West Side Watershed Restoration – December 9, 2008

I. Background

The National Forest Transportation System is essential to the effective management of National Forest lands, for Forest users and for the natural resources entrusted to the care of the agency. In January 2001, the Forest Service adopted a new road management policy, which directs the agency to maintain a safe, environmentally sound road network that is responsive to public needs and affordable to manage. The policy includes a science-based roads analysis process designed to help managers make better decisions on roads.

In its approach to managing the transportation system, the Shasta-Trinity NF (Forest) seeks balance among these factors:

- the health of the environment;
- the need for safe public and administrative access to forest lands; and
- the financial cost of effectively maintaining a safe transportation system

In this era of declining National Forest budgets, it is no longer possible to maintain to standard all the roads currently in the forest road system. The Forest Service must focus on maintaining roads essential for public access and administrative needs that are also consistent with maintaining or improving ecosystem health. In particular, there is a need to reduce our road system's controllable sediment discharge sources[1] in areas with accelerated erosion and stream sedimentation.

The science-based roads analysis process (RAP) instituted as part of the 2001 road management policy, has since then been part of interdisciplinary project planning and evaluation, before implementing any project activity that would change the road system or affect public access to national forest lands. This RAP process often brings to light little-used roads that are having negative effects on fish and water quality, or are disproportionately difficult to maintain. These roads then are targeted for improvement, or for elimination through the process of decommissioning; to improve water quality, fish habitat, and other watershed resources.

This proposed action, for watershed restoration on the west side of the Shasta-Trinity National Forest, was developed from the management needs and opportunities identified by the Roads Analysis Process for the following seven areas: Rattlesnake, Smoky, Salt, Soldier, Clear Creek, Middle Fork Cottonwood and Upper Hayfork Creek (see Appendix E maps). The project is designed to implement the Aquatic Conservation Strategy (ACS) and other management direction given in the Shasta-Trinity National Forest Land and Resource Management Plan and the Forest System Roads Policy.

II. Purpose and Need for Action

The purpose of the project is to improve water quality and reduce existing negative environmental impacts by 1) decommissioning some roads that currently pose risks to water quality and watershed resources and that are not necessary for public or administrative access; and 2) modifying other roads to improve environmental conditions while maintaining necessary access. These will be improved by (a) converting roads to trails, (b) upgrading stream crossings to improve drainage and decrease future potential for mass failure; and (c) realigning a portion of a road out of a seasonally wet meadow.

[1] Where watersheds have accelerated erosion and stream turbidity, roads are typically implicated as the major sediment source. Road and stream crossing removal are proven ways to reduce controllable sediment discharge.

Table 1. Comparison of the existing and desired conditions associated with the roads identified in this proposal on the Shasta-Trinity National Forest.

Road Management Factors	Existing Condition	Desired Condition
Health of environment	• Existing roads and road maintenance lead to high levels of ongoing disturbance • Roads contribute to high levels of erosion and sedimentation • Roads cause adverse effects to water quality & aquatic habitat.	• Low levels of disturbance. • Recovery from past disturbances, with stable soils and natural drainage patterns. • Improvements to water quality and aquatic habitats
Access & safety	• The Forest road network includes more roads than are needed for access; some roads are rarely or never used. • Safety concerns exist because of limited maintenance: o brush encroachment o limited line of sight o rougher road surface o higher potential for stream crossing failures o hazard trees, down logs and/or boulders o entrapment--fallen trees or boulders prohibit safe entry & exit	• The road system matches access needs for the area. • Safety concerns are addressed by appropriate maintenance of a right-sized road system for the forest.
Cost to maintain	• Limited maintenance funds are inefficiently spent on low use/ high cost routes.	• Maintenance funds are efficiently spent on needed roads.

The existing conditions vary from the desired conditions (Table 1). Specific transportation management objectives associated with the transportation policy goals and the Purpose and Need for this proposal include:

Goal: Provide for safe public road access while allowing for economical and efficient management of the Shasta-Trinity National Forest transportation system

- **Objective 1-** Minimize or reduce the amount of unnecessary classified and unauthorized routes, in order to use maintenance funds in areas of the forest that have greater resource protection needs and higher use demand. Accomplish this by decommissioning unneeded roads that pose risk to public safety or environmental quality; and by improving the condition of needed roads that pose risk to public safety or environmental quality.

Goal: Reverse adverse ecological impacts associated with roads**.**

- **Objective 2**- Reduce runoff and controllable sediment discharge to improve watershed condition. Minimize the potential for altered stream flows, accelerated sedimentation, and other water quality impairments by improving needed roads or eliminating unnecessary roads.
- **Objective 3**- Protect and enhance conditions that provide habitat for wildlife and fish – Increase the connectivity of riparian corridors, ability of the stream system to transport bedload and associated debris; and passage for aquatic species. Minimize or reduce the impact of road/stream crossings through upgrades, rerouting crossings, or crossing removal.

III. Project Area Location

The project area is defined by the boundaries of each RAP watershed as shown in Appendix E maps. Project watersheds are within the Klamath River Basin via the Trinity River, and the Lower Sacramento River Basin, as shown in Figure 1 and Table 2. Legal locations for each project watershed are indicated on the maps in Appendix E.

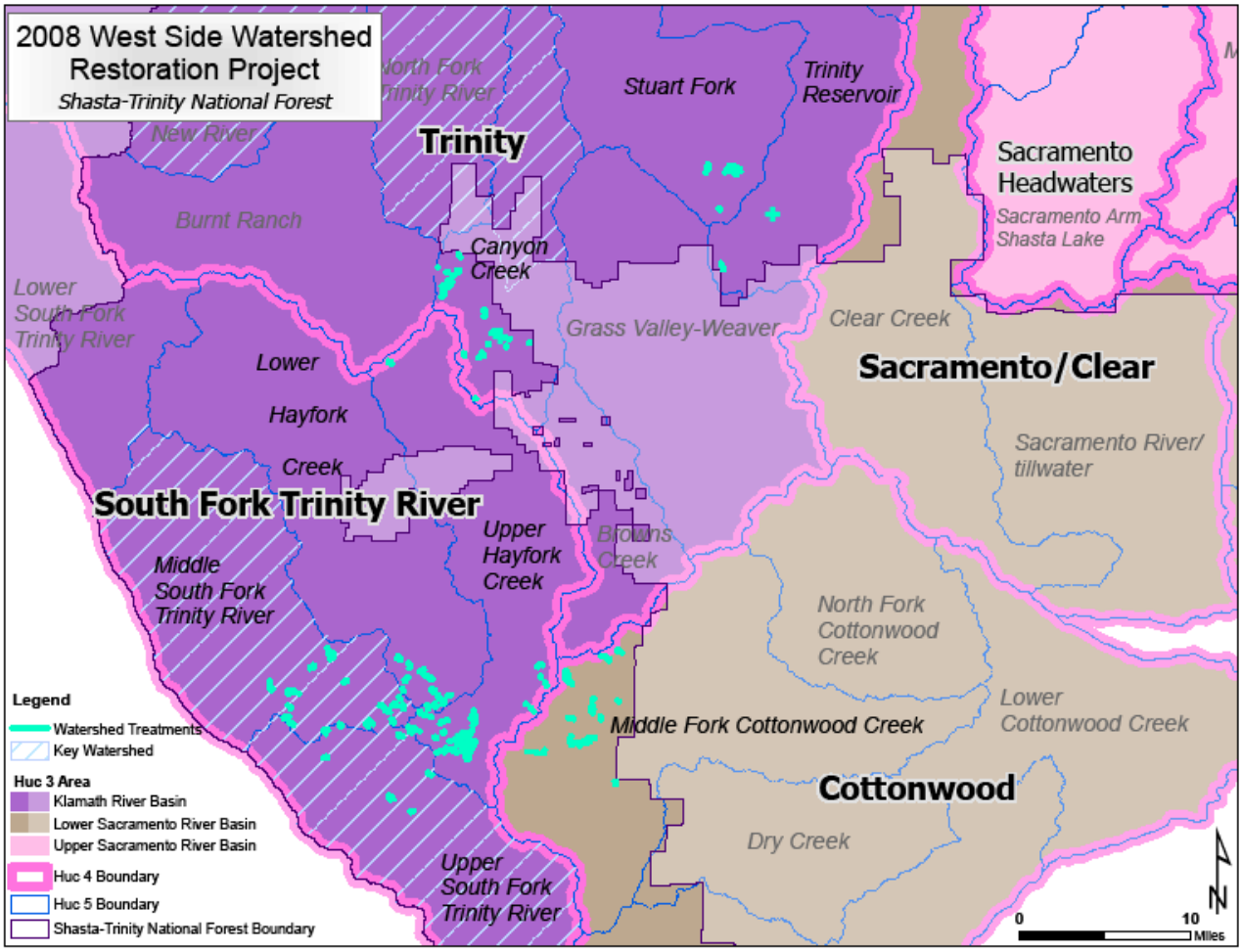

Figure 1. Location of proposed action by watershed. See Table 2 for further detail.

Table 2. Proposed Treatment by Watershed and Operational Maintenance Levels

Nested Watersheds (HUC 3-5)			Road Operational Maintenance Level									
			1 - Basic Custodial Care (Closed)			2 - High Clearance		3 - Passenger Car Suitable		Unauthorized (Non-System) Routes	Grand Total	
			DECOMMISSION	REROUTE	UPGRADE X-ING	DECOMMISSION	UPGRADE X-ING	CONVERT TO TRAIL	UPGRADE X-ING	DECOMMISSION	UPGRADE X-ING	
HUC3 NAME	HUC4 NAME	HUC5 NAME	miles	miles	#	miles	#	miles	#	miles	#	miles
Lower Sacramento River	Cottonwood	Middle Fork Cottonwood Creek	1.9			1.4		0.3		5.0		8.7
Klamath River	South Fork Trinity River	Lower Hayfork Cr	0.6		3	0.5				2.8	3	3.9
		Middle South Fork Trinity River	6.3			1.5				1.4		9.2
		Upper Hayfork Creek	4.7			3.3				5.0		13.0
		Upper South Fork Trinity River	2.4			0.4				0.3		3.1
	Trinity River	Browns Creek								0.1		0.1
		Canyon Creek	0.3	1.8					1	3.0	1	5.1
		Stuart Fork	1.8			2.0						3.8
		Trinity Reservoir	0.4				1				1	0.4
		Grand Total	18.5	1.8	3	9.1	1	0.3	1	17.7	**5.0**	**47.3**

IV. Proposed Action

The Shasta-Trinity National Forest proposes to reduce the risks to the environment associated with roads while addressing the need for a safe transportation network through the following actions:

1. decommission approximately 18 miles of existing unauthorized routes (currently closed);
2. decommission approximately 20 miles of currently closed high clearance system roads (Maintenance Level 1[2])
3. decommission approximately 9 miles of currently open high clearance system roads (Maintenance Level 2).
4. re-route/realign 1.8 miles of closed high clearance system road (Maintenance Level 1);
5. upgrade 2 stream crossings (Maintenance Level 3)
6. convert 0.3 miles of passenger car-accessible system road to motorized trail (Maintenance Level 2);

Implementation of the proposed action is expected to take five to 10 years. Implementation is scheduled to begin immediately following completion of the NEPA process.

Description of Treatment Types

Decommission

Roads that are no longer needed for administrative use will be decommissioned. Several of these roads are overgrown with vegetation and/or already are causing erosion and sedimentation problems. About 30 culverts are identified for permanent removal on 51 miles of road decommissioning (refer to Appendix A for detailed road list). Decommissioning a road meets multiple objectives that may involve one or more of the following restorative actions described below.

Table 3. Decommissioning Objectives and Actions

	Need/Objective	Action
1	Remove stream crossing failure potential Restore more natural stream flow characteristics.	Remove fill and pipes at all stream crossings. Match width & slope of fill removed to stream channel widths & slope.
2	Restore more natural hillslope drainage pattern. Leaving pipes in place reduces disturbance and costs of removal while still meeting objectives.	Crush cross drain pipes creating a dip in road. Block inlet and prevent flow thru the pipe and /or down any remaining ditch. Leave crushed pipe in place.
3	Restore hillslope hydrology – disperse flow Reduce compaction, surface runoff, erosion and sedimentation. Promote infiltration Provide a seed bed for future vegetation.	Pull roadside berms and as much road fill as feasible into the road cut, placing it along cut banks. Out-slope and compact the excavated material.
4	Reduce compaction, surface runoff, erosion and sedimentation. Promote infiltration. Provide a seed bed for future vegetation and an area to capture settling sediment.	Subsoil road prism along outsloped, crowned or along sections where fill volume is insufficient to outslope the road. This activity will not occur in areas prone to non-native invasive plants.

[2] **Definitions of road maintenance levels, from the 2008 Travel Routes Data Dictionary**

1 - Basic Custodial Care (Closed)	Assigned to intermittent service roads during time they are closed to vehicular traffic
2 - High Clearance Vehicles	Assigned to roads operated for use by high clearance vehicles.
3 - Suitable For Passenger Cars	Assigned to roads operated and maintained for travel by a prudent driver in a standard passenger car.

	Need/Objective	Action
5	Reduce soil erosion by providing ground cover. Promote recovery of new vegetation.	Seed, and mulch (using materials selected through consultation with a botanist) all stream crossings and other areas where slopes are steep and soils are disturbed
6	Logs on contour provide flow and sediment impediments. Logs break down in time and enrich soil resources. Logs help to discourage use of old road bed.	Stockpile any large logs or hazard trees that are encountered along decommissioned routes to place on the contour in areas of disturbance.
7	Prevent and discourage future vehicle traffic into restored areas.	Create an earthen berm at the start of the road or decommissioned road segment.

Reroute/Realignment

Road 33N31 provides administrative access for future needs. This road currently traverses a seasonally wet meadow. The treatment would realign the road (1.8 miles) to prevent rutting, rilling and vehicle to water contact associated with the road use in this area.

Upgrade

Roads needed for long-term use by the Forest Service, public, and private industry with identified issues at stream crossings will be upgraded to accommodate the Q_{100} flood event as well as potential debris loads. There are two roads identified for stream crossing upgrades, these are the 33N47 crossing at Soldier Creek and 34N13 tributary to Trinity River below Trinity Reservoir. Culverts may need to be larger than the 100 year return interval in systems with high sediment loads. Crossing upgrade designs prevent stream capture by the road in the event of a failure through the installation of a critical dip. Ditch relief culverts are added where road grades may result in the stream being captured by the road.

Road upgrades can include one or more of the following actions:

- Grading, outsloping, and spot rocking the surface.
- Establishing cross-drains, installing waterbars and drainage dips.
- Installing stand pipes, placing splash aprons below culvert outlets, upsizing culverts, and adding drainage relief culverts.
- Road crossings will be modified when feasible to enhance connectivity of the aquatic environment.
- Where culverts are required, they are sized to pass a Q_{100} flow, bedload and floatable woody debris.

Convert To Motorized Trail <50”

The lower 0.3 miles of 28N06 will be converted to a motorized trail <50” wide. This conversion to trail will eliminate car and truck access to the river while still providing motorized OHV public access. Conversion of a road to a motorized trail < 50” involves the same restorative actions described in Table 3, Decommissioning Actions and Objectives, with a modification to Action Item 3. The extent and placement of the road fill back onto the roadbed requires leaving the outer edge of the roadbed intact to provide the width of the new trail surface. This action also reduces road density by decreasing the width of compacted surface.

V. Project Design Features

All activities associated with this proposed action will be in conformance with the following project design features:

A. Environmental Compliance and Connected Actions

- Aquatic Conservation Strategy Objectives (ACS) (as detailed in the Northwest Forest Plan pgs B-9 to B34);
- Other legislative mandates for the Forest Service to manage lands and resources such as the Clean Water Act, National Environmental Policy Act, Federal Land Policy and Management Act (FLPMA), and the Endangered Species Act;
- Best Management Practices for management of water quality;
- Requirements to seed and mulch disturbed ground prior to winter weather;
- Requirement to clean vehicles and large equipment of soil by steam cleaning or use of a high-pressure hose. Cleaning shall be inspected and approved by the Forest Service;
- Wet Weather Operations Guidelines;
- Dispose of unsuitable slide and waste material in stable, non-floodplain sites. Disposal of suitable slide, fill and waste material may be used to restore natural or near-natural contours, as approved by geotechnical engineer or other qualified personnel;
- Minimize disturbance of existing vegetation within the road clearing limits, at stream crossings, and approved disposal sites to the extent necessary to restore the hydrologic function of the subject road;
- All Limited Operating Periods designated in Biological Assessments for the protection of listed wildlife and fish species. Wildlife operating periods for spotted owl will allow for up to two hours of noise disturbing work on Level 1 and 2 roads during the breeding season where the activity is within ¼ mile of suitable habitat. Activities exceeding this time frame will have a seasonal restriction (February 1 through July 31). For Southern Oregon/Northern California Coasts (SONCC) coho salmon, there will be no operation between October 15 and April 15, unless agreed upon by the district fisheries biologist and the National Marine Fisheries Service. Examples of conditions that may warrant an extension are 1) an extended dry weather forecast or 2) a greater risk of environmental harm by leaving a site to over winter in its current condition versus finishing the work; and
- Historic Properties will be recorded, flagged, and avoided.

B. Monitoring

- Project implementation and effectiveness monitoring is used to determine how well objectives are being met, and to determine the effects of project implementation on the environment. The Forest Service will monitor this project during and after its implementation to ensure that objectives are being met and to gather information used to improve the effectiveness of future projects. Information gathered in the monitoring plan will also be used to gauge appropriateness and timing of any future actions and necessity of follow-up rehabilitation measures. Monitoring methods include surveillance, sampling, and measurement of implementation check points and long-term project effectiveness.

VI. Management Direction

The direction guiding the analysis includes: the Multiple-Use Sustained Yield Act of 1960; the National Forest Management Act of 1976; the National Environmental Policy Act of 1969; the National Historic Preservation Act of 1979; the Endangered Species Act of 1973; and the Shasta-Trinity National Forest

Land and Resource Management Plan published in 1995 (hereafter referred to as the Forest Plan). The Forest Plan provides programmatic management direction for the site-specific analyses completed and disclosed in this Environmental Assessment.

Forest Plan Direction - The Forest Plan allocates forest lands in several management categories, each with specific direction, for discrete areas of the Forest. The project area is located throughout the west side of the Shasta-Trinity National Forest on lands allocated to Commercial Wood Products, Roaded Recreation, Wildlife Habitat Management, Riparian Reserve and Late-Successional Reserve (see Table 3 and Figure 2).

Key Watersheds - Within the range of the Northern Spotted Owl, Key Watersheds are designated that contribute directly to conservation of at-risk anadromous salmonids, bull trout, and resident fish species, and/or are important sources of high-quality water. Forest Plan direction for Key Watersheds is that the amount of existing system and nonsystem road should be reduced through decommissioning.[3] This proposed action would decommission 11.7 miles of road in Key Watersheds.

Forest Service Transportation System Policy - This national policy, issued in 2001, directs the Forest Service to manage National Forest System roads to provide for public uses of National Forest System lands, safe public access and travel; to allow for economical and efficient management, to begin to reverse adverse ecological impacts associated with roads, to the extent practicable; and to meet all other current and future land and resource management objectives.

This policy provides for the science-based roads analysis process that was a primary driver for this proposed watershed restoration project.

Forest Service Travel Management Rule - This 2005 national rule requires designation of roads, trails, and areas that are open to motor vehicle use on National Forests; and specifies that motor vehicle use will only be allowed on these designated system routes and in designated areas. The Shasta-Trinity National Forest recently proposed actions to implement the Travel Management Rule by adding approximately 43 miles of existing unauthorized routes to the National Forest Transportation System for public use, and the Forest will be analyzing effects of the proposal in an Environmental Impact Statement.

This watershed restoration project proposal complements but does not duplicate the Travel Management proposed action. This proposed action decommissions unauthorized routes, and decommissions or improves existing system roads. The Travel Management proposed action adds unauthorized routes (currently not part of the National Forest Transportation System) to the system if they are needed and can be maintained so as not to cause ecological harm.

[3] LRMP, page 4-59

Watershed Restoration Treatment	Key Watershed	Commercial Wood Products	Late Successional Reserves	Riparian Reserves	Roaded Recreation	Wildlife Habitat Management	Grand Total (Mi)	Grand Total Upgrade X-ings #
Decommission	12.6*	14.7	6.3	10.1	10.3	3.7	45.2	
Convert To Trail				0.3			0.3	
Reroute				0.8	0.2	0.9	1.8	
Upgrade Xing		4		5	1		5	5
Grand Total (mi)	**12.6**	**14.7**	**6.3**	**11.2**	**10.5**	**4.5**	**47.3**	5

*Note: *Key Watershed allocation lies atop other land allocations, so treatment miles are not added to total.*

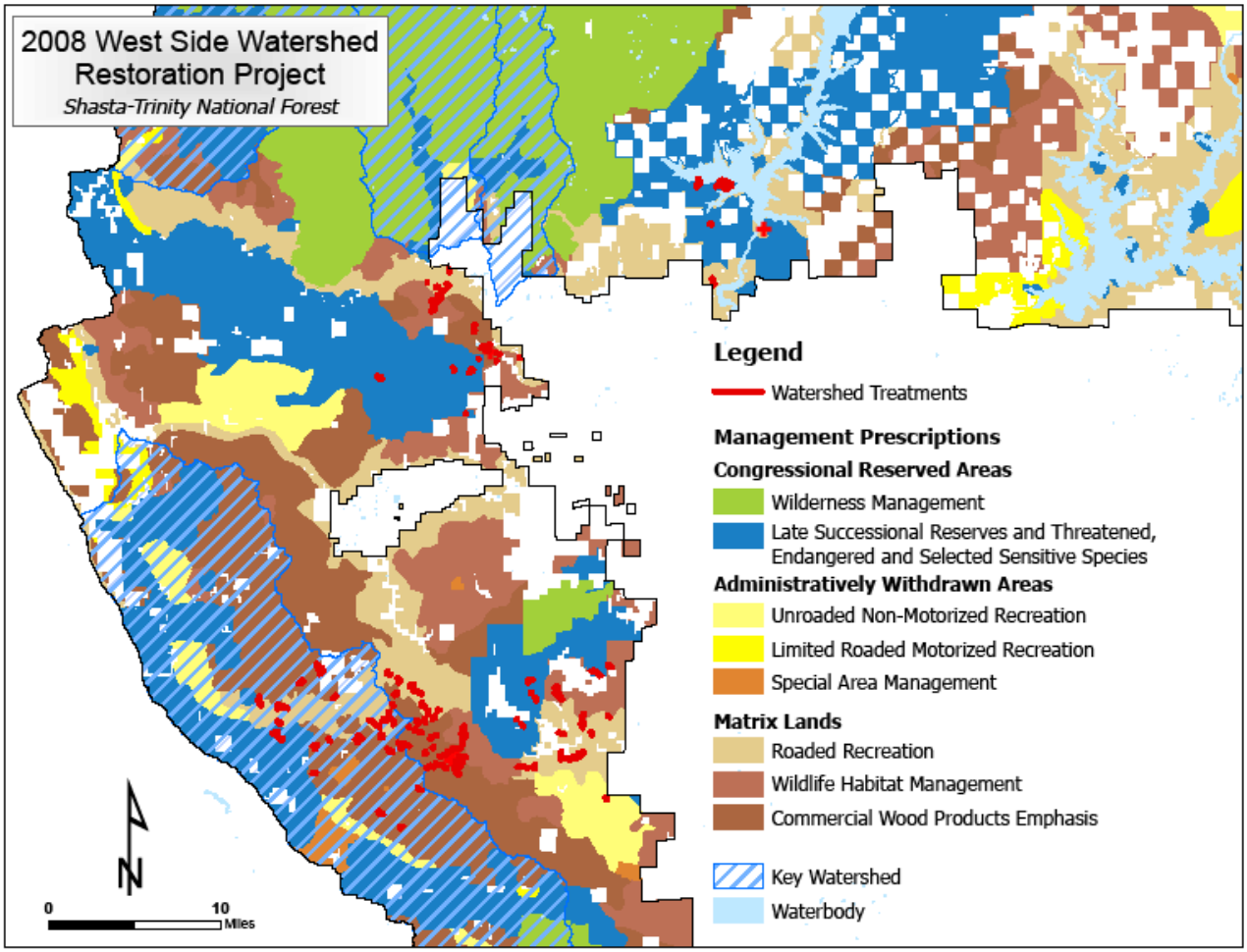

Figure 2. Location of Proposed Action in relation to Forest Plan land allocations. Riparian Reserve allocation cannot be shown at this scale. See Table 4 for more detail.

VII. Decision Documentation

An Environmental Assessment will be prepared for this project in compliance with the NEPA and other relevant federal and state laws and regulations.

VIII. Consultation with Other Agencies

The USDI Fish and Wildlife Service, USDC NOAA Fisheries Service and the North Coast Regional Water Quality Control Board have provided input to the ID Team during the scoping process. As part of the ID process, the Forest Service has prepared biological assessments which examine the potential effects of proposed management activities of the Proposed Action upon listed species and habitats as per the Endangered Species Act.

IX. Public Scoping

The proposed action was first listed in the Forest Schedule of Proposed Actions (SOPA) in July, 2008.

Appendix A. Road Routes in Proposed Action, listed by RAP

Roads Analysis Process (RAP)	Watershed Analysis (WA)	HUC4 Name	HUC5 Name	Route ID	ML 1	ML 2	ML 3	ML U	Grand Total
BIG CR	M HAYF CR	South F Trinity R	U Hayfork Cr	4N16B	0.4000				**0.4000**
GEMMILL	BROWNS CR	Trinity	Browns CR	U30N37A				0.0893	**0.0893**
	U. HAYF CR	South F Trinity R	U Hayfork Cr	30N03A	0.4000				**0.4000**
				U29N07C				0.2800	**0.2800**
				U29N07G				0.1350	**0.1350**
				U29N25C				0.0370	**0.0370**
				U29N83C				0.0820	**0.0820**
KNOB PEAK	M F COTTONWOOD	Cottonwood	M F Cottonwood CR	U29N02C				0.1870	**0.1870**
				U29N05AB				1.2538	**1.2538**
				U29N05D				0.2069	**0.2069**
MF COTTONWOOD	M F COTTONWOOD	Cottonwood	M F Cottonwood CR	29N22A	0.5000				**0.5000**
				29N54		1.3930			**1.3930**
				29N54A	0.1000				**0.1000**
				29N54B	0.1000				**0.1000**
				30N13C	0.8000				**0.8000**
				30N14Y	0.4268				**0.4268**
				U28N10A				0.3204	**0.3204**
				U29N21X				0.3930	**0.3930**
				U29N22A				1.0200	**1.0200**
				U29N22E				0.4380	**0.4380**
				U29N22I				0.1821	**0.1821**
				U29N41W				0.6535	**0.6535**
				U29N41X				0.3860	**0.3860**

Roads Analysis Process (RAP)	Watershed Analysis (WA)	HUC4 Name	HUC5 Name	Route ID	ML 1	ML 2	ML 3	ML U	Grand Total
NOT IN A RAP	BEEGUM CR	Cottonwood	M F Cottonwood CR	28N06			0.3000		**0.3000**
PETTIJOHN	LEWISTON	Trinity	Trinity Reservoir	33N04YA	0.4200				**0.4200**
	WEST TRINITY RESERVOIR	Trinity	Stuart F	34N17YA		0.1816			**0.1816**
				34N34YA	0.6000				**0.6000**
				34N36	0.8000	1.3000			**2.1000**
				34N80B	0.3747	0.5000			**0.8747**
RATTLESMOKE	RATTLESNAKE CR	South F Trinity R	M South F Trinity R	1S28C	0.6000				**0.6000**
				1S37	0.9000				**0.9000**
				1S39A	0.4000				**0.4000**
				29N58H	0.5715				**0.5715**
				29N58K	0.2000				**0.2000**
				29N68A	0.5000				**0.5000**
				29N68B	0.5000				**0.5000**
				29N81	0.6000				**0.6000**
				29N81A	0.4000				**0.4000**
				30N28A	0.2000				**0.2000**
				30N28B	0.4000				**0.4000**
				30N50A		1.5000			**1.5000**
				30N53A	0.3000				**0.3000**
				30N53B	0.5000				**0.5000**
				30N57A	0.2000				**0.2000**
				U1S29				1.2372	**1.2372**
				U29N58HA				0.1653	**0.1653**

Roads Analysis Process (RAP)	Watershed Analysis (WA)	HUC4 Name	HUC5 Name	Route ID	ML 1	ML 2	ML 3	ML U	Grand Total
	SMOKY	South F Trinity R	M South F Trinity R	29N58E	0.0051				**0.0051**
				29N58H	0.0285				**0.0285**
			U. South F Trinity R	28N31A	0.7000				**0.7000**
				28N71A		0.4000			**0.4000**
				29N48A	0.6000				**0.6000**
				29N56	0.3000				**0.3000**
				29N56A	0.3000				**0.3000**
				29N58E	0.1949				**0.1949**
				29N62D	0.3000				**0.3000**
				U29N51A				0.3207	**0.3207**
SALT	SALT CR	South F Trinity R	Lower Hayfork CR	29N64		0.5000			**0.5000**
				30N14A	0.4000				**0.4000**
				30N18A	0.2000				**0.2000**
				U29N31EAA				0.2735	**0.2735**
				U29N31EB				0.3341	**0.3341**
				U30N14A				0.0789	**0.0789**
				U30N14AA				0.1995	**0.1995**
				U30N14B				0.0559	**0.0559**
				U30N27A				0.1030	**0.1030**
				U30N27AB				0.1004	**0.1004**
				U30N27B				0.0749	**0.0749**
				U30N27D				0.0541	**0.0541**
				U30N27F				0.0627	**0.0627**
				U30N27K				0.0382	**0.0382**
				U30N27W				0.1360	**0.1360**
				U30N27X				0.1726	**0.1726**
				U30N27Z				0.0283	**0.0283**
				U30N28C				0.0678	**0.0678**
				U30N28D				0.0514	**0.0514**
				U30N28FA				0.1982	**0.1982**
				U30N45A				0.0476	**0.0476**
				U30N45B				0.1850	**0.1850**
				U36TRI03				0.4609	**0.4609**
				U36TRI05				0.1175	**0.1175**

Roads Analysis Process (RAP)	Watershed Analysis (WA)	HUC4 Name	HUC5 Name	Route ID	ML 1	ML 2	ML 3	ML U	Grand Total
SOLDIER	SOLDIER	Trinity	Canyon CR	33N31	1.8000				**1.8000**
				33N47A	0.2000				**0.2000**
				33N51C	0.1000				**0.1000**
				U32N25B				0.0757	**0.0757**
				U33N22BA				0.0721	**0.0721**
				U33N22C				0.1027	**0.1027**
				U33N22D				0.2681	**0.2681**
				U33N30				0.1558	**0.1558**
				U33N30A				0.1238	**0.1238**
				U33N30D				0.0763	**0.0763**
				U33N41AA				0.0219	**0.0219**
				U33N41AC				0.0697	**0.0697**
				U33N41EA				0.0345	**0.0345**
				U33N41FA				0.1635	**0.1635**
				U33N41M				0.2263	**0.2263**
				U33N48AA				0.1021	**0.1021**
				U33N48B				0.0774	**0.0774**
				U33N48C				0.1842	**0.1842**
				U33N48D				0.0389	**0.0389**
				U33N51BA				0.1625	**0.1625**
				U33N51E				0.0897	**0.0897**
				U33N51F				0.3210	**0.3210**
				U33N51G				0.1255	**0.1255**
				U33N51H				0.1267	**0.1267**
				U33N51I				0.0509	**0.0509**
				U33N51J				0.2198	**0.2198**
				U414B				0.0963	**0.0963**

Roads Analysis Process (RAP)	Watershed Analysis (WA)	HUC4 Name	HUC5 Name	Route ID	ML 1	ML 2	ML 3	ML U	Grand Total
U. DUBAKELLA	SMOKY	South F Trinity R	U. HayF CR	29N73D		0.1881			**0.1881**
				U29N73E				0.0750	**0.0750**
			U. South F Trinity R	U29N73E				0.0096	**0.0096**
	U. HAYFORK CR	South F Trinity R	M South F Trinity R	U29N73E				0.0076	**0.0076**
			U. Hayfork CR	29N12A	0.2000				**0.2000**
				29N17B	0.2380				**0.2380**
				29N30P	0.1000				**0.1000**
				29N31C	0.2000				**0.2000**
				29N42A	0.3000				**0.3000**
				29N46A	0.2039				**0.2039**
				29N46B	0.1830				**0.1830**
				29N46C	0.2850				**0.2850**
				29N50		0.7000			**0.7000**
				29N63		1.4000			**1.4000**
				29N71A	0.3000				**0.3000**
				29N73D		0.4119			**0.4119**
				29N86	1.2300				**1.2300**
				29N86A	0.7000				**0.7000**
				29N89		0.1929			**0.1929**
				29N89A		0.3985			**0.3985**
				U29N32B				1.7650	**1.7650**
				U29N33B				0.9155	**0.9155**
				U29N46D				0.3839	**0.3839**
				U29N71B				0.0699	**0.0699**
				U29N73E				0.0525	**0.0525**
				U29N86B				0.5841	**0.5841**
				U29N86BA				0.4387	**0.4387**
				U29N86BB				0.1370	**0.1370**
Grand Total					**20.2614**	**9.0660**	**0.3000**	**17.6518**	**47.2792**

Appendix B. Project Design Standards

Pre Project Considerations and Consultations

Consult with a geologist if any of the following is encountered

- Excessive sidecast
- Incompetent bedrock
- Tension cracks; potential for a large failure
- Lack of adequate drainage
- The presence of seepage water through fill/sidecast
- Organic debris incorporated in fill

Consult with a hydrologist or fisheries biologist if following is encountered

- If channel is vertically unstable (significantly aggraded above or downcut below) consult with geologist or hydrologist to ensure adequate grade controls are in place to prevent excessive or chronic sediment introduction.

Consult with a botanist for the following

- Survey all perennial streams by botanist for rare special status or noxious weed species, or assume occupancy.
- Survey for sensitive serpentine cutbank loving sensitive plants or assume occupancy in these areas.

Project Design Standards		Soils	Geology	Aquatics/Hydrology	Cultural	Botany
Road Decommissioning						
Timing	• Ground-based mechanical equipment can only operate on fine-textured soils (non-rocky) when the soils are dry down to 8 inches typically from June to the end of September.	X		X		
	• Limited operating period (LOP) from October 15 to April 15th.	X		X		
	• Activities scheduled between October 15 and April 15 can be permitted on soils with compaction hazard ratings of less than high with restrictions. Seek consultation with earth scientist for further clarification.	X				
	• No ground disturbing wet weather operations on soils with severe or high compaction hazard.	X				
	• Erosion control measures will be in place by October 1, or as COR allows on a case by case basis.	X		X		
Mechanized Ground based Equipment Limitations	• Mechanical equipment is generally restricted to slopes less than 35%.	X				
	• LOP described above.	X				
	• Clean equipment to remove noxious weeds and petroleum residues prior to all work and again after working in any areas containing noxious weeds. This could require interim cleaning during implementation to prevent introducing noxious weeds to a channel.	X		X		X
Cutbanks, Stream Crossing Fills and Berms	• Stream crossing fill and roadside berms are removed and fill is generally placed along cutbanks to create out-sloping roads.		X	X		
	• Cutbank overhangs are removed.		X			
	• Culvert removal requires excavation to prefill level of channel; remove culvert; continue to pull fill back until natural channel width is reestablished.		X	X		
	• Remove organic debris from fill.		X			
	• Dispose of unsuitable slide and waste material in relatively flat stable areas away from stream courses.		X	X		
Promote Infiltration / Minimize Surface Runoff	• Rip old roadbeds and compacted soils (with winged sub-soiler to 18 inches deep).	X				
Surface Drainage	• Remove berms or provide breaks in earth mass to allow dispersal of surface flow.	X	X	X		
	• Disperse surface flow onto stable slopes with vegetation or rip-rap protection.		X			
	• Insure that inboard ditch relief is provided by outsloping, maintaining or adding dips to disperse surface runoff.	X		X		
	• Provide drainage to prevent ponding water.		X			
Stream Flow	• Isolate construction sites from stream flow before removing a culvert and performing work inside the stream channel. The work site may be completely dewatered or the stream may be rerouted within the channel.			X		
	• When water is drafted from Pacific salmonids bearing stream reaches follow attached NOAA Fisheries Water Drafting Specifications.			X		

Project Design Standards		Soils	Geology	Aquatics/Hydrology	Cultural	Botany
	• When activities are proposed within a stream channel that may cause significant disturbance to coho salmon, a biologist will survey the area prior to dewatering to move them out of the area and estimate the number of individuals potentially affected.			X		
	• If a channel with spawning is accidentally dewatered or otherwise operated in a manner that results in significant negative effects to individual coho salmon, NOAA-Fisheries staff will be contacted immediately to estimate Incidental Take.			X		
General Protection Measures						
	• Minimize disturbance of existing vegetation within the road clearing limits, at stream crossings, and approved disposal sites to the extent necessary to restore hydrologic function.			X		X
	• Implement all Applicable BMPs (attached).			X		
	• Document daily monitoring related to BMP implementation and effectiveness especially any additional corrective actions. Daily diaries or BMPEP forms can provide this documentation.			X		
Fueling	• No fueling/refueling to occur within 100 feet of any flowing watercourse or intermittent stream.			X		
	• Fueling and servicing of vehicles will be done outside of RRs in accordance with BMP 2-12.			X		
Hazardous Spills	• All hazardous spills will be immediately contained & cleaned up to extent feasible.			X		
	• Report any chemical spills to the District Ranger, Hazmat coordinator and Fisheries biologist immediately.			X		
	• Notify NOAA Fisheries for emergency consultation & re-initiate ESA consultation if warranted.			X		
Site stabilization	• Revegetate disturbed sites					
	o Seed with grasses or forbs utilizing a forest botanist approved mix.	X				X
	o Plant tree seedlings where available	X				X
	• Provide ground cover by mulching with weed-free rice straw, woodchips, or approved fine slash to achieve 1.5 -2 tons/acre.					
	o Effective ground cover is between 50 and 70% except on granitic soils maintain 90% or more.	X		X		
	o 50% of ground cover is organic matter (duff, plant leaves/needles, fine slash (<3 inch material), etc.)	X		X		
	• Energy dissipaters (rock rip rap, mulch, straw waddles, etc) are required where concentrated surface flow would otherwise result in sediment transport.	X		X		
	• Stockpile and replace existing down coarse woody debris (CWD) on disturbed slopes whenever possible.	X		X		
Fuel Reduction Activities / Vegetation Manipulation						
	• Retain 30-50% of existing surface duff mat (R5 SQS 2509.18-95-1).	X				

Appendix C. Water Drafting Specifications[4]

"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. 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 surface[2], 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.

Operating Guidelines

1. Operations are restricted to one hour after sunrise to one hour before sunset.[5]
2. Pumping rate shall not exceed 350 gallons per minute.
3. The pumping rate shall not exceed ten percent of the stream flow.[6]
4. Seek streams and pools where water is deep and flowing, as opposed to streams with low flow and small isolated pools.
5. Pumping shall be terminated when the tank is full. The effect of single pumping operations, or multiple pumping operations at the same location, shall not result in obvious draw-down of either upstream or downstream pools.
6. Each pumping operation shall use a fish screen. The screen face should be oriented parallel to flow for best screening performance. The screen shall be designed and used such that it can be submerged with at least one-screen-height-clearance above and below the screen.
7. Operators shall keep a log on the truck containing the following information: *Operator's Name, Date, Time, Pump Rate, Filling Time, Screen Cleaned (Y or N), Screen Condition, Comments*. These guidelines should be included as instructions in a logbook with serially numbered pages. This assures each truck operator easy access to this information.

Screen Construction Criteria

1. **Surface Area** - The total (unobstructed) surface area of the screen shall be at least 2.5 square feet, based on the upper limit of pumping of 350 gpm[7]. Larger surface areas are recommended where debris buildup is anticipated, and where stream depth is adequate to keep the screen submerged at approximately mid-depth.

[4] National Marine Fisheries Service, Southwest Region, August 2001

[5] Restricting operations to daylight-only prevents the use of lights that will attract fish to the drafting pool.

[6] Restricting drafting to ten percent of the stream flow provides adequate downstream flow to support fish, aquatic insects, amphibians, and other biota. Ten percent of flow may be estimated by pump operators.

[7] If larger pumping volumes are needed, or if the pumping application is continuous, refer to http://swr.nmfs.noaa.gov/habitat.htm and review addendum for small pump intakes.

2. **Screen Mesh** -Screen Mesh must be in good repair and present a sealed, positive barrier- effectively preventing entry of the "design fish" into the intake. The design fish in this case is a immature (20-30mm) salmon or steelhead fry. The screen mesh size shall be:

- Round openings - maximum 3/32 inch diameter (.09 inch)
- Square openings - maximum 3/32 inch diagonal (.09 inch)
- Slotted openings - maximum 1/16 inch width (.07 inch)

3. **Screen Design** - Water drafting screens may be off-the-shelf products, but they are often custom-made devices appropriate to the scale and duration of pumping operation. To keep the screen supported and correctly positioned in the water column, adjustable support legs are advised. Screen geometry can be configured either as rectangular or cylindrical, i.e. - as a shallow "box-shape" or tubular. The intake structure shall be designed to promote uniform velocity distribution at all external mesh surfaces. This can be accomplished with a simple internal baffle device that distributes the flow evenly across the entire surface of the screen. In order to accomplish this, the designer needs to understand the hydraulic characteristics of these devices. There is a tendency for most of the intake water to enter the screen near the hose end, so a typical internal baffle would consist of a pipe (or a manifolded set of pipes) which has variable porosity holes at predetermined spacing. We recommend starting near the hose end with approximately 5-10% average open area, and gradually increasing the porosity toward the length of the screen. At a point where screen length exceeds three times the diameter of the suction hose, the baffling effect tends to diminish rapidly. At this point the baffle porosity may approach 100%. A successful baffle system will functionally distribute flow to all areas of the screen. A poorly designed screen may result in high-velocity "hot spots," which could lead to fish impingement on the screen face. Hydraulic testing of prototype screen designs is recommended where the application is on-going and extensive.

4. **Screen Structure -** The screen frame must be strong enough to withstand the hydraulic forces it will experience. However, structural frames, braces, and other elements that block the flow, change flow direction, or otherwise decrease the screen surface area should be minimized.

5. **Screen Cleaning -** The screen shall be cleaned as often as necessary to prevent approach velocity from exceeding 0.33 feet per second. Operators should withdraw the screen and clean it after each use, or as necessary to keep screen face free of debris. Pumping should stop for screen cleaning when approximately fifteen percent or more of the screen area is occluded by debris. A suitable brush shall be on board the truck for this cleaning operation.

If the operator notes (a) impingement of any juvenile fish on the screen face or (b) entrainment of any fish through the screen mesh, he/she should stop operations and notify the Department of Fish & Game and/or NMFS hydraulic engineering staff:

National Marine Fisheries Service
Engineering Section
777 Sonoma Avenue, Suite 325
Santa Rosa, CA. 95404
(707) 575-6050
Rebecca Lent, Ph.D.
Regional Administrator

Appendix D. Applicable Best Management Practices

Description of Erosion Control Measure	Applicability of Erosion Control Measure to Project	BMP
Timing of Erosion Control Work		
Conducts operations in a timely manner within the Limiting Operating Period.	Applies to project area	1.5, 2.3
Implements and constructs erosion control work.	As stated in contract or BMP practice or until accepted by FS (see monitoring section below)	2.9, 2.24
Use of Mechanical Equipment in Riparian Reserves		
Dispose of all waste material (fuels, lubricants, etc.) properly and select service/refueling areas well away from wet areas and surface water.	Applies to project area	2.12
No piling of brush/debris or spoils in Riparian Reserves.	Applies to project area, unless specifically designated	2.4, 2.19
Control construction and maintenance activities within and adjacent to any stream management zone.	Applies to project area, unless specifically designated	2.13, 2.14
No disposal of spoils (fines) within 100 feet of culverts, road dips or any where material can reach a stream channel.	Applies to project area	2.11
Dispose of material cleaned out from culvert intakes to locations where it will not enter a channel, ditch, or re-enter an intake area.	Applies to project area	2.11, 2.22
Culvert Installation / Removal		
Stream flow will be diverted around CMP construction sites at all live stream crossings.	Applies to project area	2.15
Keep excavated material out of channels.	Applies to project area	2.17
Remove any materials stacked, or stockpiled on floodplains prior to the rainy season.	Applies to project area	2.17
Divert flowing water around work site.	Applies to project area	2.17
In some cases, fill material may have to be imported for better soil compaction. Original fill may have to be exported to a disposal site.	Applies to project area	2.17
Install silt fences or straw bale check dams at culvert outlets if road will be used during wet weather.	Applies to project area	2.7
Roads		
Spot rocking of native surface roads with aggregate if used during wet weather operations.	Applies to project area	2.7, 2.23
Stabilize road slope surfaces and spoil disposal areas	Applies to project area	2.4
Mulch and seed new or disturbed fill slopes and disposal sites prior to winter.	Applies to project area	2.4
Do not undercut toe of fill slope, leave at a stable angle of repose	Applies to project area	2.5
Properly space and construct to specification all cross drains, water bars or rolling dips to control road rilling.	Applies to project area	2.7, 2.22
Properly install all energy dissipaters, aprons, downspouts, flumes and overside drains to control road rilling.	Applies to project area	2.7, 2.22

Description of Erosion Control Measure	Applicability of Erosion Control Measure to Project	BMP
Properly armor ditches and drain inlets/outlets. Removing most berms to control runoff unless needed to divert water away from unstable areas.	Applies to project area	2.7, 2.22
Accomplish dispersal of runoff on the road surface by means of outsloping or crowning.	Applies to project area	2.7, 2.22
Utilize potential sidecast (fines) and other waste material on the road surface or remove to designated disposal sites.	Applies to project area	2.11, 2.22
Utilize proper size and composition rip rap as specified for project.	Applies to project area	2.20
Utilize proper techniques for water source development.	Applies to project area	2.21
All grading will be completed using water to properly compact the roadbed.	Applies to project area	2.22, 2.23
Restoration of borrow pits and quarries.	Applies to project area	2.27

Adverse Effects from Wet Weather Operations		
Conditions that trigger project suspension and corrective actions.	Erosion of Road Material	▪ Scour or sediment deposition evident and extending more than 20 feet below outlet of cross drain. ▪ Scour or sediment movement into riparian reserve or sliding away from road surface, cut slope, or fill slope. ▪ Ruts formed that can channel water past erosion control structures.
	Ponding	▪ Ponding present on road surface that is causing fill subsidence or otherwise threatening integrity of fill.
	Ruts/Rills	▪ More than 10% of road segment length has rills more than 2 inches deep and 20 feet in length that continue off road. ▪ Numerous rills present at stream crossing (>1 rill per 5 feet lineal), apparently active or enlarging, evidence of sedimentation.
	Culverts	▪ Sediment or debris is blocking 30% of inlet or outlet. ▪ More than 10% of the flow to pass beneath or around culvert, or noticeable piping evident.

Appendix E. Maps

Due to file size limitations, the maps are separate files.