and equipment exerts less than 6 psi then it is safe to operate.**
- **If current soil conditions are above double black line and equipment exerts more than 6 psi then it is safe to operate.**
- **When soil conditions fall below the solid black line it is unsafe regardless of type of equipment to be used.**

Plastic limit is the water content in the soil at the point of a solid and semisolid state where soil begins to puddle.

Slick is the descriptor that denotes the amount of clay in the soil that creates a slippery feeling.

Use with care as this guide may not be appropriate for all conditions given the high variability in soils, topography and climate. Field Guide Developed by Brad Rust: Forest Soil Scientist, Shasta Trinity National Forest (brust@fs.fed.us).

Appendix B-4: National Marine Fisheries Service Guidance Documents

The following documents provide guidance to minimize impacts to listed salmonids. Activities under the WFRBA would comply with these specifications. Variances to these guidelines would be addressed via the “variance process” during project notification and during the Annual Coordination Meeting.

These guidelines would be implemented in all habitat potentially occupied by ESA listed salmonids. In the event NMFS updates their guidance documents the revisions would be implemented and documented through the Fisheries Level 1 process.

- NOAA/NMFS Water Drafting Specifications, 2001.
- NOAA/NMFS Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act, June 2000
- NOAA/NMFS (Southwest Region) Guidelines for Salmonid Passage at Stream Crossings, 2001

Double click on document image to open entire guidance in Adobe. Complete copies are located in the project file.



WATER DRAFTING SPECIFICATIONS

National Marine Fish Service
Southwest Region

August 2001

“Water-drafting” is a short-duration, small-pump operation that withdraws water from streams or impoundments to fill conventional tank trucks or trailers. Usually, this water is used to control road dust, or for wildfire management.¹ Short term water drafting is also used to temporarily de-water a construction site, or to temporarily divert water around a construction site.

The specifications below are given primarily for the protection of juvenile anadromous salmonids, in waters where they are known to exist; but they also may be applied to protect a host of other aquatic organisms as well. The issue of sufficient in-stream flow for life support of the aquatic ecosystem should be addressed by a local Fish & Game biologist. Temporal and cumulative effects should be considered on a watershed scale. While we give some guidelines in that area, the actual impact of water drafting on stream ecology should be assessed and monitored at the local level by qualified personnel.

The main focus of this guidance is the construction, operation, and maintenance of a fish screen module(s) that must be installed at the in-stream end of the drafting hose to protect small salmon and steelhead fry from being entrained in the hose, or impinged on the surface of the screen. The specifications are based on the critical “approach velocity” at the screen surface², and a recognition that many temporary screens will not be outfitted with automatic cleaning devices to remove debris buildup. Since it is difficult to measure water velocities in the field, only the construction, pumping capacities, and operations are specified. Variances from these specifications may be considered on a case-by-case basis.

¹ In case of emergency wildfire, where human life is in danger, the operator may disregard the screening requirement if a suitable screen is not immediately accessible.

² Approach velocity is the horizontal velocity vector component, typically measured at a distance of 3 inches from the screen face.



Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act *June 2000*

Purpose and Scope

The purpose of this document is to provide guidelines for the safe use of backpack electrofishing in waters containing salmonids listed by the National Marine Fisheries Service (NMFS) under the Endangered Species Act (ESA). It is expected that these guidelines will help improve electrofishing technique in ways which will reduce fish injury and increase electrofishing efficiency. These guidelines and sampling protocol were developed from NMFS research experience and input from specialists in the electrofishing industry and fishery researchers. This document outlines electrofishing procedures and guidelines that NMFS has determined to be necessary and advisable when working in freshwater systems where threatened or endangered salmon and steelhead may be found. As such, the guidelines provide a basis for reviewing proposed electrofishing activities submitted to NMFS in the context of ESA Section 10 permit applications as well as scientific research activities proposed for coverage under an ESA Section 4(d) rule.

These guidelines specifically address the use of backpack electrofishers for sampling juvenile or adult salmon and steelhead that are *not* in spawning condition. Electrofishing in the vicinity of adult salmonids in spawning condition and electrofishing near redds are not discussed as there is no justifiable basis for permitting these activities except in very limited situations (e.g., collecting brood stock, fish rescue, etc.). The guidelines also address sampling and fish handling protocols typically employed in electrofishing studies. While the guidelines contain many specifics, they are not intended to serve as an electrofishing manual and do not eliminate the need for good judgement in the field.

Finally, it is important to note that researchers wishing to use electrofishing in waters containing listed salmon and steelhead are not necessarily precluded from using techniques or equipment not addressed in these guidelines (e.g., boat electrofishers). However, prior to authorizing the take of listed salmonids under the ESA, NMFS will require substantial proof that such techniques/equipment are clearly necessary for a particular study and that adequate safeguards will be in place to protect threatened or endangered salmonids. Additional information regarding these guidelines or other research issues dealing with salmon and steelhead listed under the ESA can be obtained from NMFS' Protected Resources Divisions in:

Washington, Oregon, and Idaho

Leslie Schaeffer
NMFS
525 NE Oregon Street, Suite 500
Portland, Oregon 97232-2737
Phone: (503) 230-5433
FAX: (503) 230-5435
Internet Address: Leslie.Schaeffer@noaa.gov

California

Dan Logan
NMFS
777 Sonoma Ave., Room 325
Santa Rosa, California 95404-6515
Phone: (707) 575-6053
FAX: (707) 578-3435
Internet Address: Dan.Logan@noaa.gov



**National Marine Fisheries Service
Southwest Region**



**GUIDELINES FOR SALMONID PASSAGE
AT STREAM CROSSINGS**

1.0 INTRODUCTION

This document provides guidelines for design of stream crossings to aid upstream and downstream passage of migrating salmonids. It is intended to facilitate the design of a new generation of stream crossings, and assist the recovery of threatened and endangered salmon species. These guidelines are offered by the National Marine Fisheries Service, Southwest Region (NMFS-SWR), as a result of its responsibility to prescribe fishways under the Endangered Species Act, the Magnuson-Stevens Act, the Federal Power Act, and the Fish and Wildlife Coordination Act. The guidelines apply to all public and private roads, trails, and railroads within the range of anadromous salmonids in California.

Stream crossing design specifications are based on the previous works of other resource agencies along the U.S. West Coast. They embody the best information on this subject at the time of distribution. Meanwhile, there is mounting evidence that impassable road crossings are taking a more significant toll on endangered and threatened fish than previously thought. New studies are revealing evidence of the pervasive nature of the problem, as well as potential solutions. Therefore, this document is appropriate for use until revised, based on additional scientific information, as it becomes available.

The guidelines are general in nature. There may be cases where site constraints or unusual circumstances dictate a modification or waiver of one or more of these design elements. Conversely, where there is an opportunity to protect salmonids, additional site-specific criteria may be appropriate. Variances will be considered by the NMFS on a project-by-project basis. When variances from the technical guidelines are proposed, the applicant must state the specific nature of the proposed variance, along with sufficient biological and/or hydrologic rationale to support appropriate alternatives. Understanding the spatial significance of a stream crossing in relation to salmonid habitat within a watershed will be an important consideration in variance decisions.

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Appendix C: Stresses and Threats – Recovery Plans

The following outlines stresses and threats identified in the SONCC coho salmon recovery plan (NMFS 2014). The public draft Multispecies Recovery Plan for NC steelhead and CC Chinook salmon has not been released; however the co-managers review indicates actions to improve conditions for SONCC would benefit steelhead and Chinook. Stresses are the physical, biological, or chemical conditions and associated ecological processes that may be impeding salmon recovery. Threats are activities or impacts that cause or contribute to the stresses that limit recovery of the species. This WFRBA identifies specific actions to reduce threats to SONCC coho salmon and enhance aquatic conditions such that stresses can be reduced.

The following tables list the threats and stresses and those SONCC populations where the threat or stress was identified as High or Very High. The final column identifies actions within this WFRBA that would reduce the effects of the threats or, improve the watershed conditions such that the corresponding stresses are also reduced.

SNRF ability to address threats and stresses in the individual basis is dependent on the percentage of the land under SRNF administration as well as the location (typically the headwaters).

The following SONCC populations have less than approximately 10% of the basin under SRNF management: Redwood Creek (1%) Lower Eel/Van Duzen (10%).

Prioritization

Implementation of projects under the Watershed and Fisheries program would be based on available funding and grants received. Projects that reduce Very High or High threats and stresses would have a higher priority to be implemented.

Table 1. High and Very High Threats identified for SONCC coho and NC steelhead Populations on SRNF

Threats • Notes/Specifics	Coho Populations	NC Steelhead	Forest Service Ability to Influence Threats
Roads • No road-stream blockages on FS roads • Sediment input primary concern • Reducing risk of road failure during storm events	Smith River Lower Klamath River South Fork Trinity River Lower Trinity River Redwood Creek Mad River Lower Eel/Van Duzen rivers Mainstem Eel River North Fork Eel River	Mad River North Fork Eel Van Duzen River	Complete Travel Management for minimum necessary road system Decommission roads Upgrade/stormproof roads Maintain roads
Timber Harvest • Improved harvest rules • Harvest associated with illegal marijuana grows	Lower Klamath River Redwood Creek Lower Eel/Van Duzen rivers Mainstem Eel	Mad River (Private lands)	Aquatic Conservation Strategy and ecological restoration limit threat No Proposed Activities as part of this WFRBA.
Channelization/Diking • Prominent in low-	Smith River Lower Klamath River		Little influence as SRNF has not

Threats • Notes/Specifics	Coho Populations	NC Steelhead	Forest Service Ability to Influence Threats
lying areas far downstream of USFS lands	Lower Trinity River Redwood Creek Mad River Lower Eel/Van Duzen rivers		channelized or diked streams
Agricultural Practices	Smith River Lower Klamath River Lower Eel/Van Duzen rivers		Little influence as SRNF does not manage agricultural lands
Dams/Diversions • Managed through Special Use Permits • Illegal marijuana grows	Lower Klamath River Middle Klamath River South Fork Trinity River Lower Trinity River Lower Eel/Van Duzen rivers Mainstem Eel River	Mad River Van Duzen River	Enhance instream conditions for cool water refugia Restore flow conditions from illegal marijuana grows Site specific improvements to diversion infrastructure would provide benefits
Mining/Gravel Extraction • Instream Gravel Mining – most are downstream of FS lands • Suction Dredging • Historic Mines	Redwood Creek Mad River		Managed through Special Use permits – require all SUP to use NMFS gravel extraction guidelines Restoration of historic mine sites to reduce water quality impacts
Urbanization	Lower Eel/Van Duzen rivers		Little influence as SRNF does manage agricultural lands or urban areas.
Fishing and Collecting	No high threat watersheds	Van Duzen River	SRNF does not manage or have influence over fishing regulations
Climate Change	Lower Klamath River South Fork Trinity River Lower Trinity River Mainstem Eel River North Fork Eel River		Improve instream and watershed conditions to make streams more resilient
Hatcheries	South Fork Trinity River Lower Trinity River Mad River (NC steelhead)	Mad River	SRNF does not manage or have influence over fishing regulations
High Severity Fire	Middle Klamath River Mainstem Eel River North Fork Eel River	North Fork Eel River	Reducing the severity of fires was not included as part of this WFRBA although

Threats • Notes/Specifics	Coho Populations	NC Steelhead	Forest Service Ability to Influence Threats
			identified as a recovery action.
Invasive/Non Native Species Disease Predation and Competition	Lower Eel/Van Duzen rivers	Van Duzen River	Improve instream conditions to make streams more resilient Implement noxious weed Best Management Practices Remove invasive plants from riparian areas Partner with CDFW when invasive fish species are found on Forest.

Table 2. High and Very High Stresses identified for SONCC coho and Poor rating for NC steelhead populations on SRNF

Stress • Notes/specifics	SONCC coho populations	NC Steelhead populations	Forest Service Proposed Actions to Reduce Stress
Adverse Hatchery Related Effects	South Fork Trinity River Lower Trinity River	Mad River	SRNF does not manage or influence hatcheries. Information on hatchery fish is collected during spawning surveys on SRNF lands.
Impaired Water Quality • increased water temperature • decreased dissolved oxygen • increased turbidity. • Disrupted food web processes	Smith River Middle Klamath River South Fork Trinity River Redwood Creek Mad River Lower Eel/Van Duzen rivers Mainstem Eel River North Fork Eel River	Mad River NF Eel River Van Duzen	Riparian Restoration Reduce sediment sources BMPS to reduce action-related sedimentation Nutrient supplementation Reduce risk of road failure Livestock barriers/management
Degraded Riparian Forest	Lower Klamath River Salmon River South Fork Trinity River Redwood Creek	North Fork Eel River	Conifer recruitment Planting Remove invasive species Protect streambanks

Stress <ul style="list-style-type: none"> Notes/specifics 	SONCC coho populations	NC Steelhead populations	Forest Service Proposed Actions to Reduce Stress
	Mad River Lower Eel/Van Duzen rivers Mainstem Eel River North Fork Eel River		(More intensive silvicultural treatments are not proposed as part of WFRBA)
Increased Disease/Predation/Competition	Middle Klamath River Lower Eel/Van Duzen rivers Mainstem Eel River North Fork Eel River		Protect cool water refugia Improve tributary conditions
Altered Sediment Supply	Lower Klamath River Middle Klamath River South Fork Trinity River Lower Trinity River Redwood Creek Mad River Lower Eel/Van Duzen rivers Mainstem Eel River North Fork Eel River	Mad River North Fork Eel River Van Duzen River	Reduce sediment sources Road decommissioning/upgrading Reduce impacts from roads, OHV, livestock access to streams Reduce recreation site impacts
Lack of Flood Plain and Channel Structure <ul style="list-style-type: none"> High/Very High for all streams managed by SRNF Flood plains are found in lower gradient streams 	Smith River Lower Klamath River Middle Klamath River Salmon River South Fork Trinity River Lower Trinity River Redwood Creek Mad River Lower Eel/Van Duzen rivers Mainstem Eel River North Fork Eel River	North Fork Eel River	Instream enhancement to add complexity by adding LW and boulders Reconnecting side channels, off channel habitat Encouraging existing beavers
Altered Hydrologic Function <ul style="list-style-type: none"> Timing Magnitude Summer rearing 	Lower Klamath River South Fork Trinity River Lower Trinity River Mainstem Eel River North Fork Eel River		Improve instream conditions Restore flow conditions from illegal marijuana grows
Barriers <ul style="list-style-type: none"> Road-Stream Low flow barriers 	Smith River Middle Klamath River South Fork Trinity		No road-stream barriers Improve instream

Stress • Notes/specifics	SONCC coho populations	NC Steelhead populations	Forest Service Proposed Actions to Reduce Stress
	River		conditions to reduce low-flow barriers Open tributary mouths during low flows
Impaired Estuary/Mainstem Function	Smith River Lower Klamath River Middle Klamath River Redwood Creek Mad River Lower Eel/Van Duzen rivers Mainstem Eel River North Fork Eel River	Van Duzen River North Fork Eel River	SRNF does not manage any estuaries
Adverse Fishery and Collecting Related Affects	No High or Very High Stress Watersheds		SRNF does not manage or have influence over fishing regulations Use of NMFS electrofishing guidelines

Appendix D: WFRP Decision Process and Monitoring

Appendix D-1: Decision Framework

The following flow chart was created to show all of the checkpoints and input opportunities for a project moving from the initial concept through the decision – making process all the way to implementation and monitoring. The purpose of this flow chart is to clearly demonstrate that the decision making process under the Watershed and Fisheries Program will result in recovery actions on the ground that minimize impacts to water quality and listed salmonids.

Appendix D-2: Regional Best Management Practices Evaluation Program 10 Year History

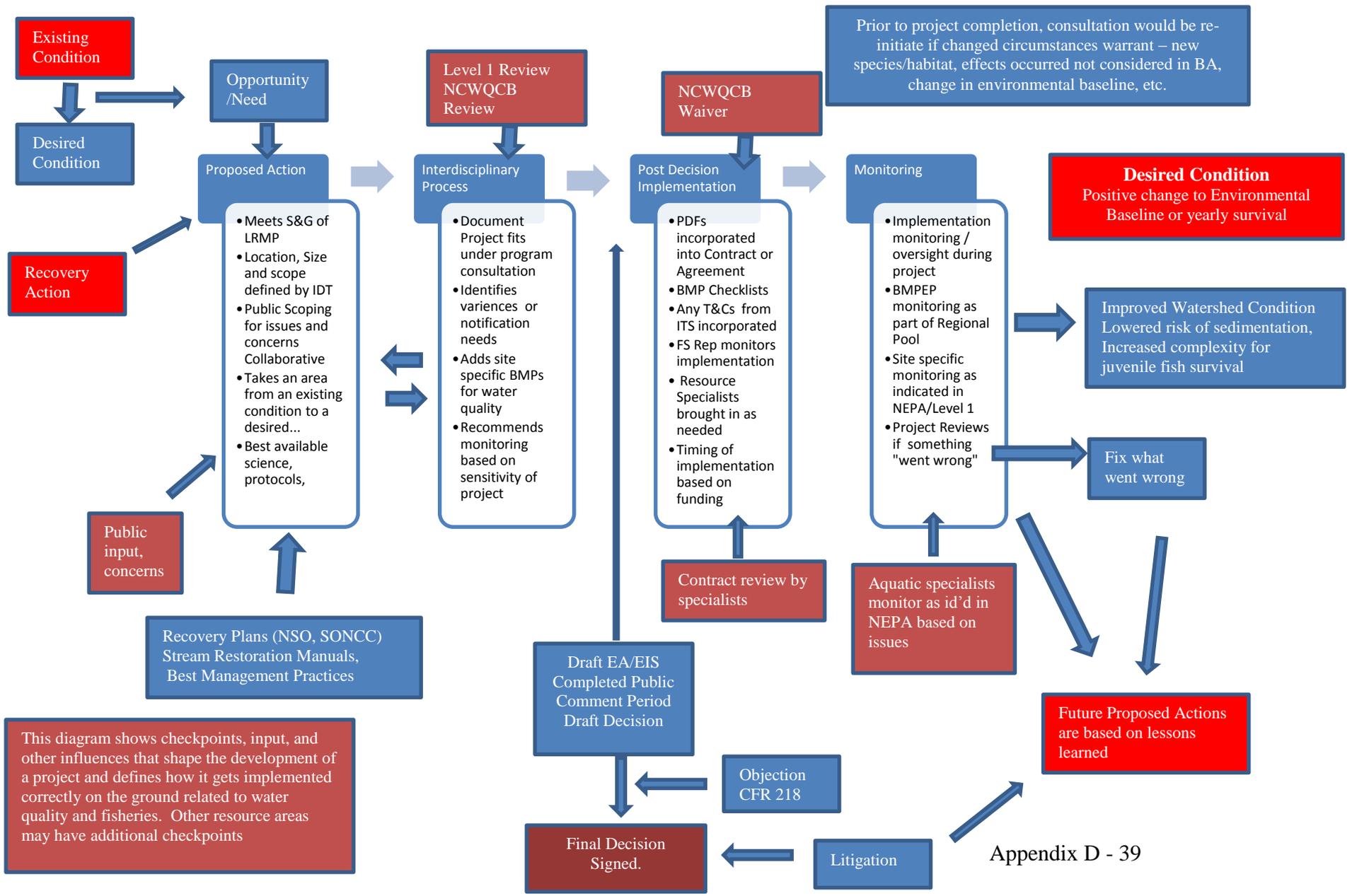
The best demonstration of this process working is the results of the Best Management Practices Effectiveness Program (BMPEP) which specifically looks at whether or not the BMPs were implemented correctly and if they were effective in meeting the objectives of preventing impacts to water quality.

Appendix D-3: Water Quality Monitoring and Reporting Program Annual Report.

This Monitoring and Reporting Program (MRP) is associated with the Categorical Waiver of Waste Discharge Requirements for Nonpoint Source Discharges on National Forest Lands Order Number R1-2010-0029 (hereinafter referred to as “Waiver”). The terms and conditions of the Waiver stipulate a monitoring and reporting program that assesses water quality in upland watersheds as well as in-stream channel reaches. This MRP outlines the suite of monitoring activities, their locations, and associated methods and protocols (Quality Assurance Protection Plan (QAPP) for the Six Rivers National Forest. The U.S. Forest Service is responsible for conducting monitoring as required in the Six Rivers Land and Resource Management Plan (LRMP) and in the Waiver MRP.

This report has had additional monitoring added in order to also serve as a monitoring report for National Marine Fisheries Service on the implementation of this WFR BA as the goals of the two regulatory agencies overlap.

Appendix D-1: Decision Framework for Restoration Projects



Appendix D-2: Regional Best Management Practices Evaluation Program Reports

The United States Department of Agriculture, Forest Service (USFS) Pacific Southwest Region initiated its Best Management Practices Evaluation Program (BMPEP) in 1992. This program fulfills monitoring commitments to the State Water Resources Control Board (SWRCB) and facilitates adaptive management by assessing and documenting the efficacy of the USFS water quality management program. Each of the 18 National Forests in California provide data to the BMPEP database.

An essential part of the BMPEP is to update BMPs that were not effective in protecting water quality and identify barriers to proper implementation. Since the inception in 1992, the BMPs and BMPEPs have undergone multiple revisions, including adding two new evaluations to address road decommissioning and dispersed recreation and several existing protocols were improved. Substantial database improvements were also made in 2002 and follow-up database work was initiated in 2003.

The following are summaries of two Regional reports: 1992 to 2002 and 2002 to 2007. These reports are available upon request. SRNF information is incorporated within these reports. See Appendix D-3 for SRNF data on BMP implantation and effectiveness for the years 2012-2014. With the advent of the National BMP and BMPEP direction in 2012, there is a high likelihood of the Regional BMP protocols being replaced.

1992 to 2002 Regional BMPEP Report

Evaluations were made using 29 different monitoring procedures that focus on different programs, including timber, engineering, recreation, grazing, mining, prescribed fire, and vegetation management. Conclusions presented below are based on analysis of over 3,000 of these evaluations performed at randomly selected sites between 1992 and 2002.

BMP Implementation

- For all activities combined, BMPs were implemented at 85% of observation sites during the 1992-2002 monitoring period.
- Between 1992 and 2002, BMP implementation rates were 87% for timber, 85% for engineering, 68% for recreation, 77% for prescribed fire, and 87% for vegetation management.
- Between the first and second half of the 1992-2002 monitoring period, implementation rates increased by 5% or more for six of the 29 protocols. Decreases of more than 5% occurred for four evaluations.
- BMP implementation rates for individual Forests ranged from 60% to 96%. Implementation was 80% or greater on 14 of 18 Forests [including SRNF] and 75% or greater on all but one Forest.
- Administrative phases were the most problematic project stages for BMP implementation. Key indicators of the reasons for poor implementation are reported for each BMP or category of BMPs.

BMP Effectiveness

- Between 1992 and 2002, BMPs for all activities combined were effective at 92% of the sites at which they were implemented. These rates were similar between 1992-1996 and 1997-2002.
- BMPs were effective 94% of the time for timber, 89% for engineering, 89% for recreation, 98% for prescribed fire, and 89% for vegetation management. Only qualitative results are available for grazing and mining.
- During the 11-year monitoring period, BMP effectiveness rates for individual evaluations ranged from 69% to 100%. These rates were 90% or greater for 21 of 29 evaluations and 85% or greater for all but three evaluations. Only one protocol had effectiveness rates less than 80%.
- Effectiveness rates associated with only one protocol increased by 5% or more between the first and second half of the 1992-2002 monitoring period. Decreases of more than 5% occurred for two evaluations.
- BMP effectiveness rates on individual Forests ranged from 83% to 99%. Thirteen of 18 Forests had rates greater than 90% [including SRNF].
- Causes of poor effectiveness for each BMP or category of BMPs were determined based on comments from field evaluators and responses to key effectiveness questions.

When effectiveness problems are evident at project sites, field observers evaluate and provide comments regarding probable effects on beneficial uses. Observers' comments were used to classify likely effects with respect to their magnitude, extent, and duration and to establish an overall effects ranking. For all activities combined, water quality effects classified as potentially significant were found at 60 (<2%) of the sites monitored between 1992 and 2002. Most of these were related to engineering practices (37, 2% of engineering sites). In particular, road-related activities were most problematic. Fifteen were related to timber practices (1% of sites) and one (<1%) occurred at a recreation site. Two (<2%) were associated with grazing, one (<1%) resulted from a prescribed fire, three (<4%) were found at mining sites, and one (<1%) was related to vegetation management. With the exception of stream crossings, the number of significant effects observed decreased substantially between the first and second half of the 1992-2002 monitoring period.

Effects classified as significant were typically caused by lack of or inadequate BMP design or implementation.

To facilitate adaptive management, monitoring results were used to identify and prioritize 22 issues and associated corrective actions. Eight of these relate to overall program management. Three issues pertain to timber management, specifically streamside management zones, skid trails, and landings. Six issues are associated with engineering, including water source development, in-channel construction, snow removal, restoration of borrow pits and quarries, stream crossings, and road surfacing, drainage, and slope protection. The final five issues involve recreation, grazing, mining, and prescribed fire.

The USFS has implemented several other monitoring programs, including stream monitoring, to compliment the BMPEP onsite evaluations. Together, these programs address a range of monitoring issues including project-level implementation and effectiveness of BMPs, validation of BMP effectiveness, compliance with regulatory standards, assessment of conditions and trends in water quality and aquatic resources, and evaluation of cumulative watershed effects

(CWE). The best demonstration of this process working is the results of the Best Management Practices Effectiveness Program (BMPEP) which specifically looks at whether or not the BMPs were implemented correctly and if they were effective in meeting the objectives of preventing impacts to water quality.

2002 to 2007 Regional BMP Report

The USDA Forest Service Pacific Southwest Region (USFS) Best Management Practices Evaluation Program (BMPEP) included 2,861 randomly-selected onsite evaluations of Best Management Practice (BMP) implementation and effectiveness between 2003 and 2007.

For the 5-year reporting period:

- 86% of Best Management Practices (BMPs) were rated as implemented and 89% were rated as effective.
- Among implemented BMPs, 93% were rated effective.

Of the 2,861 on-site evaluations used for this report:

- 98% indicated no significant adverse impacts on water quality.
- Only 8% of the onsite evaluations indicated any measurable potential or actual adverse impacts on water quality.

Many of the BMPs rated as ineffective were ineffective owing to lack of implementation rather than shortcomings in the BMPs. Improved implementation of BMPs is the single most useful step that can be taken to improve water-quality protection on national forests in California. Several BMPs were not highly effective even when implemented, and can be revised to improve protection of water quality. These include BMPs for developed recreation sites, road stream crossings, and water source development. Several BMPs have been 95 to 100% effective when implemented, including almost all BMPs for timber harvests, vegetation management, and prescribed fire. Given the documented performance of these BMPs, effectiveness monitoring of these protocols can be reduced in the future in order to focus on areas where improvement is needed. BMP implementation and effectiveness have improved slightly in comparison to results for 1992 to 2002 (Staab, 2004), and the number of BMPEP evaluations has increased. BMP implementation on national forests in California was within the range of results reported in previous studies on private lands in the western United States. Measures planned to improve protection of water quality on national forest system lands in the Pacific Southwest Region include implementation checklists for all projects with ground disturbance, annual reviews of national forest watershed staffing, revision of selected BMPs that have relatively low effectiveness when implemented, modification of the BMPEP scoring procedures, and adoption of a new regional water-quality monitoring program

Appendix D-3: SRNF Water Quality Report.

This Monitoring and Reporting Program (MRP) is associated with the Categorical Waiver of Waste Discharge Requirements for Nonpoint Source Discharges on National Forest Lands Order Number R1-2010-0029 (hereinafter referred to as “Waiver”). The terms and conditions of the Waiver stipulate a monitoring and reporting program that assesses water quality in upland watersheds as well as in-stream channel reaches. This MRP outlines the suite of monitoring activities, their locations, and associated methods and protocols (Quality Assurance Protection Plan (QAPP) for the Six Rivers National Forest. The U.S. Forest Service is responsible for conducting monitoring as required in the Six Rivers Land and Resource Management Plan (LRMP) and in the Waiver MRP.

This report has had additional monitoring added in order to also serve as a monitoring report for National Marine Fisheries Service on the implementation of this WFR BA as the goals of the two regulatory agencies overlap. This is the first report sent to North Coast Water Quality Control Board (NCWQCB) as a requirement of the Waiver. SRF is currently working NCWQCB in the development of the new waiver program (2015). A MRP will continue to be required.

Water Quality Monitoring Reporting Objectives:

The objectives of the Water Quality Monitoring and Reporting Program are to:

1. Determine whether BMPs collectively are effective in protecting and improving water quality at the watershed scale. BMP effectiveness will be assessed by monitoring trends in channel characteristics that affect beneficial uses and by comparing measures of central tendency for channel characteristics of streams downstream of managed areas with those in reference watersheds
2. Share monitoring results and trends of in-channel monitoring.
3. Share annual watershed and fisheries restoration activities that implement goals and objectives lined out in watersheds with TMDL requirements.
4. Share other incidental monitoring activities that occur on the forest as they apply to watershed condition and beneficial uses.

The 2012-2014 SRNF Water Quality Monitoring Report was provided electronically to National Marine Fisheries Service as part of this consultation (in the Support Document folder) and will continue to be provided annually as part of this consultation.

Appendix E: Status of Past Consultations

The WFRBA replaces all previous watershed and fisheries restoration consultation since the original listing of SONCC coho salmon in 1997. For each of the following programmatic and large scale projects, there is a description of the following: description of what the consultation covered; analysis of any differences in design features or aquatic conservation measures; and the remaining work to be accomplished.

2007 Orleans Transportation BA

- 1) The proposed action included 202 miles of road decommissioning and 457 road maintenance and upgrades (rolling dips, culvert replacements etc.). A small amount of motorized trail work was proposed. The associated EA implemented Subpart A and B of Travel Management the Orleans Ranger District (not including the Ukonom Ranger District). The Wet Weather season was identified as October 22 to June 15.

Consultation was concluded with a LOC from NMFS (Project File). This determination was agreed to via the Level 1 process based on the lack of overlap of instream culvert work to coho habitat and the project design features (including BMPs) that limited the amount of work per watershed.

- 2) No changes have occurred to the Aquatic Conservation Strategy and the 1995 Six Rivers National Forest LRMP; therefore, all S&Gs identified in Appendix B would have been included in the design features.
 - Best Management Practices were updated in 2010 to reflect the results of the effectiveness program.
- 3) Remaining work to be accomplished:
 - Annual road maintenance is continuing, (including storm proofing activities as needed) as identified in Appendix G-3.
 - The remaining road decommissioning work as of June 2015 is as follows

Road Number	Mileage	Approx. Number of Stream Crossings	6th field watershed
10N15A	0.5	3	Slate Creek-Klamath River
11N65A	0.67	3	Boise Creek-Klamath River
10N05A	2.65	1	Red Cap
10N03.3	0.07	4	Red Cap
10N13.2	2.6	2	Red Cap
10N13.4	0.5	2	Red Cap
10N45	2.8	5	Boise Creek-Klamath River
Total	9.79	20 xings	

2007 Smith River Road Restoration BA

- 1) This original project proposed to maintain and manage 470 miles of system roads, remove and decommission 72 miles of system roads and 132.5 miles of non-system roads, and improve and add 47 miles of non-system roads as motorized trails or as system

roads. The Wet Weather season was identified as generally from mid October to the beginning of June for Port Orford cedar root rot concerns. The WWOS in Appendix B would be followed.

- Consultation was concluded with a LOC from NMFS (Project File). This determination was agreed to via the Level 1 process based on the lack of overlap of road work occurring within coho habitat (greater than 300 feet) and the project design features (including BMPs) that limited the amount of work per watershed.
- 2) The NEPA document that would have implemented this consultation was not completed due to challenges from the public. Since the 2007 consultation, BMP have been updated and additional National BMPs were created and the SONCC recovery plan released that identified the Smith River as a core population.
 - 3) In the convening years and ongoing public involvement, the proposed alternatives have stayed similar; however restoration of recreation sites and one bridge replacement have been added to the proposed action alternatives. The Final Smith River National Recreation Area Restoration and Motorized Travel Management EIS is forthcoming.
 - Appendix G contains a summary of what the 2015 Final EIS proposes and documents that all activities within the 2015 Final EIS would be implemented according to the design features and notification process described in this WFRBA consultation. Any site specific variances would be reviewed in the Annual Coordination meeting prior to implementation on the ground.

2010 LT/MR OHV Route Designation BA

- 1) The decision reduced the number of miles used by the public by 198 miles, reduced the number of stream crossings by 472 (project wide) and reduce the number of miles of routes bisecting Riparian Reserves by 46.7 miles. Fifty-seven miles of unauthorized routes were added to the current NFTS as motorized trails, of which 28 miles would be subject to waterbars and/or route definition to reduce the risk to water quality impacts. These latter trails would not be added to the Motor Vehicle User Maps until all water quality upgrades were completed.
 - Consultation was concluded with a LOC from NMFS (Project File). This determination was agreed to via the Level 1 process based on the lack of overlap of instream work to coho habitat (greater than 300 feet) and the project design features.
- 2) No changes have occurred to the Aquatic Conservation Strategy and the 1995 Six Rivers National Forest LRMP; therefore, all S&Gs identified in the BA are still included in the design features. Best Management Practices were updated in 2010 to reflect the results of the effectiveness program.
- 3) Remaining activities under this project includes the ongoing trail maintenance to protect the trail investment as well as to limit the amount of erosion off site.

Appendix F: Project Compliance with the WFRBA

Compliance with this Six Rivers Watershed and Fisheries Restoration Program Biological Assessment (WFRBA) will be guided by the integration of General Aquatic Conservation Measures and Project Design Criteria (PDC) into the NEPA process as well as reviewing the annual program of work at the Level 1 Annual Coordination meeting to provide a tracking of level of effects under this Program consultation.

Appendix F-1 includes the Fisheries Level 1 Local Operating Guidelines updated to reflect the requirements of this consultation.

Appendix F-2 includes the process for individual projects and NEPA decisions to be covered under the WFRBA and meet the requirements of NEPA and ESA.

Appendix F-3 includes the form for documenting the determination of effects for individual projects, including documenting potential incidental take.

Appendix F-1: Streamlining Local Operating Guidelines

Local Operating Guidelines – updated April 15, 2015

National Marine Fisheries Service & Six Rivers National Forest

The purpose of this document is to provide guidelines on how 2013 Streamlining MOU would be implemented between the two identified agencies. In 2014, NMFS and SRNF began developing program level consultations to address regularly occurring activities under the 1995 SRNF land and management resource plan and the 2014 final Southern Oregon/Northern California Coasts coho salmon recovery plan. These Local Operating Guidelines were updated in February 2015 and again in April 2015 to identify program level coordination efforts identified in the first program level consultation on the Watershed and Fisheries Restoration Program Biological Assessment (2015).

Team members.

Level	NAME	PHONE	E-MAIL
“Level 0.99”			
Smith River	Mike McCain	(707) 457-3853	mmccain@fs.fed.us
Klamath River	LeRoy Cyr	(530) 627-3262	lcyr@fs.fed.us
Trinity River	Andrea Collins	(530) 629-4930	acollins03@fs.fed.us
Mad, VD and Eel Rivers	Karen Kenfield	(707) 441-3585	kkenfield@fs.fed.us
Level 1 Team			
	Karen Kenfield	(707) 441-3585	kkenfield@fs.fed.us
	Leslie Wolff	(707) 825-5172	leslie.wolff@noaa.gov
Level 1.5 Liaison			
	Carolyn Cook	(707) 441-3551	cacook@fs.fed.us
	Vacant	(707) 825-5175	
Level 2 Team			
	TBD	(707) 825-5160	
	Merv George	(707) 441-3534	mgeorge@fs.fed.us

General

- Annual Coordination Meeting – Typically held in the first quarter of the calendar year
 - Review upcoming projects under Program Consultations (i.e., Watershed and Fisheries Restoration BA)
 - Document variances to Design Features
 - Identify any pre-construction notification needs
 - Identify additional monitoring needs
 - Review completed projects under the Watershed and Fisheries Restoration Program
 - Track limits per watershed
 - Track recovery actions
 - Review projects that do not fall under a Program Consultation
 - Review Local Operating Guidelines for updates/improvements
- Hold additional quarterly meetings (or as needed) for WFR Program actions or stand alone projects

- Record notes of all meetings and have them reviewed by Level 1 team before finalization
- Keep members posted on timing/other priorities/workloads – use consultation tracking spreadsheet (attached) & update regularly, or prior to each quarterly meeting

SRNF Level 0.99 Role:

- When bringing a project/BA to Level 1 for review and discussion, clearly indicate what feedback you are looking for from NMFS: minimization measures, prelim determination, field visits, etc. Provide Project Form for stand-alone project or WFR BA Programmatic Notification information one-week prior to Level 1 meeting.
- Provide detailed description of the proposed action, identifying minimization measures, to Leslie and Karen – have Project IDT leader attend meetings as desired.
- Schedule project Level 1 Team meetings and arrange field visits outside of the quarterly meetings as necessary.
- Keep all Level 1 members informed on discussions concerning projects and consultation process – cc all emails to Leslie and Karen
- Address all suggestions, comments and questions, provided by Leslie or Karen by making necessary changes directly to the draft or final BA.

SRNF Level 1 Role:

- Provide coordination for Forest and lead interface with NMFS. Schedule quarterly meetings (or as needed) with NMFS Level 1;
 - Schedule Pre Fire Season Meeting required as per Fire Retardant EIS and RoD.
- Responsible for meeting management, setting the agenda for meetings with Forest Supervisor and NMFS, and providing all participants with meeting documents
- Level 1 meetings require Level 1 coordinator presence and are to be face to face meetings – not VCT. Lunch is negotiable.
- Coordinate tasks associated with Level 1 consultation (e.g. moving programmatic BE/BAs forward; providing consistency for NLAA and LAA determinations internally and with NMFS)
- May review draft and final BAs for consistency and completeness prior to delivering to NMFS if requested by project biologist otherwise will review within the same timeframe as Leslie.
- Send all requests for consultation directly to Will Stelle NMFS West Coast Region in care of the Arcata office with the consultation package, including final BAs, appendices and maps and provide electronic versions of all documents to NMFS Level 1:

Will Stelle, c/o Alecia Van Atta, NMFS California Coastal Office,
1566 Heindon Road, Arcata, California 95521

Send a CC copy of letter to Alecia Van Atta, Assistant Regional Administrator:

Alicia Van Atta, NMFS, 777 Sonoma Avenue, Room 325,
Santa Rosa, CA 95404

NMFS Level 1 Role:

- Review and comment on draft and final BAs using track changes – work with the SRNF project biologist and attempt to limit BAs to one review draft and one final draft.

- Will send comments regarding the draft or final BA via electronic mail to both the Project Biologist and Karen
- Let SRNF know if comments will take longer than 2 weeks to complete. cannot be returned in a reasonable time
- Prepare draft LOC or BO (referred to as Decision Documents)
- For LAA actions, have NMFS Level 1.5 review draft document.
- Share draft decision documents when requested with Forest Service Level 1 prior to finalization & transmittal

Level 1.5 Liaison Roles

- Facilitate cooperation and communication among the Level 1 Team and between Level 1 and Level 2 Teams.
- Be the first round of review if issues arise that may need to be elevated to see if solutions can be found. Review elevation letters from Level 1 to Level 2 if needed.
- Maintain abreast of current local and regional policies and provide guidance to respective Level 1 Team members.
- Review draft documents when requested.
- Facilitate development of programmatic consultations to streamline consultation process.

Level 2 Team Role

- Meet at least once a year with full team to discuss how Streamlining was implemented during the previous year and the SRNF program of work for the coming year.
- Meet more frequently as needed with each Level 2 Team member inviting other participants as appropriate (e.g. District Rangers, Level 1.5 Liaisons, Level 1 Team)
- Meet to resolve any elevation issues and provide timely feedback to staffs on decisions.

Level 1 Fish Individual Consultation Project Form

Send 1 week prior to Level 1 Team

Name of Project: _____

Today's Level 1 date: _____ Past Level 1 dates: _____

Proposed Implementation Date/Decision Date: _____

Project Biologist: _____ IDT Leader: _____

Size of Project (acres or miles): _____

Status of proposed action:

Description of the project: - Attached Draft BA or Draft NEPA? Yes _____ No: _____

Including current information and status of :

- Description of the Proposed Action
- Proposed Action Area
- Parts of the Action and where they are located (see below for Riparian Reserve info)
- Timing of the Action – (seasonality, duration, # of years)
- Watersheds – environmental baselines from which to measure effect

Is this project in compliance with Forest Plan management area direction? Y N

Does it adhere to all applicable Standards and Guidelines? Y N

Identify those that specifically minimize impacts to TE Fish Species in this project

Identify any Project Design Features that are currently required or planned for implementation of this activity, as it relates to fisheries/riparian/watershed management – including project specific BMPs.

How does this project meet SONCC Recovery Plan Objectives?

For Projects within Riparian Reserves, what ACS Objectives are being attained and how?

Riparian Reserve Information

Is any part of the project within Riparian Reserves Yes _____ No _____
 Distance of closest activity to ROD Channel (annual scour) _____ to unstable area _____
 Distance of closest activity to Perennial Channel _____
 Distance of closest activity to Critical Habitat _____
 Distance of closest activity to Occupied TE Habitat _____

Riparian Reserve Activity Summary - can be Y/N or acres or modified as appropriate

Inner Buffer Zone Identified? Yes _____ Width? _____ No _____
 (Inner Buffer: sometimes defined as “no – touch” although activities that are fundamentally a “no effect” to water quality, TE salmonids and their critical habitat could occur within) such a buffer

Project Specific Activities or Project Elements	ID Activities that would occur WITHIN....			Outside Interim Riparian Reserves	Comments – distance to TE Salmonid Occupied Habitat (GIS) FSS species notes
	Inner Buffer Zone (IBZ) No touch?	1 site potential tree up to IBZ (Inner RR)	2 site potential trees up to 1 site potential tree (Outer RR)		
Ground disturbing equipment					
Temp Road construction					
Hazard Trees					
Etc....					

Describe any aquatic related monitoring associated with this project.

Attach a map of the project with:

- Proposed Action Area (and Project Area)
- Fish distribution/critical habitat
- Location of all project elements

Preliminary effects determination for consultation:

Appendix F-2: Process for Tiering to WFRBA

Steps

The following steps would be followed when funding and staffing is available for individual NEPA projects or projects to be implemented under multi-year NEPA that address a particular landscape (e.g. Smith River NRA Restoration and Motorized Travel Management FEIS) or a particular program (e.g., 15 year Forest-wide Aquatic Restoration Proposal).

Integrate appropriate WFRBA components into Project NEPA, Design and Contract

Project Design Criteria (PDC) and Aquatic Conservation Measures (ACM) listed in this WFRBA will be incorporated into contract language, agreements or force-account implementation plans. Best Management Practices will be implemented for land disturbing activities or projects that may impact water quality.

If changes to the PDC or ACMs are necessary based on site specifics, follow the Minor Variance Process (page 23 of WFRBA). Minor variance requests must be documented (e.g., Project Notification Form or Level 1 notes) and include the following information:

- i. cite the restoration activity and the design feature that needs variance
- ii. define the requested variance
- iii. explain why the variance is necessary
- iv. provide a rationale why the variance will either provide a conservation benefit or, at a minimum, not cause additional adverse effects

Variances that do not result in an effect to listed salmonids (following or not following a minimization measure would have no effect positive or negative) would be documented as such on the checklist/compliance document and included in the Project Record.

Determine Preliminary Project Specific Effects

During the NEPA process or prior to Annual Coordination Meetings, project activities would be run through evaluation criteria to determine where impacts had a probability of occurring or what pathways/habitat indicators would be impacted (from the NMFS 2004, NMFS Matrix of Pathways and Indicators Analytic Process). Project specific effects can be identified based on:

- **Proximity** ~ the geographic relationship between the project element or action and the species and their habitat.
 - **Take:** If project occurs within occupied habitat, determine probability of “take” occurring (Document using Appendix F-3 or similar)
- **Probability** ~ the likelihood that the species or habitat will be exposed to the biotic or abiotic effects of the project elements. Actions that have a higher probability of delivering sediment into the stream system (hydrological connectivity) would have a higher probability of causing an effect. Once that sediment enters the stream channel, the distance to anadromous habitat (as indicated on map) can be determined. Other

considerations in determining if an effect could occur are the number of individuals present and the condition of the watershed (environmental baseline).

- **Magnitude, Duration and Timing** ~ the severity and intensity of the effect (level of response to a stressor), how long the activity may impact (press/pulse effect) and the life stage at which the impact may be felt.

Identify if Project Notification is Necessary

The following guidance is for identifying when projects should be brought forward to the Annual Coordination Meeting for pre-implementation review and when projects, especially recovery actions, would be shared.

Notification Not Required

Projects that have either no effect or an extremely low anticipated effect to listed species and their habitat would not need to be brought forward during the annual Level 1 meeting; however, consistency with this BA would be documented via the NEPA decision or, in the case of the multi-year NEPA decisions above, the tracking/compliance process identified within (see “Multi-year Program NEPA” section below).

- Projects that are determined to be a no effect to listed salmonid species or their habitat (NE).
- Projects that have an extremely low anticipated effect based on type of project and distance to habitat (proximity). These projects may be brought forward to the Annual Level 1 coordination meeting at the request of Level 1 team.
- These types of projects are typically not claimed as watershed or fisheries accomplishments for TEP salmonids, although other benefits may be present.

Notification Not Required Prior to Implementation

Projects that may have some insignificant or discountable level of effect, positive or negative, and do not result in take of a listed species or adverse effects to critical habitat. Projects may be located within or near listed species habitat. These projects do not require notification prior to construction but would require tracking by watershed and would be shared at the annual Level 1 meeting for tracking recovery activities.

- Projects that are entirely beneficial (NLAA)
- Projects that may result in some level of effect from short term minor sediment delivery, species disturbance, however, the changes to habitat or disturbance to species were determined to be insignificant or discountable (NLAA) and project results in a long term benefit to aquatic ecosystems.
- Projects that may involve temporary change in flow conditions, or, in the case of improving water diversion locations, involve setting minimum flows that could affect fish movement or cool water Refugia.
- Typically these are projects that are claimed as a watershed or fisheries accomplishment for water quality or TE fish habitat improvements.

Notification Required Prior to Implementation

Projects that have the potential (based on proximity, probability and magnitude analysis or stressor/response analysis) to result in a “may affect, likely to adversely affect” determination

to listed species or designated habitat would require notification prior to construction (typically at the Annual Coordination Meeting) and completion of post-project reporting.

- Any project that involves listed fish handling or potential for harm (e.g., displacement, etc.) to occur due to type of action and/or actions occurring near or within occupied habitat.
- Projects that may result in a short term minor sediment delivery or turbidity, temporary change in flow conditions, species disturbance, where the changes to habitat or disturbance to species cannot be discounted and project results in a long term benefit to aquatic ecosystems.
- Any project that involves full spanning structures or engineered projects in listed fish habitat.

Projects that result in a solely negative effect could not tier to this WFRBA and would require separate consultation.

Review of Projects at Level 1 Annual Coordination Meeting

The purpose of the Level 1 Annual Coordination Meeting is to review potential watershed and fisheries restoration projects planned for implementation during the upcoming work season (information included on the project notification forms). It is typically held in the first quarter of the calendar year, but may vary when agreed by both agencies.

- Review upcoming projects under Program Consultations (i.e., Watershed and Fisheries Restoration BA) to:
 - Document variances to Design Features as per Minor Variance Process
 - Identify any pre-construction notification needs
 - Identify any additional monitoring needs
- Review past years projects under the Watershed and Fisheries Restoration Program to:
 - Track limits per watershed
 - Track recovery actions

Project Notification Form

The following Project Notification Form is an example format for the information that needs to be provided to the Level 1

Project Notification Form

(See Page 22 of WFR Program BA)

Project Name: _____

NEPA Document Name and Date: _____

Location: _____

Project Biologist: _____ IDT Leader: _____

Timing (start and end date): _____ WWO's ? _____

Activity Type – As listed in this WFR Program BA: _____

Description of the project: - Attachment (e.g., grant proposal)? Yes _____ No: _____

Including current information and status of :

Description of the Proposed Action

Proposed Action Area

Parts of the Action and where they are located (Project Elements))

Watersheds – environmental baselines from which to measure effect

Extent –miles treated and estimated miles of habitat benefitted (WIT Tracking)

TEPS Anadromous Fish Information:

- Species Affected
- Distance to Occupied Habitat (Proximity)
- Fish handling required? (seining, block net/ electrofishing/dewatering)

Verification of incorporation of General Aquatic Conservation Measures/ Project Design Criteria:

Variances to WFRBA

- A. Restoration Activity/Design Feature needing variance?
- B. Describe variance, including need for variance
- C. Rationale for why variance will provide equal or greater conservation benefit
- D. Effect of Variance

Describe any aquatic related monitoring associated with this project.

Preliminary effects determination for consultation:

Today's Level 1 date: _____

Record Level 1 recommendations, additional information request and monitoring requirements:

Six Rivers National Forest Watershed and Fisheries Restoration Program Annual Compliance and Implementation Checklist -

Level 1 Review Date:

Project # (Yr+#)	NEPA Document OR Project Name under large scale NEPA decision	Project Contact	Stream Name & HUC number	Implementation Date (Start and End dates xx/xx/xxxx)	Miles Treated or Acres Treated (Report numbers in WIT with mapping)	Location/Title of Project Information Source <ul style="list-style-type: none"> ○ BA? ○ Grant? ○ Contract? ○ NEPA? ○ Notification Form? 	NEPA Document	Monitoring Req'd?	Fish Handling Y/N	Determination
2015-1	Proposed Forest Wide Aquatic Restoration EA	Carolyn Cook	All Watersheds	2015 - 2030	TBD	Scoping Document	New	Y	N & Y	NLAA LAA
2015-2										

Appendix F-3: Determination of Effects Documentation

1. Are there any proposed/listed fish species and/or proposed/designated critical habitat in the watershed?

NO – The Project is above Matthews Dam No effect

YES – List Distance to Occupied Habitat..... Go to 2

2. Will the proposed action(s) have any effect whatsoever² on the species and/or critical habitat?

NO No effect

YES Go to 3

3. Does the proposed action(s) have the potential to hinder attainment of relevant "functioning appropriately" indicators?

A. NO Go to 4

B. YES Go to 5

4. Does the proposed action(s) have the potential to result in "take"³ of any proposed/listed fish species or destruction/adverse modification of proposed/designated critical habitat?

A. NO Not likely to adversely affect

B. YES Likely to adversely affect

5. Does the proposed action(s) have the potential to result in "take"² of any proposed/listed fish species or destruction/adverse modification of proposed/designated critical habitat?

A. NONot likely to adversely affect

B. YES Likely to adversely affect

2 Any effect whatsoever includes small effects, effects that are unlikely to occur, and beneficial effects (all of which are recognized as "may effect" determinations). A "no effect" determination is only appropriate if the proposed action will literally have no effect whatsoever on the species and/or critical habitat, not a small effect, an effect that is unlikely to occur, or a beneficial effect.

3 "Take"- The ESA (Section 3) defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct". The USFWS (USFWS, 1994) further defines "harm" as "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering", and "harass" as "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering".

Documentation of Expected Incidental Take

Project Name and location of action(s):

Species: SONCC_____ NC Steelhead_____

1. The proposed action may result in incidental take through which of the following mechanisms?

Harm: Significant habitat modification such that impairment of behavioral patterns such as breeding, feeding, sheltering, and others (identify).

Harass: Significant disruption of normal behavior patterns which include, but are not limited to, breeding, feeding, sheltering, or others (identify).

2. What is the approximate duration of the effects of the proposed action(s) resulting in incidental take?

3. Which of the following life stages will be subject to incidental take (circle as appropriate)?

Fertilization to emergence (incubation)

Juvenile rearing

Adults: holding and overwintering spawning migrating

4. Quantify your expected incidental take:

Length stream affected (miles):

Individuals (if known):

5. Comments

Level 1 Date:

Appendix G: Projects with upcoming NEPA Decisions

Concurrent with the development of the WFR Program BA, three projects are under development that would fall under this consultation. The following large scale NEPA projects would implement actions described under this WFR Program consultation. These projects would follow the process described below. Additional information, including Project maps, is included in this appendix both as examples, and because based on where they are in the NEPA process, they are considered ripe for consultation.

For these three identified multiple year NEPA projects that are implementing the suite of restoration activities, the Annual Coordination meeting would serve as a checkpoint for continued compliance with the design criteria and salmonid minimization measures. If changes to the project need to occur or the specific project results in impacts different than those analyzed in this assessment this annual process would identify the need to re-initiate. New multiple year NEPA documents would follow this same process.

Appendix G-1: Six Rivers National Forest Aquatic Restoration EA – 2016 to 2030

This project would implement riparian and instream restoration activities designed to meet ESA listed species recovery objectives. This project is currently in the scoping period and, based on a final NEPA decision, would be implemented across the Forest as indicated in the table and maps in Appendix G-1. WFR BA Activities included in this project are:

- Fish Access to Habitat
- Instream Habitat Enhancement (Large wood, gravel augmentation, beaver habitat restoration)
- Sid-Channel/Off-channel Restoration
- Streambank Restoration
- Riparian Restoration
- Other (reduction of impacts from marijuana grows, mine reclamation, nutrient enhancement)
- **Notification Requirements:** The WFRBA Project Notification Form would be used for site specific projects that fit the criteria identified in the **Project Notification Guidance** portion of the BA.
 - Notification would be required for use of heavy equipment within occupied habitat, projects involving fish handling, and projects with full spanning weirs in listed habitat.

Appendix G-2: Smith River National Recreation Area Restoration and Motorized Travel Management DEIS – 2016 to 2030

This project implements the 2005 Travel Management Rule to provide access and recreation opportunities while reducing the risk to ecological resources in the Smith River watershed. This project proposes to reduce existing resource impacts to water quality by restoring drainage patterns, decommissioning roads and storm-proofing remaining road network. This project is due to release the final EIS in late summer 2016 and would be implemented following a final NEPA

decision. See description and map in Appendix G-2 for potential actions. WFR BA Activities included in this project include:

- Reduction/Relocation of Recreation Impacts
- Road and Trail Erosion Control
- Decommissioning Roads
- **Notification Requirements** (see Appendix E for 2007 consultation and Appendix G-2 for 2015 FEIS updates). The WFRBA Project Notification Form would be used for site specific projects that fit the **Project Notification Guidance** portion of the BA.
 - Notification would be required for projects that are adjacent to occupied coho habitat; however, actions that meet recovery goals would be shared at the Annual Coordination Level 1 meeting to facilitate NFMS tracking of SONCC Recovery Plan actions.

Appendix G-3: Six Rivers Forest Wide Road Maintenance Proposed CE – 2016 – 2023

This project would authorize maintaining roads across the Forest to provide for safe travels and to reduce the risk of water quality impacts. This project implements a consistent annual review process for ensuring water quality objectives are met during maintaining the road network. See the project descriptions in Appendix G-3 for more information.

All maps in this document show the existing road network that would be maintained under current Travel Management decisions. Future Travel Management Decisions (i.e., Smith River National Recreation Area Restoration and Motorized Travel Management FEIS) would reference/incorporate this road maintenance CE and update the road network needing to be maintained.

WFR BA Activities included in this project include:

- Road and Trail Erosion Control
- Reducing the risk of road failure during storm events
- **Notification Requirements:** This CE implements an annual IDT review of the proposed program of work with all annual actions documented on an IDT compliance tracking spreadsheet (Appendix G-3).
 - Notification would be required for projects that are adjacent to occupied SONCC coho or NC steelhead habitat and actions that meet recovery goals would be shared at the Annual Coordination Level 1 meeting to facilitate NMS tracking of SONCC Recovery Plan actions.

Appendix G-1: Aquatic Restoration Proposed Action

NEPA Status – Scoping Began July 2015

SRNF is scoping on the Forest-wide Aquatic Restoration Project in June or July 2015 with the intended purpose of enhancing habitat conditions for aquatic species in the short and long term through a suite of instream and riparian restoration activities. The scoping document was sent to NMFS, therefore, the following is a summary of the actions.

The activities listed in this NEPA Proposal are described in the Watershed and Fisheries Restoration BA. Following a brief description of the actions proposed, are maps of each district showing where instream restoration activities would occur and, a table with specific information for each activity.

All activities would follow the General Aquatic Conservation Measures and Activity Specific Design Criteria described in the WFRBA.

Fish Access to Habitat

A number of aquatic species make upstream and downstream migrations. Some obstructions to their movement include: heavy stream bedload deposits, boulders, plunges, chutes, landslides, logs and debris accumulations. Any of these types of obstructions can create a temporary (seasonal), partial or total barrier.

Instream Habitat Enhancement - new sites and historic (legacy sites)

Large woody debris (LWD) is an important part of the forest stream ecosystem and is critical for survival of salmonids and other aquatic species that inhabit streams. LWD diverts water flow, changes velocity to trap sediment or create pools and cover for fish. Increasing instream cover and complexity for juvenile fish survival and spawning success are intended to provide predator escape and resting cover, increase spawning and rearing habitat, improve migration corridors, improve pool to riffle ratios, and add habitat complexity and diversity.

Side-Channel/Off Channel

Projects will be implemented to reconnect historic side-channels with floodplains by removing off-channel fill and plugs. Furthermore, new side-channels and alcoves can be constructed in geomorphic settings that will accommodate such features. This activity category typically applies to areas where side channels, alcoves, and other backwater habitats have been filled or blocked from the main channel, disconnecting them from most if not all flow events.

These project types will increase habitat diversity and complexity, improve flow heterogeneity, provide long-term nutrient storage and substrate for aquatic macroinvertebrates, moderate flow disturbances, increase retention of leaf litter, and provide refuge for fish during high flows. Creating side channels or off channel rearing habitat has been identified as a critical need for recovering SONCC coho salmon.

Streambank Restoration

When natural levels of erosion are exceeded, fish habitat may be lost and stream and riparian productivity may have difficulty recovering. This restoration activity will improve streambank

conditions by stabilizing these unstable or potentially unstable areas with appropriate site-specific techniques by hand or through the use of heavy equipment where road access exists.

Reduction of streambank sediment input will improve fish habitat and fish survival by increasing fish embryo and alevin survival in spawning gravels, and minimizing the loss of, or reduction in, size of pools from excess sediment deposition.

Riparian Restoration

This restoration activity will help restore species composition and structural diversity of plant communities in riparian areas to provide adequate thermal regulation, nutrient filtering, and appropriate rates of surface erosion, bank erosion and channel migration and to supply LWD sufficient to sustain physical complexity and stability. When opportunities exist, enhance existing riparian conditions by increasing future recruitment of LWD to the stream network. These types of projects will aid in the restoration of riparian habitat by increasing the number of native plants and groupings

Reduction of Impacts related to Illegal Marijuana Grow Clean up

This restoration activity includes the cleanup of illegal marijuana grows that have been cleared by law enforcement and pose risk to aquatic ecosystems. Actions included in this activity will be accomplished by hand or through the utilization of heavy equipment when existing road access permits.

Mine Reclamation

The restoration of non-active mine locations include the excavation and removal of mine waste from stream channels, banks, terraces and lower hill slopes; stabilization and re-vegetation of mines and associated waste areas, transportation of waste materials to safe impoundment areas and, capping of impoundments with soil and vegetation. This restoration activity will not include actions under the Comprehensive Environmental Response, Compensation and Liability Act (CERLA), commonly known as Superfund, enacted in 1980.

In-channel Nutrient Enhancement

This restoration activity includes the placement of salmon carcasses, carcass analogs (processed fish cakes), or inorganic fertilizers in stream channels to help return stream nutrient levels back to historic levels. This action will help restore marine-derived nutrients to aquatic systems, thereby adding an element to the food chain that is important for growth of macroinvertebrates, juvenile salmonids, and riparian vegetation.

Resident Aquatic Species Stream and Lake Enhancement

Restoration activities described here include the improvement of the native fish and other native aquatic species and their associated habitat. These types of activities include:

Maps – Hard Copy/Electronic PDF

The four maps below are images of larger scale maps sent to NMFS as part of the Scoping. These maps show SRNF fish and watershed restoration accomplishments since the late 1980's. Riparian and landslide plantings have occurred on the SRNF during this time; however these site

locations are not shown on these maps. These past fish and watershed restoration treatments are featured under two categories:

Past Restoration Sites

- Past Instream Enhancement Sites (small blue circles) and
- Decommissioned Roads (orange lines).

In addition to these historic restoration efforts, these District maps reflect the different areas where restoration actions may occur.

Proposed Restoration Sites

 Activities with the “green hatched polygons” are numbered and described in the table found in Attachment 3. Vehicle access typically exists and past restoration may be present. The table describes the planned activities and indicates if the site was previously accomplished or if it is a new site location. These locations would have a higher likelihood of ground disturbing activities due to possible use of heavy equipment; however, not all of the restoration activities planned at the identified locations would require heavy equipment over the 10 year period covered by this analysis.

 The “purple parallel lines” are areas that typically have no equipment or vehicle access, would include low probability of ground disturbing actions and would be primarily accomplished by hand crews. These restoration activities are more opportunistic in scope and identified during stream surveys. Restoration and maintenance of historic instream fish structures may occur. The Forest’s fish distribution layer was used to determine the extent of where these actions would occur and provide the most benefit to our Forest fisheries resources.

The blue polygons are the lakes that have actions proposed in them to restore native aquatic fauna. Included here is Ruth Reservoir (Mad River RD) and Fish Lake (OR/UK/LT RD). Stock ponds, due to their small size are not shown on the map.

 The red stars show the locations of where lake restoration activities would occur using hand crews and on site materials.

 Yellow boxes with numbers refer to the table below where a site specific description of the potential activities are located. Projects would be implemented based on annual funding received on the Forest and/or through grants and partnerships.

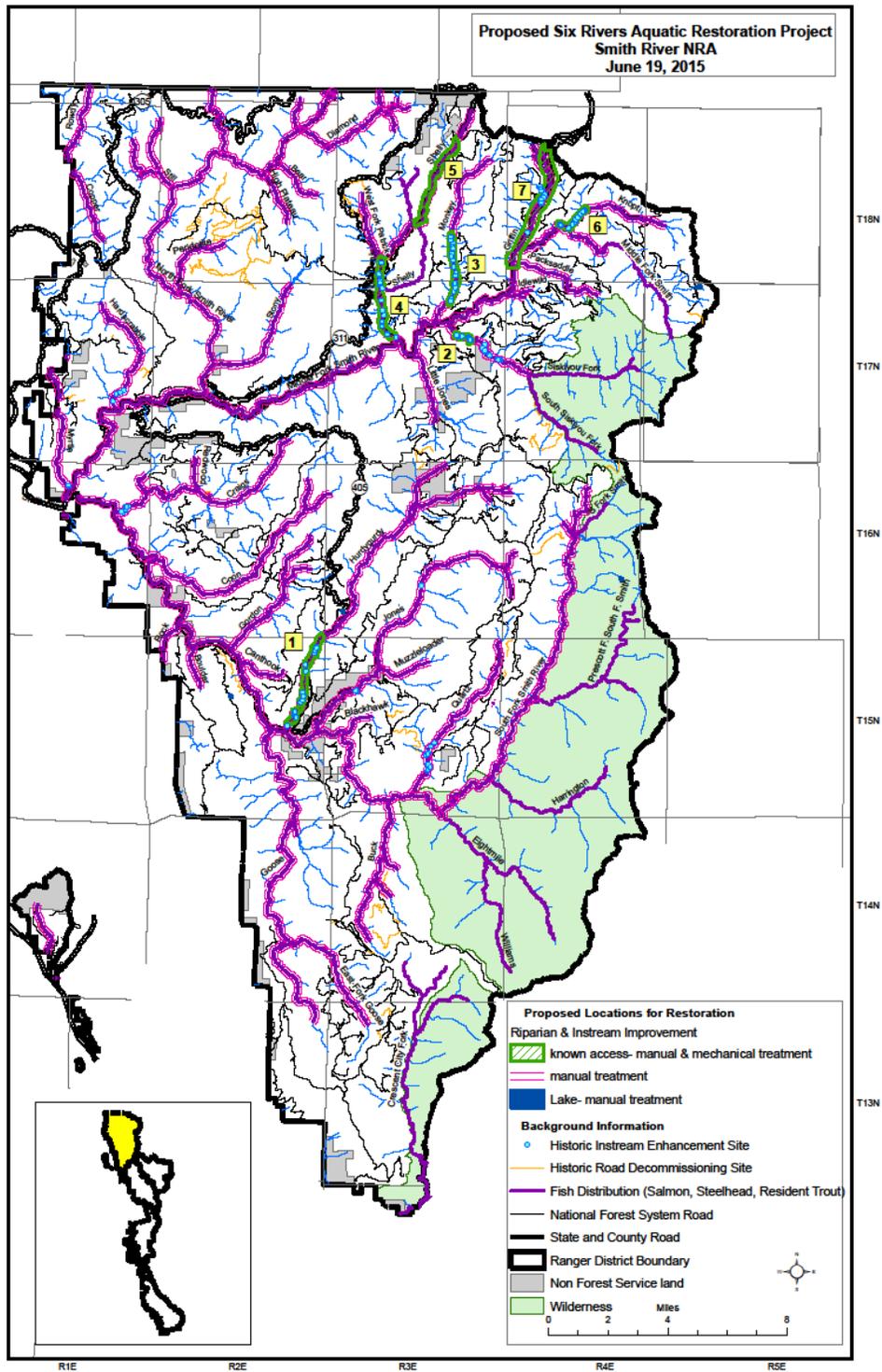


Figure 2. Smith River Watershed

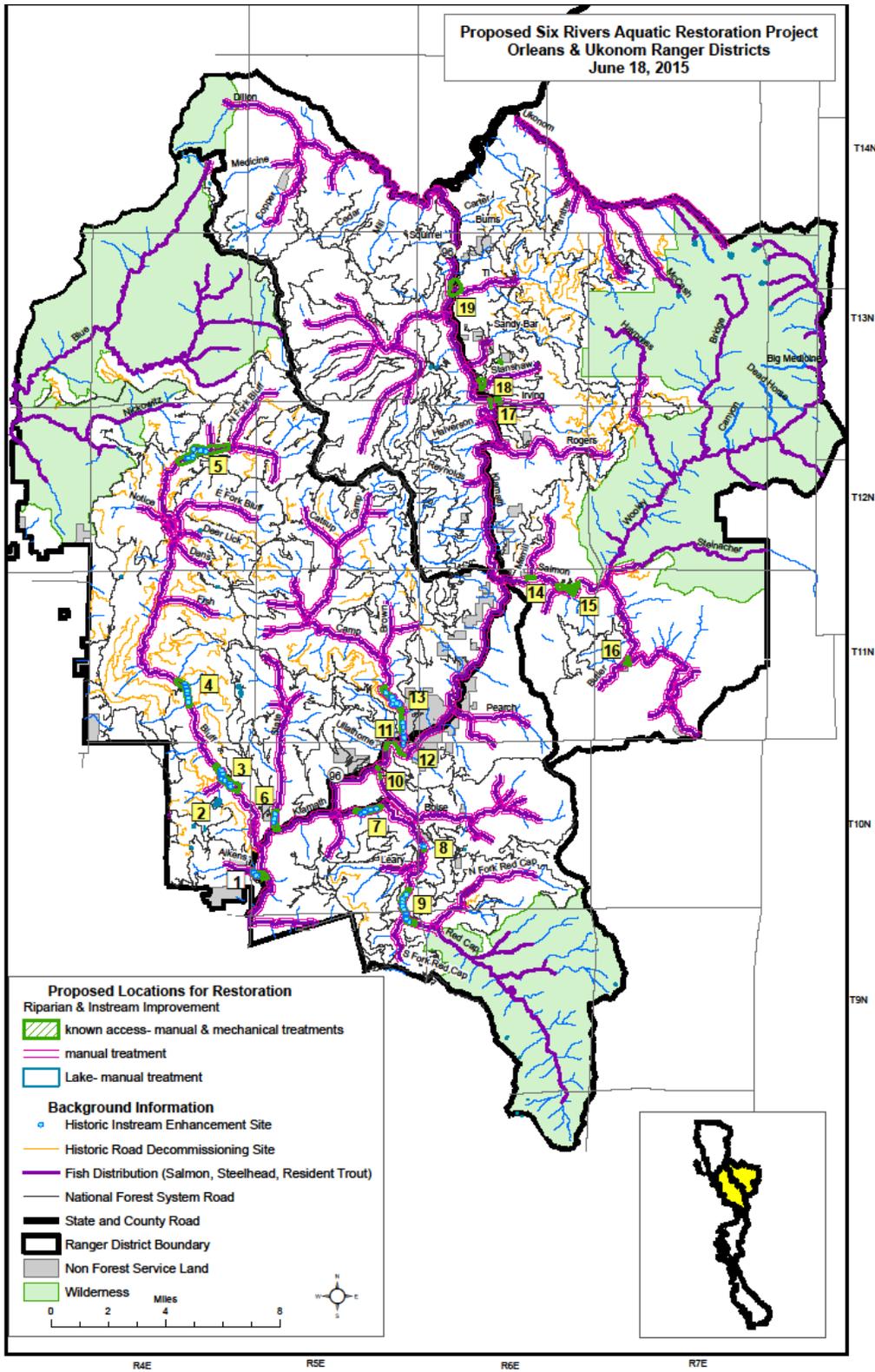


Figure 3. Lower Klamath River Watershed

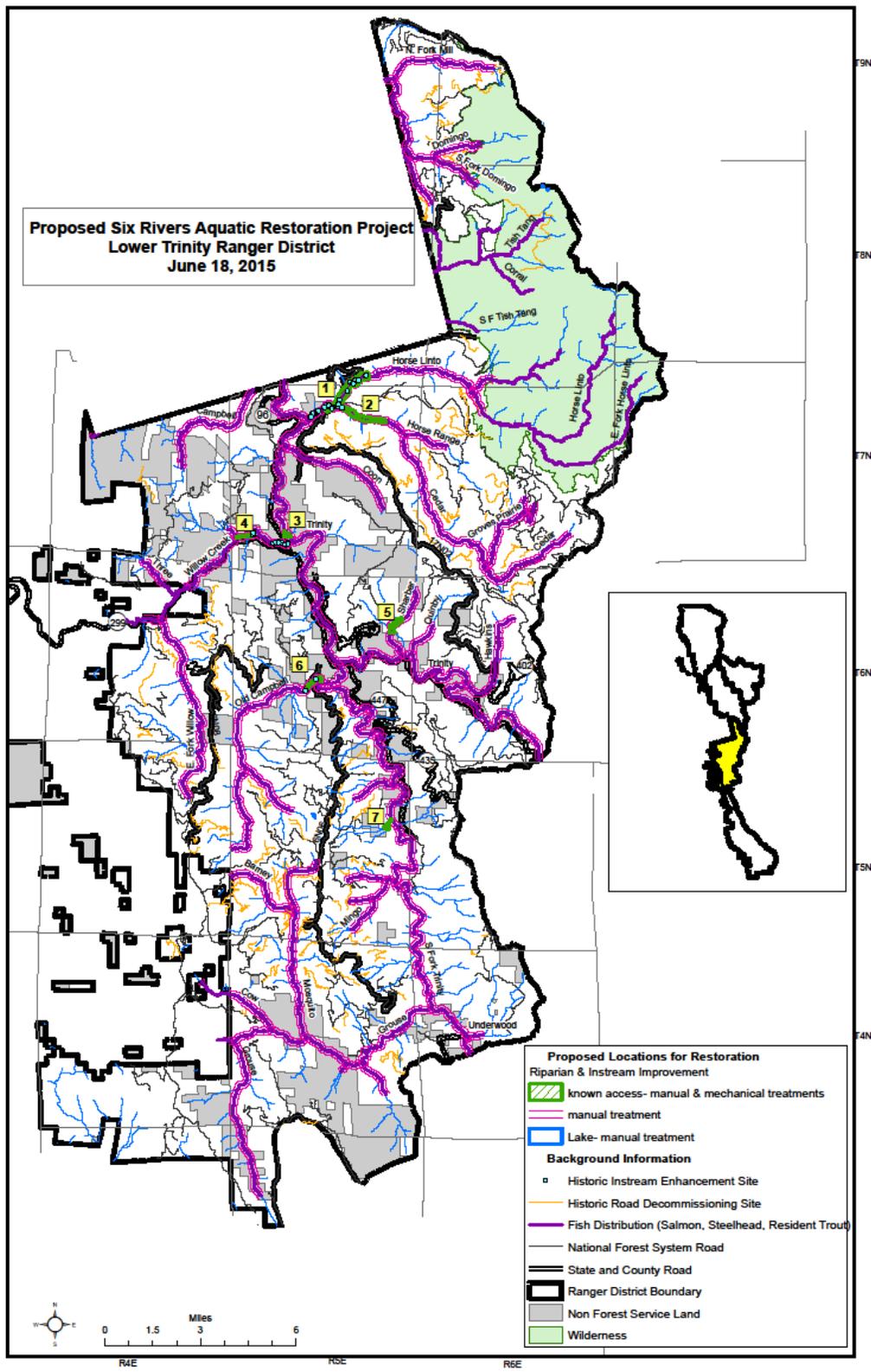


Figure 4. Lower Trinity Watershed

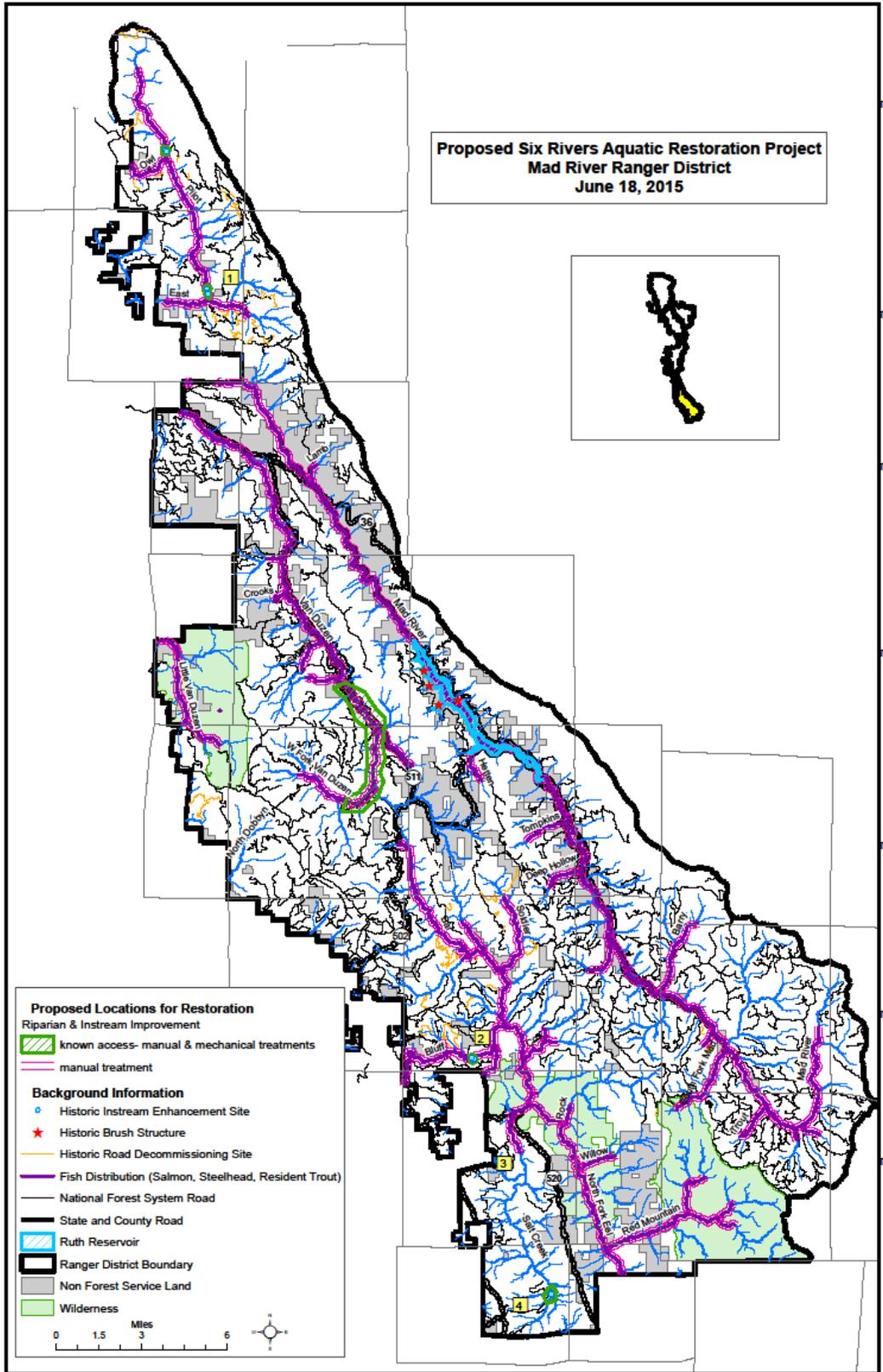


Figure 5. Mad, Van Duzen and Eel River Watersheds

List of Proposed Forest-wide Aquatic Restoration Projects

Project Name	Map Identifier	Watersheds	Historic Restoration Location?	Description of Proposed Action	Ground Disturbance/Access
Forest-wide Riparian and Stream Treatments	Purple Buffered Streams (District Maps 1-4)	Across Forest adjacent to fish bearing stream reaches	N/A	Provide a broad sweep of opportunities to enhance existing riparian and stream conditions to create a diversity of desirable habitats. Examples include girdling of alders to promote conifer growth for future large woody debris recruitment to adjacent stream channels. Move and align existing down woody debris to reduce sedimentation, increase cover and channel complexity, and enhance holding, spawning and/or rearing fish habitat.	Hand tools only. Little to no ground disturbance - limited to relocation of woody debris within riparian area to adjacent stream channel (dragging, lifting with grip hoists, etc). No new access.
Forest-wide Lake Treatments	Lake Symbol (District Maps 1-4)	Across Forest	N/A	The improvement of those natural lakes where fishing is permitted, as well as the enhancement of other water bodies where native non-salmonid aquatic fish and wildlife species occur. Activities include: installation of aquatic species habitat structures, manual invasive weed removal, reduction of recreation impacts associated with unauthorized trails and sanitation, placement of basking platforms, and eradication of nonnative aquatic species through non chemical treatments (seining, draining) of natural and artificial ponds.	Activities will be accomplished by hand only. Little to no ground disturbance anticipated.
Smith River Tributaries	NRA 1-7 (Map 1)	Hurdygurdy, Siskiyou Fork, Monkey, Patrick, Shelly, Knopki, Griffin Creeks	1-4, 6, parts of 7 are existing 5 and parts of 7 are new	This project would improve existing fish habitat by placing additional LWD to increase cover and promote scour, adjust boulders to improve off-channel connectivity and habitat diversity, plant or manually release existing conifers to promote natural future recruitment of LWD, look at utilizing beavers for off-channel/side channel habitat. Project areas may include strategic invasive plant species treatments to improve riparian conditions.	Yes - Activities will likely involve the use of heavy equipment, access will primarily involve existing routes.
Lower Aikens Creek	OR-1 (Map 2)	Lower-mid Klamath River	Existing and New	The lower mile of Aikens Creek occupies the pre-1964 Bluff Creek channel. Currently, the existing stream channel is simplified due to the changes resulting from previous floods, the placement of the existing road and associated dispersed campsites. This project would widen the channel and reconnect a portion of the remnant	Yes - Activities will involve the use of heavy equipment, use of existing roads and trails, no new access.

Project Name	Map Identifier	Watersheds	Historic Restoration Location?	Description of Proposed Action	Ground Disturbance/Access
				floodplain by removing accumulated bedload deposits. Side channel ponds will be created to restore complexity for instream and off-channel salmonid habitat. Placement of LWD will enhance spawning and overwintering rearing fish habitat. Removal of invasive non-native plants will improve the health of existing native vegetation. Riparian plantings will increase shade, enhance vertical/horizontal structure and diversity, and promote future LWD recruitment to the site.	
Fish Lake	OR-2 (Map 2)	Lower Bluff Creek	Existing and New	Eurasian water milfoil is considered to be the most problematic invasive aquatic plant in the area. Because it is widely distributed and difficult to control, existing Eurasian water milfoil would be removed from the boat access and day use areas and perimeter of Fish Lake. Add LWD to enhance cover for bass habitat and basking platforms for western pond turtles. Eradicate bull frogs and other non-native species inhabiting the area.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Wright's Ranch	OR-3 (Map 2)	Lower Bluff Creek	Existing and New	Since the mid-1980's, fisheries enhancement projects have occurred in Bluff Creek. This project would improve existing fish habitat by align existing boulders to improve off-channel connectivity and habitat diversity, placing additional LWD to increase cover, detritus retention and side channel complexity, and stabilize existing lower hillslopes to reduce bank erosion in this reach.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Dragon Bar	OR-4 (Map 2)	Middle Bluff Creek	Existing and New	This project proposes to adjust and improve existing boulders and place logs with rootwads to provide cover, promote pool scour, sediment sorting and metering, and induce favorable hydraulics and connectivity to existing off-channel features.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Bluff Mainstem (near FS Rd 12N13H)	OR-5 (Map 2)	Upper Bluff Creek	Existing and New	This stream segment is lacking instream habitat complexity. The placement of LWD in this low gradient reach would create pools, provide cover, reduce gravel movement and enhance slow water habitat.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.

Project Name	Map Identifier	Watersheds	Historic Restoration Location?	Description of Proposed Action	Ground Disturbance/Access
Lower Slate Creek	OR-6 (Map 2)	Lower-mid Klamath River	New	This project would incorporate bioengineering techniques to improve bank stabilization and vegetative structure and diversity in the lower reaches. In-stream LWD structures would be added to promote channel scour and thalweg development, as well as increase spawning and rearing fisheries habitat.	Yes - Activities will likely involve the use of heavy equipment or helicopters, use of existing roads and trails, no new access.
Larson's Place	OR-7 (Map 2)	Lower Red Cap Creek	Existing and New	Adjust existing instream structures found within the mainstem and side channel habitat. Add LWD with root wads to increase cover and habitat complexity. Induce favorable hydraulics and connectivity to existing off-channel features. Improve the depth and quality of pool habitat within disconnected side channel features. Remove invasive plant species at strategic locations and plant a diverse array of native riparian species to promote diversity and future LWD recruitment in this stream reach.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Red Cap Mainstem (near FS 10N02 Bridge)	OR-8 (Map 2)	Middle Red Cap Creek	Existing and New	This project would improve existing fish habitat by removing an old bridge abutment and fence rock gabions. Place additional LWD with root wads in low gradient areas to provide mainstem and side channel habitat complexity by mimicking natural processes. Stabilize existing side slopes to reduce bank erosion in this stream reach.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Schnable Diggings	OR-9 (Map 2)	Upper Red Cap Creek	Existing and New	This project proposes to adjust existing boulders and place logs with rootwads to provide cover, promote pool scour, sediment sorting and metering, and induce favorable hydraulics and connectivity to existing off-channel features. This project includes some streambank restoration to improve stability, promote native species composition, structural diversity and integrity of existing riparian plant community.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Lower Boise Creek	OR-10 (Map 2)	Lower-mid Klamath River	New	Modify bedrock outcrop and boulders found near the mouth to improve seasonal passage to adult and juvenile fish. Improve and maintain connectivity of existing off-channel beaver ponds. If deemed necessary, consider routing a portion of the creek through	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.

Project Name	Map Identifier	Watersheds	Historic Restoration Location?	Description of Proposed Action	Ground Disturbance/Access
				<p>beaver ponds and around bedrock cascade near the confluence. Consider potential development of other off channel ponds where cold water seeps connect to the old Klamath River floodplain. Remove invasive plant species found within the area. Enhance the existing riparian plant community to improve root cohesion, roughness and vertical and horizontal vegetative structure.</p>	
Lower Ullathrone Creek	OR-11 (Map 2)	Lower-mid Klamath River	New	<p>Improve fish habitat found near the confluence of lower Ullathrone Creek and the Klamath mainstem. This restoration activity would remove some of the aggraded bedload deposits, extend the contribution of cold water refugia found in the area, as well as develop off channel rearing ponds and LWD cover for juvenile salmonid summer and winter rearing.</p>	
Lower Camp Creek	OR-12 (Map 2)	Lower Camp Creek	Existing and New	<p>Enhance off-channel ponds and braided side-channels located within this lower reach of Camp Creek. Improve connectivity to channel found on north side of floodplain near mouth. Place LWD with rootwads within backwater stream margins to enhance naturally occurring alcoves and remnant oxbows. Remove proliferation of exotic plants and maintain riparian species composition and structural diversity of native plant community. Accelerate growth of riparian canopy within this entire lower stream reach. Project areas may include strategic invasive plant species treatments to improve streamside conditions.</p>	<p>Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.</p>
Middle Camp Creek Mainstem	OR-13 (Map 2)	Middle Camp Creek	New	<p>This project would restore complexity and resiliency to instream and off-channel habitats by aligning existing structures, removing old cable and rebar, placing additional LWD, and excavating disconnected side channels. Remove introduced exotic plant species, maintain composition and structural diversity of native plant community and accelerate growth of riparian canopy.</p>	<p>Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.</p>

Project Name	Map Identifier	Watersheds	Historic Restoration Location?	Description of Proposed Action	Ground Disturbance/Access
Lower Merrill Creek	OR-14 (Map 2)	Lower Salmon River	New	Low-flow fish passage remains a seasonal concern within lower Merrill Creek. This project proposal would modify the bedrock outcrop and boulders found near the mouth below the Hwy 93 bridge to improve salmonid passage. Willow and other riparian plantings will improve vertical and horizontal vegetative structure and bank stability.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Oak Bottom	OR-15 (Map 2)	Lower Salmon River	New	Across from Somes Creek, a large right bank river bar is formed at the Oak Bottom River Access. This project proposes to enhance the existing off-channel pools found on the eastern end of the river bar. This enhancement project would capture existing stream flow from this right bank tributary and reconnect this floodplain feature to enhance existing off-channel rearing habitat.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Lower Butler Creek	OR-16 (Map 2)	Lower Salmon River	New	This project proposes to enhance the left bank side channel of the Salmon River near the mouth of Butler Creek by adding some larger diameter LWD with rootwads to increase cover for juvenile fish. Bioengineering techniques will be used to increase vegetative structure, cover and diversity to the site.	No - Activities will not involve the use of heavy equipment.
Lower Irving Creek	OR-17 (Map 2)	Lower-mid Klamath River	New	This project proposes to integrate the use of willows and other native plants to enhance the riparian community and to place logs with rootwads to promote pool scour, cover and diversify existing monotypic habitat features.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Stanshaw Creek	OR-18 (Map 2)	Lower-mid Klamath River	New	Enhance the Klamath River off-channel pool located near mouth to increase summer and winter rearing habitat and juvenile coho survival. Add LWD and boulders in lower reach of Stanshaw Creek in order to maintain gradient control, step pool configuration and improve fish passage. This project would incorporate bioengineering techniques to improve bank stabilization and vegetative structure and diversity throughout the watershed. Integrate the use of willows, alders, big leaf maple, as well as other native plants to enhance riparian community. Work with all private	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.

Project Name	Map Identifier	Watersheds	Historic Restoration Location?	Description of Proposed Action	Ground Disturbance/Access
				landowners to improve existing water diversions, reduce water loss and demand, and return flow.	
Lower Ti Bar	OR-19 (Map 2)	Lower-mid Klamath River	New	The construction of State Highway 96 and the Ti Creek bridge in 1965 confined lower Ti Creek into an incised, single thread channel and disconnected some complex off-channel habitat in this section of the lower-mid Klamath River. This project would provide connectivity to off-channel features by excavating this lower river bar to create side-channels, add LWD, enhance remnant wetlands and oxbows to support salmonid habitat.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Horse Linto	LT-1 (Map 3)	Trinity River	Existing	This project would improve existing fish habitat by placing additional LWD to increase cover and promote scour, remove or repair old fencing and restoration debris, adjust boulders to improve off-channel connectivity and habitat diversity, plant or manually release existing conifers to promote future recruitment of LWD and look at utilizing beavers for creating off-channel/side channel habitat.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Cedar	LT-2 (Map 3)	Trinity River	Existing	This project would improve existing fish habitat by placing additional LWD to increase cover and promote scour, remove or repair old fencing and restoration debris, adjust boulders to improve off-channel connectivity and habitat diversity, plant or manually release existing conifers to promote natural future recruitment of LWD and look at utilizing beavers for creating off-channel/side channel habitat.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Mainstem Trinity (Below Willow)	LT-3 (Map 3)	Trinity River	Existing	Plant or manually release existing conifers to promote natural future recruitment of LWD.	No - Activities will not involve the use of heavy equipment.
Willow	LT-4 (Map 3)	Trinity River	Existing	This project would improve existing fish habitat by placing additional LWD to increase cover and promote scour, remove or repair old fencing and restoration debris, adjust boulders to improve	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new

Project Name	Map Identifier	Watersheds	Historic Restoration Location?	Description of Proposed Action	Ground Disturbance/Access
				off-channel connectively and habitat diversity, plant or manually release existing conifers to promote natural future recruitment of LWD and look at utilizing beavers for creating off-channel/side channel habitat.	access.
Upper Sharber	LT-5 (Map 3)	Trinity River	New	This project would improve existing fish habitat by placing additional LWD to increase cover and promote scour, adjust boulders to improve connectively and habitat diversity, plant or manually release existing riparian trees to promote future recruitment of LWD, look at utilizing beavers to enhance off-channel/side channel habitat and look at effects of past gravel mining.	Yes - Activities will likely involve the use of heavy equipment, use of existing roads and trails, no new access.
Madden (otherwise known as Old Campbell)	LT-6 (Map 3)	South Fork Trinity River	Existing	This project would enhance existing fish habitat by placing additional LWD with rootwads to promote scour and increase cover, remove old fencing and legacy restoration debris, adjust boulders to improve off-channel connectively and habitat diversity, plant or manually release existing conifers to promote future recruitment of LWD, and enhance the confluence of the creek to improve juvenile and adult fish access of this lower thermal refugia associated with the South Fork Trinity River.	Yes - Activities may involve the use of heavy equipment, use of existing roads and trails, no new access.
South Fork Mainstem	LT-7 (Map 3)	South Fork Trinity River	New	Consider Cedar Grove Ranch Slide area for tree planting and erosion control measures. Look at effectiveness of all of the past erosion control measures on the South Fork Trinity River.	No - Activities will not involve the use of heavy equipment.
Pilot Creek	MR 1 (Map 4)	Mad River	Existing	Additional of large wood would provide cover in identified pools and reaches. Wood could come from existing downed wood or from selection of single trees in the area.	No - Activities will not involve the use of heavy equipment.
Bluff Creek	MR 2 (Map 4)	North Fork Eel	Existing	Additional of large wood would provide cover in identified pools and reaches. Wood could come from existing downed wood or from selection of single trees.	No - Activities will not involve the use of heavy equipment. All work would be done by hand.
Salt Creek	MR 3 (Map 4)	North Fork Eel	New	Portions of these streams go subsurface, leaving steelhead in isolated pools. Presence of lamprey amocyetes indicates year round	No - Activities will not involve the use of heavy equipment. All work would

Project Name	Map Identifier	Watersheds	Historic Restoration Location?	Description of Proposed Action	Ground Disturbance/Access
				subsurface flows. Additional of large wood would provide cover in identified pools and reaches. Wood could come from existing downed wood or from selection of single trees.	be done by hand.
Upper Salt Creek	MR 4 (Map 4)	North Fork Eel	Existing	Stream goes dry in summer time with occasional isolated pools. Area is part of an allotment that is being rested. Past restoration activities and livestock exclusion fencing requires cleanup and removal. Addition of large wood for cover, movement of existing boulders to narrow thalweg, streambank protection measures though use of onsite materials.	No - Activities will not involve the use of heavy equipment. All work would be done by hand.
Van Duzen River	MR 5 (Map 4)	Van Duzen	New	Additional of large wood would provide cover in identified pools and reaches. Wood could come from existing downed wood or from selection of single trees.	Yes - Activities may involve the use of heavy equipment at existing access points. The majority of the work would be done by hand.
Ruth Reservoir	MR 6 (Map 4)	Mad River	Existing	Maintain brush structures during lowest reservoir levels. Add additional manzanita brush from adjacent hillsides as approved by resource specialists. Manzanita would be cabled to cinder blocks and placed at existing sites.	No – Use of boat to move structures would be necessary. Activities will be accomplished by hand crews.

Appendix G-2: Smith River National Recreation Area Travel Management

The following updates the proposed action and replaces the 2007 *Biological Assessment/Evaluation for the Smith River Road Management and Route Designation Project* (2007 BA/BE). The Forest released the *Smith River National Recreation Area Restoration and Motorized Travel Management DEIS* (Smith River TM DEIS) in April 2014 and identified Alternative 6 as the preferred alternative. The Final Smith River TM EIS is in progress. The information below is to identify changes that have occurred since 2007.

All alternatives under the DEIS describe actions that fall within the WFR BA covered activities including road related actions (decommissioning and road/trail erosion control –stormproofing, road maintenance, and bridge replacements) and reduction/relocation of recreation impacts. All activities would follow the General Aquatic Conservation Measures and Activity Specific Design Criteria. The road network displayed in Appendix A-1 Figure 2 – Smith River NRA is the current road system upon which this DEIS is based. The map of Alternative 6 is provided electronically and hard copy as part of Appendix G-2.

The 2007 BA analyzed

- 72 miles of road decommissioning
- 132.5 miles of restoring unauthorized routes
- Improving 47 miles of unauthorized routes and adding to the Motorized Trail system
- Performing maintenance (as described below in Appendix G-3) on all roads and trails.

New items in the Smith River TM Project previously not consulted on include:

- Additional unauthorized routes found would be treated to restore hydrologic function and reduce the risk of impacts to water quality.
- Identification of dispersed recreation sites, including restoration activities to reduce water quality impacts.
- Bridge replacement over Griffin Creek due to structural failure.

Smith River TM Actions (Numbers are approximate as FEIS is not completed):

- Adding 42 miles of existing unauthorized routes (with roughly 17 stream crossings) to NFTS as motorized trails
 - Mitigations include; waterbar installation, culvert replacement, and route definition (signage or physical barriers to restrict use to only designated routes).
 - Implementation of these mitigation measures is expected to reduce the risk to water quality to low levels. Direct and indirect affects in the short term (1 year) are limited.
 - The only new ground disturbance would be the installation of waterbars to improve drainage and road barriers or other obstacles to limit use of designated travel way since the routes already exist on the landscape
- Changes to existing NFTS, including decommissioning 53 miles of NFTS (including ~50 stream crossings, placing 40 miles of NFTS roads into Operational Maintenance Level 1

(including ~ 30 stream crossings), and 81 miles of “stormproofing⁴” (including ~215 stream crossings)

- For decommissioning and placing into OML 1, all culverts and associated fill would be removed and stored at stable locations. The travelway may be outsloped or decompacted and motor vehicle barriers will be installed. Because road decommissioning can result in short-term impacts to water quality, mitigation measures such as; mulching, seeding, outsloping, waterbars, rip rap placement, and re-establishment of natural drainage pathways, restoring the stream channel to natural configuration (channel bottom widths and side slope gradients match the surrounding topography) would be implemented where appropriate.
- Stormproofing includes actions that are intended to improve the roads resiliency to withstand larger storm events and minimize the potential for adverse impacts to water quality. Common treatments include installing larger diameter culverts at stream crossings, constructing rolling dips, outsloping and spot rocking the travelway. Road stormproofing and maintenance activities associated with this alternative are expected to reduce the amount of fine sediment that is delivered to streams from surface erosion. These activities are also expected to reduce the impacts of mass-wasting events through reducing the potential for stream channel diversion, replacing undersized culverts, and hardening of road surfaces.
- Restoration of 98 miles unauthorized routes (including ~ 75 stream crossings) to reduce water quality impacts and prevent future use.
 - Restoration actions include; placing vehicle barriers, installing waterbars and culvert removal. Route-stream crossings would be treated to improve overall hydrologic function and restore more natural drainage patterns.

Appendix G-2 Map of Alternative 6 provided electronically and hard copy.

⁴ Stormproofing are road maintenance actions specifically designed to reduce the risk of road/culvert failure due to storm events, thereby preventing or limiting water quality impacts from occurring.

Appendix G–3: Forest Road Maintenance

Six Rivers National Forest and Ukonom District, Klamath National Forest
Humboldt, Del Norte, Trinity and Siskiyou Counties, California

NEPA Status

The Forest Road Maintenance Project CE is being prepared to address road maintenance and on all current National Forest Transportation System roads (OML 1 through 5). The proposed NEPA decision is not intended to substantially improve conditions above those originally constructed nor is it meant to preclude future road decisions. It allows for adding to or modifying the original conditions such as increasing culvert size or frequency, without increasing service provided or type of use of the road, primarily to protect water quality.

Operational Maintenance Level (OML)

The **Transportation System Maintenance Handbook** (FSH 7709.59) describes the various maintenance levels for managing FS road systems. Roads assigned Operational Maintenance Levels 2, 3, 4, or 5 are to be maintained in accordance with the requirements of the Highway Safety Act as indicated by FSM 1535.11. The majority of maintenance activities occur on the higher level roads. On Level 1 roads, emphasis is given to maintaining drainage facilities and runoff patterns.

Maintenance Level 1 – These are roads that have been placed in storage between intermittent uses. Basic custodial maintenance is performed to prevent damage to adjacent resources and to perpetuate the road for future resource management needs. Planned road deterioration may occur at this level.

Under more current Travel Management decisions, Level 1 roads are typically closed to all vehicular use and have been treated to leave them in a hydrologically maintenance-free state. However, not all Level 1 roads are in such a state. Many Level 1 roads are accessible to motor vehicles, and have drainage problems that should be addressed. These roads may be indistinguishable from Level 2 roads on the ground. All maintenance Level 1 roads will be eligible for maintenance to reduce impacts to aquatic ecosystems, including replacing (or removing) undersized pipes, fixing drainage concerns, gating or otherwise closing roads that have a decision under Subpart A. Level 1 roads that have grown closed would not be made drivable.

Maintenance Level 2 - This level is assigned where management direction requires the road to be open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic volumes are minor. Use will be approximately 35 percent for timber resource functions and 65 percent for general purpose and recreational access.

Maintenance Level 3 - This level is assigned where management direction requires the road to be open and maintained for safe travel by a prudent driver in a passenger car. Traffic volumes are minor to moderate; however user comfort and convenience is not considered a priority. Roads at this maintenance level are normally characterized as low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material. The functional classification of these roads is normally local or minor collector (has lower level roads branching off from it).

Maintenance Level 4 - This level is assigned where management direction requires the road to provide a moderate degree of user comfort and convenience at moderate travel speeds. Traffic volumes are normally sufficient to require a double-lane, aggregate-surfaced road. Some roads may be single lane and some may be paved/and or dust abated. The functional classification of these roads is normally collector or minor arterial (has one or more collectors branching off from it).

Maintenance Level 5 - This level is assigned where management direction requires the road to provide a high degree of user comfort and convenience. These roads are normally double-lane, paved facilities. Some may be aggregate-surfaced and dust-abated. Functional classification of these roads is normally arterial.

Specialist Review Process

Each year the engineering and hydrology staffs will put together a list of proposed maintenance activities for the following year and share with specialists via email. Subsequently, the interdisciplinary team will meet to discuss and review the list of road maintenance activities and projects identified. This list shall include road numbers, mile posts (if appropriate), and the activities that will occur. The list shall include enough relevant information for specialists to identify concerns in order to refine the year's maintenance activities and provide standards and guidelines for implementation as needed. This annual review process would also prevent cumulative watershed effects from occurring from too many planned activities that would generate sediment.

Confirmation that work may proceed in a given year will be tracked through use of a spreadsheet checklist recording each specialist's input and potential design features on a road by road (or site by site) basis. The spreadsheet checklist and the signing of the tier form associated with the biological assessment/evaluation prepared for Wildlife (TEP and FSS), Fisheries (FSS) and Botanical (TEP and FSS) species confirms that the road maintenance activities can proceed.

Road Maintenance actions that may be identified after the annual interdisciplinary review must be vetted through the specialists on the identified district prior to proceeding to contracting or implementation, including the signing of additional WFB BA/BE tier forms (Draft Wildlife, Fisheries and Botany BE/BA draft tier forms attached).

Maintenance Activities

BMP w/number = This identifies the Best Management Practice for water quality that would be implemented as part of that activity.

GP or RD w/number = this identifies the invasive species best management practices.

(e.g. 811) = number found in the R5 Forest Service Specifications for Maintenance of Roads which guides the development and administration of FS road maintenance contracts.

Miles per Watershed = for those activities that have the potential to deliver sediment into a stream channel, SRNF identified the range of number of miles of that maintenance that has typically occurred based on funding levels. Activity levels per 6th field watershed are set in the WFR BA on page 50. Funding is the limiting factor for the amount completed per watershed.

1. Grading/Reshaping/Blading - Surface blading native or aggregate roadbeds to a condition to facilitate traffic and provide proper drainage. Blading includes shaping the crown or

slope of the traveled way, berms, and drainage dips. Roadbed outside the traveled way shall be shaped only as needed to provide drainage away from the traveled way. The work would be generally be accomplished by a motor grader. BMPs 2.3, 2.4 and 2.13 will be implemented with this action. Invasive species prevention practices associated with this action are: GPA-1, GP-5, GP-7, RD-2, RD-4. This activity typically ranges from 0 up to 40 miles per 6th field watershed. (811).

2. Dust abatement - This work consists of spraying water to native and aggregate-surfaced roads from a water truck. To prevent impacts to riparian resources, water will be drawn from designated drafting sites with an approved fish screen intake. NMFS water drafting guidelines would be followed when drafting from streams containing listed salmonids. Invasive species prevention practices associated with this action are: GPA-3 BMP 2.5 will be applied with this activity.
3. Spot surfacing - This work consists of placing surface aggregate as designated. It includes preparing the area, and furnishing, hauling, and placing all necessary materials to blend with the adjacent road cross-section. This work would generally be accomplished with a dump truck, motor grader, water truck and a small roller. BMP 2.4 will be applied during spot surfacing (813)
4. Asphalt pavement patching - This work consists of patching potholes (deep patching), skin patching of asphalt surfaces, and patching asphalt berms. Generally this work will be accomplished using a grader, dump truck, small paver, and small roller. A backhoe will be used if the damaged area requires digging out. BMP 2.4 will be implemented with this activity. (814)
5. Paved surface cleaning - This work consists of removing loose material from a paved traveled way, including bridge decks and paved shoulders. Use of hydraulic flushing will not be permitted within a horizontal distance of 200 feet of a live stream, unless approved by the government. Other cleaning should be accomplished using power broom or blowers, truck with rock blade, or grader. BMPs 2.3, 2.4, and 2.5 will be implemented during this activity. (815)
6. Re-paving - This work consists of re-paving large sections of roads already surfaced with asphalt. Generally this work will be accomplished using a grader, dump truck, paver, roller and laborers. BMPs 2.3 and 2.4 will be implemented with this activity. This activity typically ranges from 0 up to 20 miles per 6th field watershed.
7. New Paving - This work consists of paving sections of existing dirt roads. Generally this work will be accomplished using a grader, dump truck, paver, roller and laborers. BMPs 2.3 and 2.4 will be implemented with this activity. This activity typically ranges from 0 up to 10 miles per 6th field watershed.
8. Surface treatment - This work consists of treating the surface of asphalt concrete or chip seal-surfaced roads with a seal coat, a chip seal, or an asphalt concrete overlay. The purpose of this work is to rejuvenate the road surface, seal hair-line cracks, or to replace a worn surface that has become unsafe. Equipment that may be used includes power brooms, dump trucks, paving machines, chip spreaders, and oil distributor trucks. BMPs 2.3, 2.4, and 2.5 will be implemented during this activity. This activity typically ranges from 0 up to 10 miles per 6th field watershed.

9. Maintenance of unpaved shoulders - This work consists of reshaping unpaved shoulders adjacent to a paved traveled way to their original configuration. This work would generally be accomplished with a motor grader with attachments. There will be no sidecasting anywhere there is likelihood that the sidecast material will reach a channel as defined by a forest fisheries or hydrology specialist. BMPs 2.3 and 2.4 will be applied as part of this activity. This activity typically ranges from 0 up to 10 miles per 6th field watershed. (816)
10. Asphalt crack cleaning and repairing - This work consists of cleaning and filling cracks in existing asphaltic concrete (AC) surfaces that are 1/4 inch or wider. Cleaning is usually accomplished with compressed air, and the AC sealer is applied using a propane-heated double-boiler unit with a wand attachment. BMP 2.4 will be implemented with this action. (818).
11. Ditch maintenance - This work consists of removing rock, wood, soil, and other materials and re-shaping all types of drainage ditches to provide a waterway which is unobstructed. During this type of operation, care shall be taken to retain existing low growing vegetative cover in the ditches. This work would generally be accomplished with a motor grader and/or backhoe. BMPs 2.3, 2.4 and 2.13 apply to this action. Invasive species prevention practices associated with this action are: GPA-1, GP-5, GP-7, RD-2, RD-4. This activity typically ranges from 0 up to 40 miles per 6th field watershed. (831)
12. Remove and end haul materials - This work consists of loading, hauling, and placing slide debris or excess materials (such as rock, soil, and vegetation) at designated disposal sites. No disposal sites will be designated within Riparian Reserves. This work would normally be accomplished with a wheeled loader and dump truck. If materials are used to fill slumps in the road, or to outslope road prisms, compaction will be required. Generally a wheeled loader, dump truck, compactor, motor grader, and backhoe would be used. BMPs 2.3 and 2.4 will be applied with this activity. Invasive species prevention practice associated with this action is GP-10. (832)
13. Culvert replacement - This work includes removal of existing culverts (cross drains and culverts within stream channels), bed preparation, installation and backfill of new culverts of the size and length specified. Excavation will be conducted as necessary to meet compaction requirements. The culvert shall be installed to maintain a uniform flow line to match the channel above and below. Any flowing water will need to be diverted around the construction zone to minimize the potential for sedimentation during implementation. Work would generally be accomplished with a backhoe, tractor, and compactor. **Annual operating plan shall identify all culverts to be replaced in stream channels.** Coordination with a fisheries biologist or hydrologist is required to determine if additional mitigations are necessary. BMPs 2.4, 2.8, and 2.13 will apply to this activity. Invasive species prevention practices associated with this action are: GPA-1, GPA-3 GP-5, GP-7. Typically 30 culverts (20 cross-drains and 10 stream crossings) per year would be placed or replaced within a 6th field watershed. (833)
14. Drainage structure maintenance - This work consists of cleaning and reconditioning culverts and other drainage structures such as catch basins, inlet and outlet channels, and ditch line transition areas. This work is usually accomplished with a backhoe. Work does not include cleaning totally plugged culverts or replacing all or part of the drainage

structure (see #13 Culvert Replacement). Hydraulic flushing of drainage structures is not a standard practice of this activity, and will only be designated by FS when all potential impacts are addressed and minimized through the annual interdisciplinary review. BMPs 2.3 and 2.4 are a part of this activity and will be implemented. Invasive species prevention practices associated with this action are: GPA-1, GP-5, GP-7, RD-2. Up to 50 drainage structures per year per 6th field watershed typically are maintained. (834)

15. Drainage dip maintenance - This work consists of maintenance or installation of drainage dips, including rolling dips and waterbars, on native, aggregate, and paved roads, and maintenance of special outlet structures to provide for a smooth flow of water from the traveled way. Generally, this work would be accomplished with a motor grader with attachments. BMPs 2.3, 2.4, and 2.13 will be implemented with drainage dip maintenance. Invasive species prevention practices associated with this action are: GPA-1, GP-5, GP-7, RD-2. (837)
16. Vegetation establishment - This work consists of applying seed, in keeping with the Six Rivers Seeding Guidelines for Restoration and Rehabilitation (2007), fertilizer, and/or mulch, on roadways and disposal areas that have been disturbed by road activities. This work would usually be accomplished by hand; however seed, mulch, or tackifier may be applied mechanically. BMPs 2.4 and 2.13 will be implemented. Invasive species prevention practices associated with this action are: GP-8, GP-14.
17. Cutting roadway vegetation - This work consists of cutting all vegetation, including trees less than six inches in diameter, at six inches above the ground in order to improve sight distance and provide overhead clearance. This work would be performed by hand using chainsaws or with a mechanical brush cutter. The objective is to manage roadside vegetation over time to maintain slope stability through vegetation cover while providing for sight distance and drainage needs. All of the work would occur within the road prism. BMPs 2.3, 2.4, and 2.13 will be applied with this action. Invasive species prevention practices associated with this action are: GPA-1, GP-5, GP-7, RD-2, RD-4. (842)
18. Logging out - This work consists of the removal of fallen trees and snags which encroach into the roadway and within four feet of the roadbed. This work is intended to open roads closed by windstorm debris or other natural occurrences. Some chainsaw and mechanical work may be necessary. BMPs 2.4 will be applied with logging out actions. (851)
19. Hazard removal and cleanup - This work consists of removing and disposing of hazards such as slumps, slides, trees, rocks, stumps and fallen trees that will create traffic safety problems. Woody debris and slash in excess of 1 foot in length or 3 inches in diameter shall not remain in ditches. All work will be within the road prism. Roadside hazard trees would meet the Region 5 Hazard Tree policy and may only be removed upon after review by a wildlife specialist. BMPs 2.3 and 2.4 will be implemented with this activity. (854)
20. Maintenance of cattle guards - This work consists of cleaning and restoring cattle guards and appurtenances. Work would normally be accomplished by hand, although a backhoe may be used to raise the deck grid. BMPs 2.4 and 2.13 will be implemented. (861)

21. Sign Maintenance - This work consists of cleaning, replacing, and reconditioning signs, posts, and markers. This work would normally be accomplished by hand by Forest Service personnel. BMPs 2.4 will apply here. (872)
22. Maintenance of Road Closures – This work consists of maintaining existing road closures through gating, or creating an earthen barrier at the road entrance. These roads have previous decisions and activities would not include new ground disturbance. If earthen barriers are created, they will be treated to avoid erosion into waterways, such as seeding and mulching, as site conditions require.
23. Rock and Common Borrow sites – Rock and fill material sources are identified with assistance from resource specialists including archeology and botany. Trees may be removed from rock pit and/or common borrow sites only if the wildlife specialist determines there will be No Effect to wildlife. Blasting may be used to dislodge material. Rock crushing machinery may be used to prepare rock for road improvement and slide stabilization. No rock and/or common borrow sites will be located within Riparian Reserves. Likewise, invasive plant prevention practices would apply to ensure rock/fill sources are not contaminated with invasive plant species. Archeology, Botany, and Wildlife will be notified in time to perform surveys if needed before enlargement of any rock pit or borrow site. BMPs 2.4, 2.8, 2.12 and 2.13 will apply to these activities. Invasive species prevention practice associated with this action is GP-9.
24. Slide and Fill Stabilization – This work consists of a variety of stabilizing techniques including spreading seed, fertilizer and mulch (with or without hydro-mulching machines), hand installation of geo-textile support, machine placed rip rap, and repair using an array of construction equipment (cats, loaders, excavators, scrapers, and trucks). BMPs 2.4, 2.8, and 2.13 will apply to these activities. . Invasive species prevention practices associated with this action are GPA-1, GP-5, GP-8, GP-14.
25. Bridge Repair (no replacement) – This work includes maintenance that does not result in any structural changes to the bridge or its footings that would impact streambed stability. Additional design features may be applied for bridges in salmon and steelhead critical habitat reaches as identified in the annual interdisciplinary review. BMPs 2.4, and 2.8 will apply to this activity. Bridges over 45 years of age are considered historic properties and are not covered under this project.
26. Fueling and Servicing of Vehicles – Fueling and servicing of vehicles, including heavy equipment, will be done outside of Riparian Reserves in accordance with BMP 2.11.

Timing of Activities

Six Rivers Wet Weather Operation Standards will apply to protect water quality and road investment. Road maintenance will occur during dry weather in the summer and fall, although work may occur at any time if conditions allow and clearance from appropriate specialists has been obtained (wildlife, botany, fisheries, hydrology, etc.). In addition, preventing the transmittal of Port-Orford root rot disease would also guide timing of activities.

Diagram of Road Bed

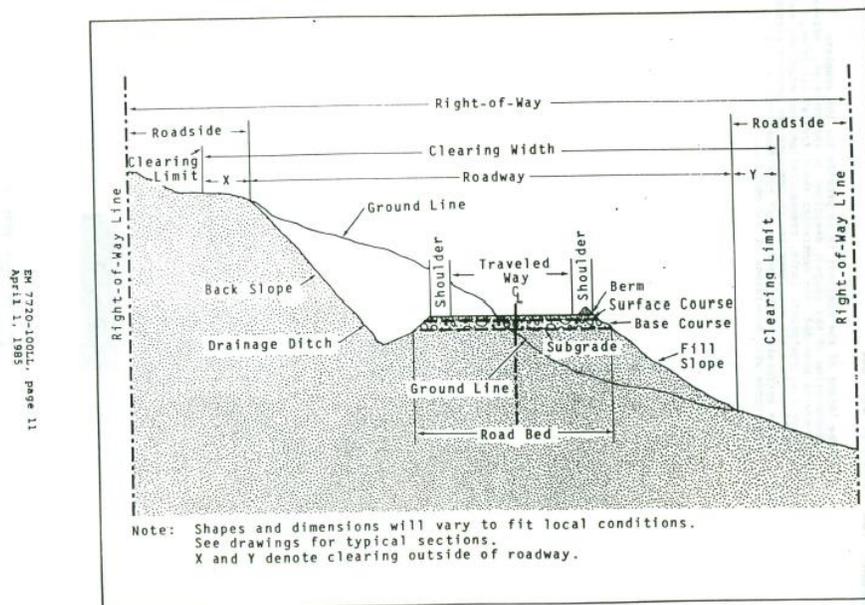


Figure 102-1.--Illustration of road structure terms.

2016-2023 Road Maintenance Biological Assessment/Evaluation Draft

A Road Maintenance BA/BE was completed in September 2015 for informal consultation with USFWS to analyze the effects of road maintenance activities on ESA listed wildlife and botanical species. The Road Maintenance BA/BE also addresses effects to wildlife, botany and aquatic Forest Service Sensitive Species. Design Features pertaining to water quality found in the Road Maintenance BA/BE are consistent with those found within this WFR BA.

During Level 1 meetings with NMFS in 2015 (2/15, 2/ 26, 3/6, and 4/9), it was agreed upon that the notification process outlined in the WFR Program BA/BE would meet section 7 requirements for ESA listed species for all future watershed and fisheries projects, including road maintenance. The specialist review process in the 2016 to 2023 Forest-wide Road Maintenance Project decision meet the requirements for the WFR Program consultation.

The following tier form developed to ensure consistence with the multi-species Road Maintenance BA/BE would serve as a checkpoint/consistency document for meeting the requirements of the WFR BA. Final BA/Tier form would be reviewed at Annual Coordination Meeting between NMFS and USFS.

SIX RIVERS NATIONAL FOREST
(Includes Ukonom – Klamath National Forest)
Biological Assessment/Evaluation
Threatened, Endangered, Proposed, and Forest Service Sensitive Species
FOREST-WIDE ROAD MAINTENANCE PROJECT

Roads Covered (Annual Review List/Single Road):

This BA/BE incorporates the Forest-wide Reference Document dated:

Has Species List been confirmed by Level 1 team? (Date of Level 1 notes):

District:

Project Implementation Dates:

Description of Project:

Legal Location(s) of Project:

Wildlife Documentation

Known Sites

Within 0.25 mile of an occupied MAMU site? Yes ___ No ___

Within 0.25 mile of a known NSO activity center? Yes ___ No ___

Within 0.25 miles of a known fisher den? Yes ___ No ___

"Yes" to any of the above questions will require additional review by the Level 1 Team

Project occurs on high use maintenance level 2 or above roads? Yes ___ No ___

Within 0.25 mi of unsurveyed spotted owl nesting/roosting habitat? Yes ___ No ___

Within 0.25 mi of unsurveyed marbled murrelet nesting habitat? Yes ___ No ___

Within 0.25 mi of unsurveyed fisher denning habitat? Yes ___ No ___

Limited operating period needed? Yes ___ No ___

If yes, state for which species and LOP: _____

Will hazard trees be removed in NSO, MAMU or fisher nesting/denning habitat?

Yes ___ No ___

How many and what size (dbh) hazard trees will be removed from the work site(s)?

Will vegetation removal at culvert replacement sites impact NSO, MAMU, or fisher nesting/denning habitat? Yes ___ No ___

Will primary constituent elements of NSO Critical Habitat Unit (CHU) be affected?

Yes ___ No ___

If yes, explain: _____

NSO CHU Identification Number: _____

Will primary constituent elements of MAMU Critical Habitat Unit (CHU) be affected?

Yes ___ No ___ If so, explain:

MAMU CHU Identification Number: _____

Distance from coast (for marbled murrelet): ___ miles FEMAT Zone: _____

Within Late-Successional Reserve? Yes ___ No ___

Within Spotted Owl Critical Habitat? Yes ___ No ___

Within Marbled Murrelet Critical Habitat? Yes ___ No ___

Fisheries Documentation

(See attached spreadsheet for multiple roads)

Does any watershed exceed the upper limit of ground disturbing activities, including work carried over from previous year? _____ If Yes, name watershed (s):

If Yes - Notification to NMFS/Level 1 may be warranted (WFRBA 2015)

Within Riparian Reserve ? Yes ___ No ___

Culvert Replacement within Intermittent Channel xing? Yes ___ No ___

Culvert Replacement within Perennial Channel xing? Yes ___ No ___

If Yes to any, Distance to Occupied Habitat: _____

If less than 0.25 miles – Harm/Harassment Likely? Yes ___ No ___

Briefly Explain (Proximity, Probability and Magnitude)

If Yes – Notification to NMFS/Level1 warranted (WFRBA 2015).

Botany Documentation

Within 0.25 miles of occupied habitat for McDonald's rockcress? Yes ___ No ___

"Yes" to this question would warrant additional review by the Wildlife and Botany Level 1 Team

Within 0.25 miles of early successional Sensitive plant species? Yes ___ No ___

Determinations

Forest Service ESA Species

___ This Project would have no effect on any ESA listed Species

___ This Project may affect but is not likely to adversely affect the following species _____

Forest Service Sensitive Species (Wildlife)

____ This project will have no impact on any Forest Service Sensitive Wildlife Species.

____ This project may impact individuals, but will not cause a trend towards listing or a loss of viability for the following Forest Service Sensitive Species:

_____ (but will not impact any other Forest Service Sensitive Species).

Explanation:

LOP for Sensitive Species

____ LOP required for activities within the primary disturbance zone, within line of sight of an active nest, within 0.25 miles of known nest/den site for the following Sensitive Species:

_____ Dates: _____

Forest Service Sensitive Species (Botany)

____ This project will have no impact on any Forest Service Sensitive Plant or Fungi Species.

____ This project may impact individuals, but will not cause a trend towards listing or loss of viability for the following Forest Service Sensitive Species:

_____ (but will not impact any other Forest Service Sensitive Species).

Explanation:

Forest Service Sensitive Species (Aquatic)

____ This project will have no impact on any Forest Service Sensitive Aquatic Species.

____ This project may impact individuals, but will not cause a trend towards listing or loss of viability for the following Forest Service Sensitive Species:

_____ (but will not impact any other Forest Service Sensitive Species).

Explanation:

By signature I certify that the above project meets the definitions and operation instructions identified in Section IV (Description of the Proposed Action) of the "Forest-wide Road Maintenance Project" BA/BE dated September 2015.

Wildlife Biologist _____ Date _____

Fisheries Biologist _____ Date _____

Forest Botanist _____ Date _____

Copies of this Project Documentation Form must be submitted to the Level 1 Teams for tracking purposes as well as provided to Engineering/hydrology staff for their files.

Table 3. Example Road by Road Fisheries Documentation for ground disturbing projects

Road Number	Activity (#)	Miles Treated	6 th Field Watersheds (for limits)	Within RR?	Within Intermittent (I) or Perennial (P)	Within 0.25 miles?	Notification ?	Duration/ Date implement?	Notes/add PDFs /s/ last line to indicate reviewer & date	Road Ok'd ?
Examples										
2S08b	1, 9, 11,	1	Little VD	Y	I	Y	Yes as in CH	Est: 3 days End of Sept 2015	w/in CH, but stream is dry when work would occur. No major ground disturbance.	Y
2S08	11	3	Little VD	Y	I	Y	No	“		Y
27N02	17	5	Upper Mad	Y	I/P	N	No	2 days		Y
								Hydro review		
								Fish	/s/ Karen Kenfield 3/31/15	

Watershed Cumulative Effects:

Identify if any 6th field watershed is approaching upper limit for implementing ground disturbing actions watershed (include any ground disturbing actions from previous years that would be implemented in the same year). Notification to NMFS/Level 1 may be warranted.

Road by Road approval and any additional PDFs would be transferred to Eng/Hydro during annual road maintenance coordination meeting

