Trinity River Coarse Sediment Injection and Rehabilitation Project Environmental Assessment

A proposal to enhance habitat for fish and aquatic organisms through restoration of the riverbed and banks of an 1,800 foot reach of the mainstem Trinity River administered by the Trinity River Management Unit, Shasta-Trinity National Forest

v.1.1

Table of Contents

Section I: Purpose and Need for Action

Background

Completion of the Trinity and Lewiston Dams in 1964 blocked migratory fish access to habitat upstream of Lewiston Dam, eliminated coarse sediment transport from over 700 square miles of the upper watershed, and restricted anadromous fish populations to the remaining habitat below Lewiston Dam. Trans-basin diversions from Lewiston Reservoir to the Sacramento River altered the hydrologic regime of the Trinity River, resulting in riparian encroachment and fossilization of point bars and riparian berms from Lewiston to near the North Fork Trinity River. Encroachment of riparian vegetation into the former active channel promoted the deposition of the fine-textured sediments, resulting in the formation of linear berms that further confined and simplified the channel, reduced the diversity of riparian age classes and riparian vegetation species, impaired floodplain access, and adversely affected fish habitat.

In 1994, the U.S. Fish and Wildlife Service as the NEPA lead agency began the public process for developing the Environmental Impact Statement for the Trinity River Mainstem Fishery Restoration Program (FEIS; the Hoopa Valley Tribe, Trinity County and the U.S. Bureau of Reclamation agreed to function as co-leads). The FEIS, published in 2000, functions as a project-level NEPA document for policy decisions associated with managing Trinity River flows. It is also intended to serve as a programmatic NEPA document providing first-tier review for "… spawning gravel placement… and other site-specific activities" (FEIS[1] page 1-3) including the Proposed Action in this EA.

The USDA-Forest Service (USFS), Shasta-Trinity National Forest has reviewed the Record of Decision (ROD) for the FEIS dated December 19, 2000. The ROD addresses the need for the proposed action: "This decision recognizes that restoration and perpetual maintenance of the Trinity River's fishery resources require rehabilitating the river itself, restoring the attributes that produce a healthy, functioning alluvial river system. Therefore, the components of the selected course of action include…(S)ediment management, including the supplementation of spawning gravels below the TRD…". The USFS proposes in this EA to undertake a restoration activity at a location specifically described in the FEIS that is integral to restoring the Trinity River. The above documents are available at the Shasta-Trinity National Forest Supervisor's Office.

The project location is immediately downstream of Lewiston Dam, adjacent to the Lewiston Hatchery. Because the project area is in the popular fly-fishing only area and there were concerns over sediment placement and transport at high flows, the Trinity River Restoration Program (TRRP) contracted with Dr. Greg Pasternack, PhD, from UC Davis for design services in July of 2003. Dr. Pasternack presented three design alternatives (Design Nos. 1-3) to the TRRP and U.S. Forest Service (USFS), the implementing agency, in September of 2004. At this meeting, additional alternatives were

[1] Placement of spawning gravel at various locations in the Trinity River was assumed to continue as on ongoing activity even under the No Action alternative of the FEIS (page 2-8; 'Fish Habitat Management').

requested for evaluation. In February of 2004, Dr. Pasternack presented the design alternatives at a sediment workshop hosted by the TRRP. In December of 2004, Dr. Pasternack presented three additional design alternatives (Design Nos. 4-6) to stakeholders at a public meeting hosted by the TRRP at the Weaverville Library. At this meeting, a consensus was reached to proceed with Design No. 6 with minor modifications for minor vegetation and bank removal for increased low velocity marginal areas for fry habitat, and improved access to the river for anglers. The modified design was submitted to the TRRP on June 30, 2005. TRRP staff met with the USFS on July 7, 2005, and it was generally agreed that the design should be considered for implementation. Dr. Pasternack met with TRRP and USFS staff on September 9, 2005 in Weaverville and at the project site to discuss design and implementation details. On September 20, the TRRP recommended to the Trinity Management Council (TMC) to implement the project as-is. The TMC tentatively approved the project but recommended that a meeting be held with technical representatives and stakeholders to verify the technical appropriateness of the project. This meeting was held on October 25, 2006 in Weaverville with technical representatives and stakeholders. Following discussion of the proposed design, the group agreed that the design for Lewiston Hatchery coarse sediment augmentation be implemented as described at the September 21 TMC meeting.

The purpose of this project is to introduce coarse sediment and do minor channel manipulations to about 1,800 linear feet of the mainstem Trinity River, beginning 400 feet downstream of Lewiston Dam, in accordance with the design concepts developed by UC Davis and approved by the TMC. This river reach has both the greatest sediment deficit and the greatest number of anadromous fish attempting to spawn in habitat that is far from suitable for successful spawning, egg incubation, and fry rearing. The 1999 Trinity River Flow Evaluation Final Report identified this reach of river as a top priority for sediment augmentation (note – the proposed project boundary has been expanded somewhat from that which was identified as follows): “There are two sites that require immediate coarse sediment supplementation: a 1,500 foot reach immediately downstream from Lewiston Dam (RM 111.9)…”(page 271). Improvements in river substrate and hydrodynamics will increase useable spawning habitat as well as spawning success, increased egg incubation success, and egg sack fry emergence and survival.

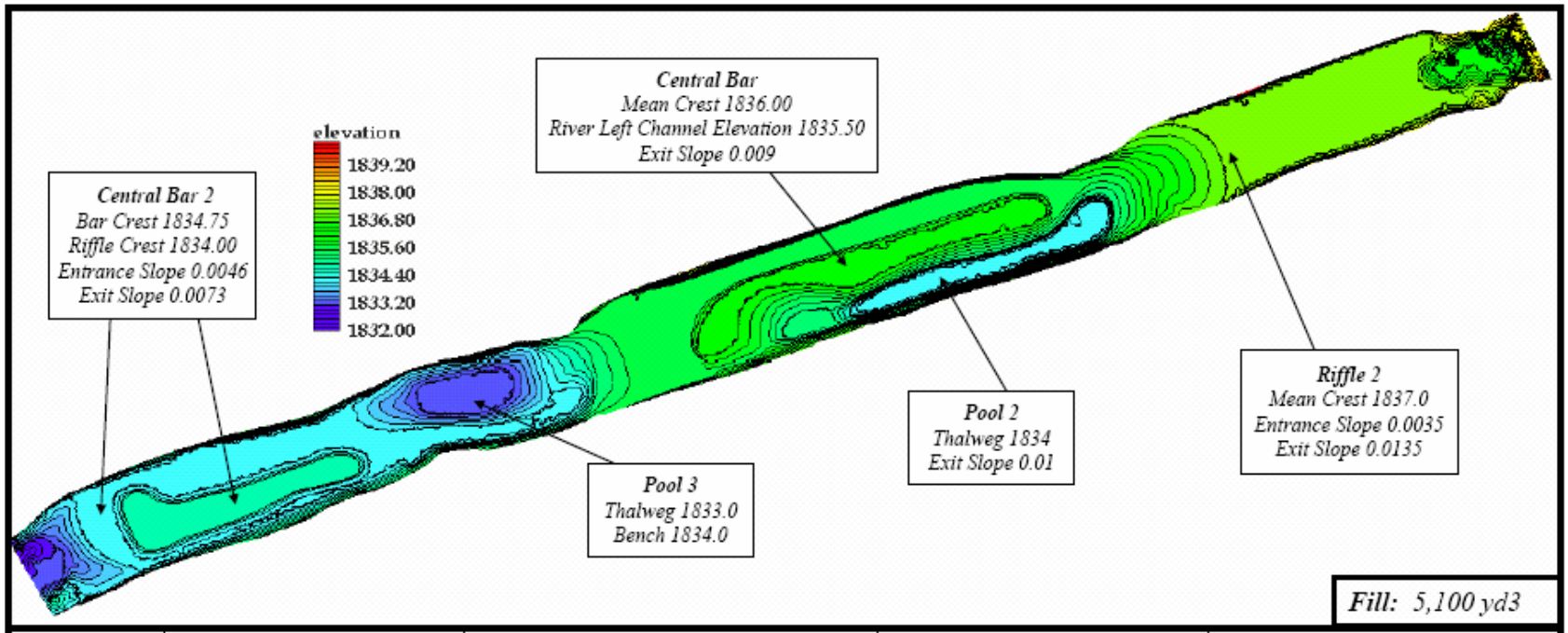
Proposed Action

The proposed action for the project includes: [1] removal of some existing riparian vegetation along specific riverbank segments to access the project site and accommodate designed channel widening; [2] mechanical excavation, reshaping and removal to designated disposal site(s) approximately 5,600 cubic yards of existing riverbank material, none of which will be allowed to enter the river; [3] repositioning from existing pools approximately 1,300 cubic yards of ‘project-suitable’ coarse material onto adjacent point-bars; [4] introduction and placement of approximately 5,100 cubic yards of washed coarse material originating from the Trinity River basin, ranging in diameter from ¼ to 5 inches; and [5] maintaining at this site approximate post-project levels of coarse material into the future as needed and provided funding is available. The following pages show a plan view showing the contours and description for the reshaped channel (Fig.1), a location map for the project (Fig. 2), a

group of diagrams showing the profile and cross-sections for the proposed action (Fig.3), and an overall aerial view of the project, showing spoil locations, access roads and the portion of the channel where the work will be done (Fig.4).

The proposed action would occur within an 1,800 foot reach of the Trinity River, located just downstream of the Lewiston Dam and adjacent to the Trinity River Fish Hatchery. Material excavated from above the water line during project implementation will not enter the watercourse, but instead be used to build up the existing access road to the site. Any additional material will be disposed of at the disposal site shown in Figure 4. This disposal site consists of a dead-end road that is located outside of the floodplain and within ¼ mile of the project site. Vegetation that is removed will also be disposed of at the disposal site, located outside of the floodplain. The lowest elevation of disposed material will be above the highest elevation of future controlled TRD flow releases.

.



	Riffle 2	Central Bar/ Pool 2	Pool 3	Central Bar 2
Hydraulic Attributes	*Existing riffle widened to promote flow divergence. Preceding pool exit slope graded to gradually dissipate high velocities.*	*Majority of flow will be through pool 2. Divergent flow fields around bar, convergence on side channels, focused in deeper channel on river right depressions. "L-shaped "bar feature forces flow divergence over bar face.*	*Constrictions at pool entrance and pool exit will induce flow convergence, flow acceleration, and eddy formation adjacent to banks. Bench morphology on river right for spawning.*	*Flow splits at bar face with majority focused in wider chute on river right. "L-shaped "bar feature minimizes scour and forces flow divergence over bar face.*
Geomorphic Attributes	*Flow divergence will cause deposition along pool exit to riffle crest.*	*Majority of flow will be through pool 2. Pool 2 will serve as a trap for upstream sediments to keep them in the reach for continued spawning use. "L-shaped "bar feature minimizes scour and forces flow divergence over bar face causing deposition from preceding chute.*	*Existing thalweg is shifted to the river left to maintain thalweg on river left through the downstream feature. Constricted pool is conducive to pool maintenance.*	*"L-shaped "bar feature minimizes scour and forces flow divergence over bar face causing deposition from preceding chute. Convex exit slope will minimize scour by causing flow divergence instead of convergence.*
Fisheries Implications	*•Spawning on river right of riffle and on riffle crest and pool exit slope* *•Increased fry habitat along river right banks along riffle crest and riffle exit*	*•Spawning on pool exit slopes and on bar top.* *•Fry habitat on river right channel margin* *•Adult holding in depressions*	*•Adult holding habitat in pool* *•Fry habitat created over channel constriction features and on river left in areas where channel was widened..* *•Spawning on peripheral pool benches*	*•Spawning on entire riffle and entrance and exit slope.*

Figure 1: Plan view showing contours and description for channel

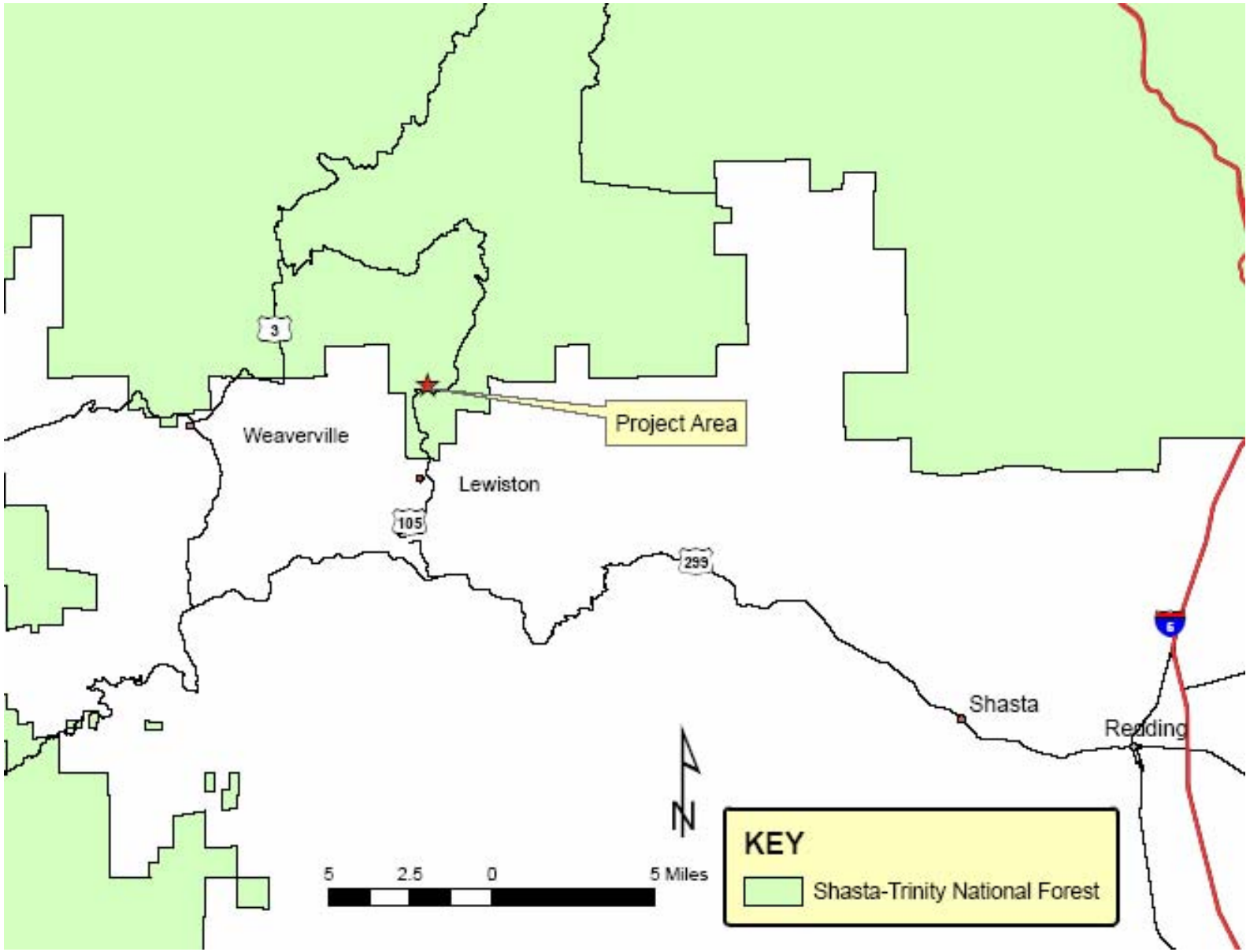


Figure 2: Location Map

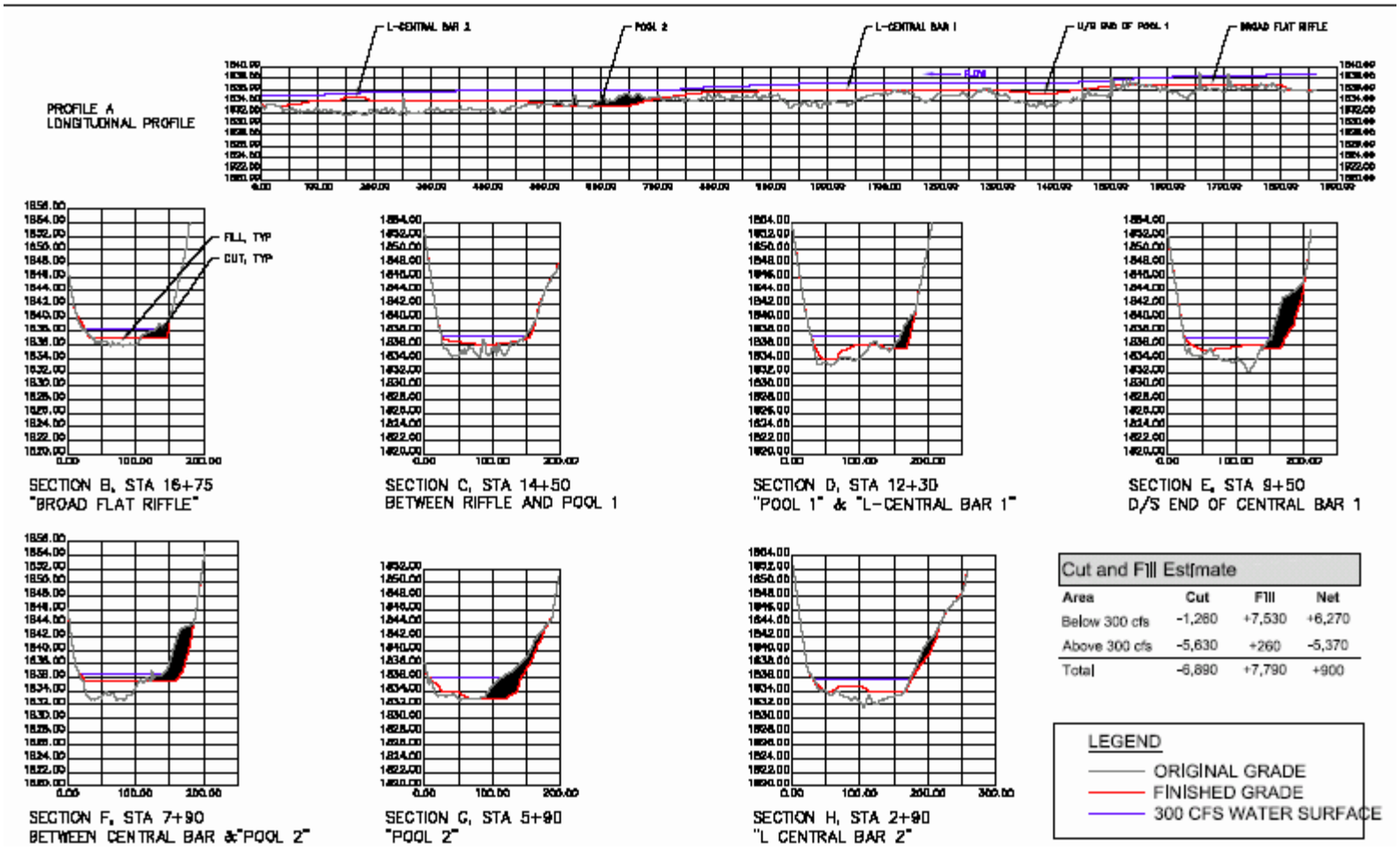


Figure 3: Profile and Cross Sections for Proposed Action

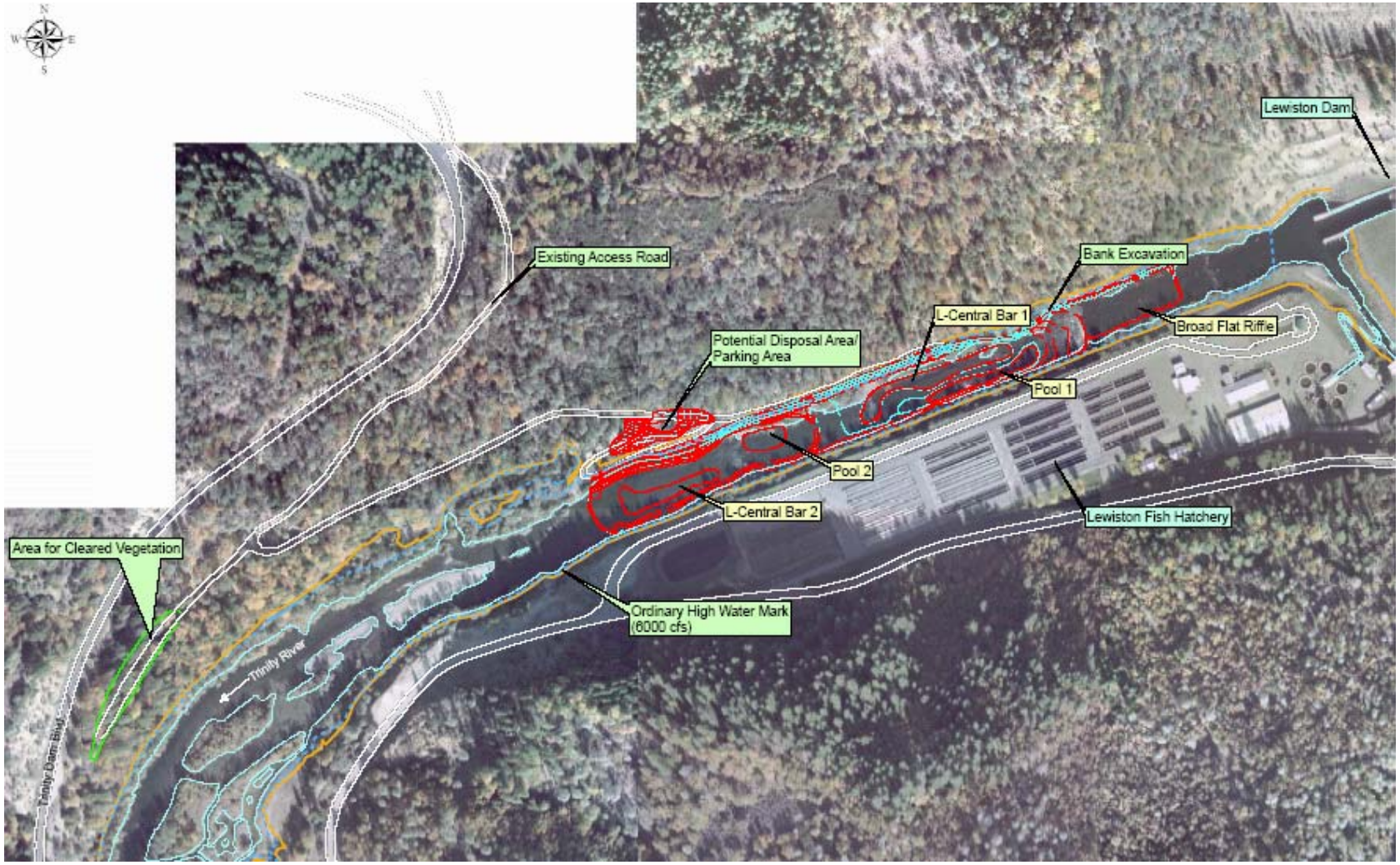


Figure 4: Aerial View of Project Area

The approximate implementation window for this proposed action would begin on or around July 22 and be completed no later than September 15. The implementation window is designed to begin at a time when flows are expected to be low. September 15 is used for a completion date because that is typically the time when adult salmon and steelhead could begin arriving in the project area.

Project Design

The goals of this design aimed to maximize the beneficial features found within the project area. An "L-shape" component was incorporated to the central bar design to minimize potential scour resulting from flow convergence at the exit of pool 2. This central bar feature was elongated to maximize the beneficial attributes found from having a deep and fast chute and a slow and shallow chute. Downstream of the central bar, the existing pool thalweg was shifted to the river right to cause a flow cross-over where the thalweg shifts from the river left to the river right through pool 3. Pool 3 was also constricted with a bench feature that ties into the second central bar feature downstream. The second central bar has two chutes at the same elevation. The thalweg follows the preceding pool on the river right. Consequently, on the river right of the central bar feature another "L-shaped" extension is added to the second central bar. The exit slope of the feature was graded convexly to cause flow divergence instead of convergence, and thus minimize scour on the tail end of the feature. The cut and fill volume estimates for the proposed design are as shown in the Table 1:

Table 1: Cut and Fill Volume Estimates for Proposed Action

Area	Cut	Fill	Net
Area Below 300 cfs Water Line	-1,260	+7,530	+6,270
Area Above 300 cfs Water Line	-5,630	+260	-5,370
Total	**-6,890**	**+7,790**	**+900**

Riffle 2

Riffle two was widened to promote flow divergence and graded at 1837.00 for 260 feet. The preceding pool exit slope was graded to 0.0035 to gradually dissipate high velocities. The flow divergence over the riffle is predicted to cause deposition along pool exit to the riffle crest. The riffle exit slope was graded concave at 0.02 to focus the majority of the flow into the downstream pool and a small portion along the river right. It is anticipated that spawning will occur along the entire riffle. A possible ancillary benefit may be juvenile and fry habitat along the channel margin.

Central Bar/ Pool 2

The central bar feature was modified into an "L-shaped" bar feature. In using an "L-shaped" bar, the flow in the faster chute is diverged over the tail end of the bar over a "boot" feature rather than converged over the pool exit slope. This feature otherwise functions hydraulically and geomorphically to the central bar feature and deposition is likely to occur on the exit slopes of pool 2, rather than scour. The bar crest is 0.5 feet higher than the river right chute and 2 feet higher than the

river left chute. The exit slope of pool 2 is 0.01 and the exit slope of the bar is 0.009. Predicted habitat is spawning habitat on the slower chute on the river right and on the bar top, and adult holding habitat in pool 2.

Pool 3

The thalweg of pool 3 was shifted to the river right to maximize lateral flow from the preceding central bar/ pool 2 thalweg, which was focused on the river left. Moreover, it has been shifted to direct flow through the river right of the downstream central bar feature. The thalweg of the pool is 1833 and the bench at only one foot higher at 1834. Constrictions at pool entrance and pool exit will induce flow convergence, flow acceleration, and eddy formation adjacent to banks. It is predicted that this pool will serve as a sediment trap during low flows and also provide an optimal location for adult holding habitat. Moreover, the bench on the river left will provide an area for spawning.

Central Bar 2

The second central bar is modeled after the first central bar in this design. It differs in length and in that the two chutes vary in width, but not in depth, with the river right chute having a larger width than the river left. Again, this "L-shaped" central bar has a "boot" feature that minimizes scour by backing up water to the preceding feature and by causing flow divergence. The crest is at 1834.75 and the surrounding elevation is at 1834. This exit slope of this feature was also graded convexly to again cause flow divergence over the exit slope rather than convergence and scour.

Coarse Sediment Management

The Proposed Action would augment the supply of coarse sediment to the project reach initially by placement of approximately 5,100 cubic yards of washed coarse material originating from the Trinity River basin, ranging in diameter from ¼ to 5 inches. The coarse sediment levels would be maintained into the future at this site as needed and provided funding is available. The Record of Decision (ROD) for the Trinity River Mainstem Fishery Restoration FEIS states that coarse sediment introductions are anticipated to average 10,300 cubic yards annually but could range from 0 to 67,000 cubic yards in any one year depending upon the water year type (Table 2, taken from Trinity River Mainstem Fishery Restoration FEIS ROD). The annual coarse sediment replacement estimates are for the Lewiston Dam to Rush Creek Reach (approx. 4 mile reach), and includes other sites. Volumes ultimately used will be determined by modeled and measured transport each year.

Table 2: Annual coarse sediment replacement estimates for the Lewiston Dam to Rush Creek Reach

Water Year	Coarse Sediment Introduction (yd3/year)
Extremely Wet	31,000-67,000
Wet	10,000-18,000
Normal	1,800-2,200
Dry	150-250
Critically Dry	0

Purpose and Need

The purpose of this project is to contribute to the restoration of aquatic habitat in the mainstem Trinity River through the development of properly functioning channel conditions. The proposed action would: (1) restore the riverbed and banks of one specific reach of the mainstem Trinity River to a condition similar to that which naturally occurred prior to the construction of the Trinity River Division of the Central Valley Project in 1964 and (2) augment the supply of coarse sediment necessary to maintain a dynamic fluvial channel. Rehabilitation treatments of the type described in this proposal, combined with enhanced upstream flow releases, are expected to contribute to the restoration of the Trinity River mainstem fishery.

The desired condition is to maintain channel conditions which allow for more dynamic interaction between sediment routing, riparian vegetation, and high-flow hydraulics. Achieving the desired condition would promote healthy riparian, aquatic, and wetland ecosystems. In contrast, existing channel and habitat conditions are relatively static, resulting in diminished habitat quality. The need for the project results from (1) the elimination of coarse sediment supplies originating upstream from Lewiston Dam, decreasing availability of suitable fish habitats in the proposed treatment reach; and (2) long-term effects of reducing the frequency and magnitude of high flows that naturally thwart encroachment of riparian vegetation and hydraulically manipulate the stream bed.

The Trinity River Mainstem Fishery Restoration FEIS identified two sites that require immediate coarse sediment augmentation for spawning purposes. (FEIS, page c-9). A 1,500-foot reach immediately downstream of Lewiston Dam and a 750-foot reach immediately upstream of the USGS cableway at Lewiston. The proposed action addresses the coarse sediment augmentation needed for the 1,500-foot reach immediately downstream of Lewiston Dam.

Watershed analysis (WA) was completed via the Mainstem Trinity River Watershed Analysis (1995). This analysis provides a means for understanding the processes and interactions occurring within the Trinity River system. Opportunities also identified in the FEIS, which relate to this proposal are shown in Table 3.

Table 3: Opportunities from the Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement/Report

Desired Condition	Opportunity
Abundant fish habitat and a functional dynamic alluvial river system	Coarse sediment management program is needed to replenish substrate blocked by the Trinity River Division
Promote fish habitat diversity	Mechanical manipulation of the river banks, riparian vegetation and river bottom at discrete sites

Decision to be made

The decision to be made is whether to implement the project as proposed or to take no action at this time. The responsible official is the Shasta-Trinity Forest Supervisor.

Geographical Area

The proposed project boundary lies entirely within lands managed by the Shasta-Trinity National Forest. The proposed project area is immediately downstream of Lewiston Dam (Trinity River Mile 111.9) and adjacent to the Lewiston Fish Hatchery.

The legal description is as follows: Township (T) 33N, Range (R) 8W, Section 8 SE 1/4.

Required Permits

Implementation of the Proposed Action would require the following federal and state permits.

- U.S. Army Corps of Engineers- Clean Water Act Section 404 permit
- Regional Water Quality Control Board – Clean Water Act Section 401 certification permit
- Endangered Species Act – Federally listed species are protected under the mandates of the Endangered Species Act of 1973. NOAA Fisheries (also known as the National Marine Fisheries Service) and the U.S. Fish & Wildlife Service were consulted for this Proposed Action. A Biological Opinion and Letter of Concurrence were received, respectively. Further discussion follows in the Environmental Consequences section.

Management Direction

Direction for management actions regarding this river restoration comes from the Shasta-Trinity National Forest Land and Resource Management Plan (LRMP 1994), the accompanying Record of Decision (USFS, 1995) (ROD), and the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl, and accompanying Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (Northwest Forest Plan, Interagency 1994). This Environmental Assessment (EA) tiers to the analysis in the Final Supplemental Environmental Impact Statement on the Northwest Forest Plan.

The LRMP provides Forest-wide and Management Area direction for the Shasta-Trinity National Forest. Forest-wide direction is located on pages 4-4 through 4-71 of the LRMP. Management Area direction for Forest Service-managed portions of the Trinity River specifically states ‘Emphasize anadromous fisheries habitat management’.

A number of Forest-wide goals listed in the LRMP are pertinent to this proposed action as well. A goal for fisheries is to provide for the protection, maintenance, and improvement of wild trout and salmon habitat. A goal for water is to maintain water quality and quantity to meet fish habitat requirements and domestic use needs. A goal for Threatened, Endangered, and Sensitive Species is to assist in recovery efforts for any ‘T&E’ species. (Threatened coho salmon utilize the project reach.)

Objectives of the LRMP’s Aquatic Conservation Strategy (ACS) are also accommodated by the proposed project:[2]

[2] The preferred alternative in the Mainstem Fishery FEIS, adopted in the accompanying ROD, specifically included watershed protection components in part because: “…they are consistent with the Record of Decision for the Northwest Forest Plan and its Aquatic Conservation Strategy…” (Mainstem FEIS, Executive Summary).

ACS Objective 1: Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted. [The proposed action will restore diversity and complexity of currently static fish habitats.]

ACS Objective 3: Maintain and restore the physical integrity of the aquatic system, including shorelines, banks and bottom configurations. [Purposeful manipulation of the river bottom, banks and shoreline in the proposed treatment reach is being proposed specifically to restore a currently static aquatic system.]

ACS Objective 5: Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport. [The introduction of over 5,000 cubic yards of coarse sediment of a specified size range, supplemented as needed in the future, clearly addresses this objective.]

ACS Objective 9: Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species. [Initial succession riparian plant communities will be established after project completion in the riverbank areas purposefully manipulated via project implementation. These communities are lacking in the project vicinity due to the mature, static nature of the reach. Aquatic invertebrate communities representative of unpolluted dynamic river systems should also flourish shortly after the coarse substrate is introduced into the proposed treatment reach.]

This EA also tiers to the Environmental Impact Statement for the Trinity River Mainstem Fishery Restoration Program (FEIS). The FEIS, published in 2000, functions as a project-level NEPA document for policy decisions associated with managing Trinity River flows and as a programmatic NEPA document providing first-tier review of other potential actions, including the Proposed Action in this EA.

Public Involvement

The scoping process used several approaches. The public was informed via the internet by using the ‘Trinity List Server’ in mid-January, 2005. Five members of the public responded to this notification. A public notice was advertised in the legal notice portion of the local Weaverville newspaper, the Trinity Journal, at the same time. A letter signed by the District Ranger was also posted on the Northern California Fly Fishing Board, and posted on additional fishing oriented and public-notice websites. The collection of responses from the public were limited to individuals who provided input via the Trinity List Server posting.

Issues

An issue is a point of discussion, debate or dispute related to the environmental effects that will occur as a result of implementing the proposed action. Following public scoping, the Interdisciplinary Team reviewed the comments and developed a list divided into two categories: Key and Non-Key issues (otherwise known as significant and non-significant). Key issues are used to formulate alternatives, prescribe mitigation measures or analyze environmental effects.

- No key issues were brought up during scoping.

The following non-key issues were brought up during scoping and already addressed in the proposed action:

A. **Coarse material brought in from sources other than Trinity River basin could be contaminated with Mercury** – This is already addressed in the proposed action. All coarse material placed in the project must originate from the Trinity basin.

B. **Coarse material, if introduced from basins other than the Trinity, may be avoided by fish for an extended time period** – This is already addressed in the proposed action. All coarse material placed in the project must originate from the Trinity basin.

The gravel shall be purchased from local Trinity River Basin sources and will be washed to meet or exceed a cleanness value of 85 according to CalTrans cleanness test # 227 specifications. Because turbidity is caused primarily by disturbance of small diameter sediment particles and mercury is associated almost exclusively with fine sediment materials, use of washed materials which exclude fines (<2.0 mm in diameter) ensures that Water Quality Control Plan (Plan) objectives for Trinity River turbidity and mercury will be met. In addition, real time monitoring of turbidity, settleable materials, and sediment will ensure that Plan beneficial uses are protected.

All placed gravel would pass the CalTrans cleanness test # 227 with a value of 85 or greater. Since mercury is associated with fine materials that would be removed in washing, there would be no chance of transporting mercury to the site or of impacting the public with this hazardous material.

The following non-key issue was brought up during scoping and not considered because it is outside the scope of the project:

C. **Consider transporting to the project area 'excess' substrate residing downstream from Indian Creek** – Outside the scope of the proposed action.

Section II: Description of Alternatives

Two alternatives were analyzed, Alternative 1- No Action (no project), and Alternative 2- Proposed Action.

Alternative 1 – No Action

Alternative 1 - Under the No-Action Alternative, the Forest would not proceed with the Proposed Action (project).

Alternative 2 – Proposed Action

Alternative 2 –Reintroduction of coarse riverbed substrate and mechanical channel rehabilitation would occur along an approximate 1,800 foot reach of the mainstem Trinity River, extending laterally from the river centerline up to approximately the extent of the 100 year floodplain. The work entails any or all of the following treatments: [1] removal of some existing riparian vegetation along specific riverbank segments; [2] excavation, redistribution and/or removal of approximately 6,900 cubic yards of existing riverbed and bank material, most of which is positioned above the dry (project implementation) season water elevation levels; [3] mechanically reshaping the river channel, including lateral channel widening of specific segments; [4] introduction and placement of approximately 5,100 cubic yards of washed river rock ranging in diameter from ¼ to 5 inches; and [5] maintaining post-project levels of coarse material into the future at this site as needed and provided funding is available. Fluvial geomorphic characteristics will benefit upon project completion rather than be adversely impacted as occurs now in the treatment reach.

The proposed action is located just downstream of the Lewiston Dam and adjacent to the Trinity River Fish Hatchery. (Figure 1). The approximate implementation timeframe for this proposed action lies between July 22 and September 15.

Comparison of Alternatives

Table 4 (following page) displays a summary of the effects of each alternative for aquatics, wildlife, botany and cultural resources.

Table 4: Comparison of Alternatives

Issue	Alternative 1 - *No-Action*	Alternative 2 - *Proposed Action*
Aquatics	**Threatened Coho Salmon & MIS species** • No direct effects will occur, indirect adverse impacts to fish will materialize in the context of foregone opportunities **LRMP Anadromous Assemblage; ESA Critical Habitat, Essential Fish Habitat & other Hydrologic Considerations:** • No action will not directly affect the fish habitat and other aquatic resources. • No action indirectly affects fish habitat and aquatic resources inconsequentially **Aquatic Conservation Strategy (ACS) Objectives** • No achievement of ACS Objectives **Cumulative Effects** • No significant cumulative impacts to fish and aquatic resources are anticipated	**Threatened Coho Salmon & MIS Species** • Indirect adverse effects are likely to result to individual fish harassment such that a more favorable location may be chosen by individual fish. These effects will not lead to mortality in either the short or long term perspective. • Direct effects may occur, incidental take via harassment, but not mortality is anticipated to occur during implementation. The project window has purposefully been chosen in part to minimize impacts to adult life stages of these fish. **LRMP Anadromous Assemblage; ESA Critical Habitat, Essential Fish Habitat & other Hydrologic Considerations:** • Fish habitat and other aquatic resources will be both directly created and manipulated during implementation of the proposed action. Coarse material will be added to accommodate fish spawning, egg incubation, and aquatic invertebrate production. River bed manipulation is also scheduled and will help facilitate some additional rearing habitat advantageous to juvenile fish successfully hatched from the coarse materials. • Project-related pulses of turbidity will result during implementation of the proposed action. This turbidity will move downstream, possibly impinging on aquatic invertebrates and the ease of salmon fry to ingest them. The turbidity will be easily transported out of the system upon experiencing just a slight increase in river discharge. • Beneficial indirect effects will materialize downstream of the project, as a result of the increased discharges expected to occur from Lewiston Dam during upcoming winter and spring seasons. A portion of the coarse material will become transported downstream during periods of greater discharge. **Aquatic Conservation Strategy (ACS) Objectives** • Proposed action allows progression toward meeting ACS Objectives 1, 3, 5, 9 **Cumulative Effects** • Fluvial geomorphological characteristics will benefit from the proposed action • No significant cumulative impacts to water quality are anticipated to occur

Issue	Alternative 1 - *No-Action*	Alternative 2 - *Proposed Action*
Wildlife	• No direct, indirect or cumulative effects to Threatened/Endangered, Proposed Threatened/Endangered and Forest Sensitive wildlife species.	• No direct effects or cumulative effects to Threatened/Endangered, Proposed, Threatened/Endangered, Survey and Manage and Forest Sensitive wildlife species. • May affect but would not likely adversely affect the bald eagle because there is a potential to temporarily displace foraging eagles at a time of relatively low eagle foraging activity in the area. Other nearby areas of the Trinity River would remain undisturbed and available for foraging eagles. Increased fish populations related to the project would benefit eagles in the long term. • An increase in fish (eagle prey) populations due to the project would likely benefit bald eagles in the Trinity River at an unknown level. • All other Threatened/Endangered, Proposed Threatened/Endangered, Survey and Manage, and Forest Sensitive wildlife species will not be indirectly affected from the Proposed Action.
Botany	• No direct or indirect effects, no cumulative effects to any sensitive plant or fungi species, and survey and manage species.	• No direct or indirect effects, no cumulative effects to any sensitive plant or fungi species, and survey and manage species.
Cultural Resources	• No direct or indirect effects, no cumulative effects to historic sites.	• No direct or indirect effects, no cumulative effects to historic sites.

Section III: Affected Environment

This section of the document incorporates by reference the Mainstem Trinity River Watershed Analysis (1995). This analysis provides a means for understanding the processes and interactions occurring within the Trinity River system. Copies of this document are located at the Shasta-Trinity National Forest Supervisors Office.

Section IV: Environmental Consequences

This section discloses the direct, indirect and cumulative environmental consequences of implementing each alternative.

Interdisciplinary team members contributing to the analysis in this section, as well as in the rest of this document, relied on field work, literature reviews, published research findings, consultation with other experts and specialists, and their own training and experience. Specific references used are cited. Other related sources not specifically mentioned in the text are included in the planning records. The assessment of effects assumes compliance with Forest Service Regional standards and guidelines and policies, and Federal laws and Forest Service national policies.

Aquatics

The Proposed Action was analyzed to determine the impacts to fish and fish habitat in the project area, and to determine the impacts to the hydrologic regime. A more comprehensive analysis is included in the Hydrology and Fisheries Reports located in the Trinity River Coarse Sediment Injection and Rehabilitation Project EA project file at the Shasta Trinity National Forest Supervisors Office. A thorough analysis is also included in the biological assessment (U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation 2000) and the consequent biological opinion (National Marine Fisheries Service 2000) addressing foreseeable Trinity River Restoration Program activities.

The Trinity River supported an ecosystem fifty and more years ago that depended upon geomorphic processes to maintain its fundamental structure. The unimpaired, highly variable flow regime resulted in a physically complex river system that provided substantial ecological benefits. Natural flows mobilized and deposited a wide range of sediment particles ranging in size from silt to boulders.

Completion of the Trinity River Division (TRD) of the federal Central Valley Project (CVP) in 1963 replaced the Trinity River's pre-dam hydrology with a greatly reduced, nearly constant flow schedule. The annual flow regime for most of the 43 years hence has been termed a '100 year recurrence interval drought occurring every year' (U.S. Fish and Wildlife Service and Hoopa Valley Tribe, 1999; Flow Evaluation Final Report).

TRD operation reduced by 90% the water release volume and accompanying transport energy from pre-CVP levels. The character of the channel was obviously affected. Riparian vegetation in the upper forty miles of river below the dam could grow unabated where conducive, because riparian-damaging flood flows have been eliminated while dry season flows are kept unnaturally high. The resulting riparian and sediment-entwined berms have since promoted largely monotypic river 'run' habitats that replaced the natural and more complex pool-riffle-run sequences. The elimination of this normal sequence has substantially reduced the complexity and diversity of the riverine habitat.

Ten attributes of a healthy alluvial river are listed in the Flow Report and reiterated in the Mainstem Fishery Final Environmental Impact Statement/Environmental Impact Report (FEIS/EIR, 2000). **None of these attributes describe the existing situation on the Trinity River, particularly the proposed action treatment reach**:

- Attribute 1: Spatially complex channel geomorphology
- Attribute 2: Flows and water quality are predictably unpredictable
- Attribute 3: Frequently mobilized channel bed surfaces
- Attribute 4: Periodic channel bed scour and fill
- Attribute 5: Balanced fine and coarse grained sediment budgets
- Attribute 6: Periodic channel migration
- Attribute 7: A functional floodplain
- Attribute 8: Infrequent channel resetting floods
- Attribute 9: Self-sustaining diverse riparian plant community
- Attribute 10: Naturally fluctuating groundwater table

The existing condition of the proposed action treatment reach will be compared to selected attributes from the list above.

Attribute 2: Flows and water quality are predictably unpredictable. The location of the proposed action treatment reach immediately downstream from the base of the TRD dam at Lewiston could not possibly create a greater contrast with this desirable attribute. An unwavering **base** discharge from Lewiston Dam of 150-450 cubic feet per second has occurred every year since TRD completion, and has nearly always been clear of any sediment.

What makes the treatment reach so diametrically opposed to this attribute is it's location at a point upriver from any naturally-flowing tributary in the Trinity River below the dam. Therefore, the proposed action river reach could not possibly be more severely impacted by reduced baseflows alone with regard to this attribute resulting from management by the TRD during the past several decades. No other reach of river for the 112 miles down to the confluence with the Klamath River has had less fluctuating discharges since TRD completion, nor nearly continuous sediment-free water passing through it. Further elaboration follows.

Attribute 3: Frequently mobilized channel bed surface; Attribute 4: Periodic channel bed scour and fill; Attribute 5: Balanced fine and coarse sediment budgets. No bedload of any size has migrated through and/or been released from the TRD facilities. Except during a few episodic flood events, the water released from the TRD is clear of even suspended sediment. This routinely clear water release carries the maximum potential energy to entrain particles of substrate up to the size diameter that the flow volume and velocity physically allows. All of the fine-grained sediment particles have therefore been entrained over time from the surface of the river bed in the proposed treatment reach because of TRD completion.

Fine-grained sediment size fractions are frequently characterized as being 'undesirable' biologically. However, it still plays a role in a naturally flowing alluvial river at low concentrations. Generally, free-flowing undisturbed alluvial watersheds possess streambed size classes such that about 15% of the total fraction of substrate is composed of fine sediment. Fine sediment occurring up to this percentage of the total does not hinder fish reproduction and aquatic invertebrate populations. The treatment reach, in contrast, is virtually free of fine-grained inorganic sediments because of the constant long-term clear water releases.

By comparison, except during a few episodic safety of dam and other controlled releases, the low volume of water released has not been able to mobilize the bed surface for substrates in the proposed treatment reach much larger than sand and silt. Much of what existed in the treatment reach larger than fine-grained to gravel-sized material is therefore still present 43 years after TRD completion wherever not previously mobilized by heavy equipment.

Attribute 6: Periodic channel migration; Attribute 8: Infrequent channel resetting floods. The largest controlled flows released from the TRD since CVP completion is approximately 7,000 cubic feet per second (2005). This recent discharge peak is a small fraction of what would have occurred naturally in the treatment reach during the past 43 years. Bedrock and cobble (and encroaching riparian vegetation further downstream in the Trinity River) have combined with the relatively low average TRD flows to prevent any meaningful channel migration. The small peak TRD flows released during times of basin flooding have not even come close to resetting the treatment reach channel in any appreciable way over the past several decades.

A. Endangered Species Consultation

A biological opinion addressing foreseeable Trinity River Restoration Program activities (National Marine Fisheries Service 2000) was written in response to a biological assessment that reflected the findings in the Mainstem Fishery Restoration EIS. The opinion was written because Trinity River coho salmon are federally listed as Threatened. The opinion describes the coarse sediment supplementation need found in the EIS' preferred alternative: "Annual gravel supplementation activities would occur prior to adult coho salmon entering the project area to spawn (October through November), so no adverse affects to this life stage are anticipated" (NMFS 2000). Smolts (young fish preparing to migrate downriver to the estuary and ocean) should be absent from the reach, but a few juveniles may be present that could be displaced from further rearing. Such adverse effects were concluded to be minor and short-lived, dwarfed by the long-term beneficial outcome via implementing the proposed action. This displacement of juvenile coho salmon "…is not expected to result in lethal take of these fish" (NMFS 2000).

B. Land and Resource Management Plan Management Indicator and Anadromous Fish Assemblage

The Forest's LRMP identifies winter-run steelhead, spring-run Chinook salmon and summer steelhead as management indicators (MIS) for the anadromous fish assemblage. The Forest Service manages fish habitat to maintain viable populations of wild, native fish. The 'indicator' fish are selected to represent their associated aquatic community. Forest management activities can then be guided and monitored for habitat protection by focusing on the welfare of these indicator fish, which can and/or do occur in the proposed action treatment reach.

C. Effects Analysis - General

Alternative 1 (No Action). The No Action alternative provides a point of reference from which to evaluate the action alternatives. This alternative would implement no activity at this time, allowing the existing conditions to remain unchanged. Despite having secured a more generous river flow

release schedule, the currently proposed but ultimately unchanged treatment reach would provide little, if any additional aquatic habitats. The rather monotypic nature of the treatment reach would persist, continuing to fall far short of being a dynamic fluvial channel. Despite the enhanced upstream flow releases, foregoing the proposed action would not in turn contribute to the restoration of the Trinity River within this critically important reach. The 'fossilized' characteristic of the proposed treatment reach would continue.

This alternative clearly does not meet the identified purpose and need for action. It disregards recommendations found in the Trinity River Mainstem Fishery Restoration FEIS/EIR and the accompanying ROD (USDI et al 2000). Management Area direction, found in the Forest's LRMP (1994) would not be honored. Aquatic Conservation Strategy objectives in the LRMP, promoted as part of the preferred alternative in the FEIS/EIR and ROD would not progress along this portion of the Trinity River.

Alternative 2 (Proposed Action). Reintroduction of coarse riverbed substrate and mechanical channel rehabilitation would occur along an approximate 1,800 foot reach of the mainstem Trinity River, extending laterally from the river centerline to approximately the extent of the 100 year floodplain. Intermittently scheduled river flows released from the Trinity River Division facility of up to 11,000 cubic feet per second would be accommodated. The work entails any or all of the following treatments: [1] removal of some existing riparian vegetation along specific riverbank segments, [2] excavation, redistribution and/or removal of approximately 6,900 cubic yards of existing riverbed material, most of which is positioned above the dry season water elevation levels, [3] mechanically re-shaping the river channel, including lateral channel widening of specific segments, and [4] introduction and placement of approximately 5,100 cubic yards of washed river rock ranging in diameter from ¼ to 5 inches and [5] Maintain levels of coarse material into the future at this site as needed. Fluvial geomorphologic characteristics will benefit, rather than be adversely impacted as occurs now.

The purpose of this project is to contribute to the restoration of aquatic habitat in the mainstem Trinity River through the development of properly functioning channel conditions. The proposed action would: (1) restore the riverbed and banks of one specific reach of the mainstem Trinity River to a condition similar to that which naturally occurred prior to the construction of the Trinity River Division of the Central Valley Project in 1963 and (2) augment the supply of coarse sediment necessary to maintain a dynamic fluvial channel. Numerous river rehabilitation treatments are proposed to occur on federal and privately managed lands during the next several years and include the type of treatment described in this proposal. When combined with enhanced upstream flow releases, restoration of the Trinity River should result, particularly down to the confluence with the river's North Fork.

The desired condition is to first achieve, then maintain channel conditions that allow for a more dynamic interaction between sediment routing, riparian vegetation, and high-flow hydraulics. Achieving the desired condition would promote healthy riparian and aquatic ecosystems. In contrast, existing channel and habitat conditions are relatively static, resulting in diminished habitat quality. The need for the project results from (1) the elimination of coarse sediment supplies originating

upstream from Lewiston Dam, decreasing availability of suitable aquatic habitats in the proposed treatment reach; and (2) long-term effects of reducing the frequency and magnitude of high flows that otherwise naturally thwart encroachment of riparian vegetation and hydraulically manipulate the stream bed.

The Mainstem Trinity River Watershed Analysis (1995; WA) addresses these issues. The analysis provides a means for understanding the processes and interactions occurring within the Trinity River system.

Best Management Practices (BMPs) are practices that both the State and Federal water quality regulatory agencies expect the Forest Service to implement to meet the obligation for compliance with the applicable water quality standards, and to maintain and improve water quality. They are the performance standards for the agency. The BMPs applicable to the implementation of this proposed action are listed in Appendix A of this document.

1. Direct Effects to Threatened Coho Salmon and MIS Fish Species

Alternative 1. No direct effects will occur to the subject species because this alternative represents no action.

Alternative 2. Direct effects to subject fish may occur during the implementation phase of the project. The National Marine Fisheries Service has recognized the probability of this occurring and has addressed it in their biological opinion. Note the descriptions from the opinion under item 'A' above in this section of Fisheries. Incidental take via harassment, but not mortality, is anticipated to occur during the implementation phase. NMFS limited their opinion to coho salmon, but there is no biological rationale not to expand the effects analysis to all the anadromous fish residing in the treatment reach.

Direction will be given to the operators of heavy equipment to progress deliberately within the wetted river channel to minimize the adverse effects to fish residing in the reach at the time of implementation. Human foot traffic will frequently occur before heavy equipment enters the river both in time and geographically to promote evasive behavior by juvenile fish. The project operation window has been purposefully chosen in part to minimize impacts to adult life stages of these fish; spawning activities do not normally occur during the planned timeframe of implementation. Eggs will also not be incubating in any treatment reach gravel occurring pre-project at the time of implementation.

2. Indirect Effects to Threatened Coho Salmon and MIS Fish Species

Alternative 1. No other related or dependent action is scheduled to take place contingent upon failure of implementing the proposed action. However, indirect adverse impacts to fish will materialize in the context of foregone opportunities. Assuming that the much more generous flow regime at Lewiston Dam materializes, and that the designed restoration projects get implemented downriver from the proposed action, then many more adult fish will be migrating over time up to the proposed action reach and stopping due to the location of the adjacent dam. The no action alternative would do nothing to accommodate this increase in migrating fish and therefore likely lead to no increase in

overall fish production from this portion of the river. A greater number of adult fish resulting from restored reaches downstream could seasonally congregate in the proposed action area upon migrating from the ocean upriver to spawn. Without implementing the proposed project, this could conceivably lead to less fish biomass produced than what originates from the proposed treatment reach today. Such would result from the effects of adverse stress and competitive energy required to defend potential spawning territories in response to overcrowded conditions.

Alternative 2. Adverse effects are likely to result to individual fish indirectly generated by the proposed action. Turbidity will be created during channel manipulation and substrate injection despite meeting the parameters of the water quality permit specifications and all other related effect minimization obligations. Fish residing downstream for some undetermined distance from the turbid point(s) of origin are likely to be adversely affected but not to the point of creating lethal conditions. Visually-oriented feeding opportunities and possibly oxygen exchange rates over fish gills could become compromised sporadically. The result may translate into level of harassment such that a more favorable location may be chosen by individual fish. The Forest Service and NMFS both conclude that these indirect affects will not lead to mortality in either the short or long term perspective.

Adult fish attempting to spawn within the treatment reach after project completion should be greatly benefited. Establishment of much more suitable substrate to accommodate this activity will unquestionably lead to many more vigorous and healthy individuals produced, comprising a much larger newly hatched 'fry' population than what is produced currently. Rearing habitat for fry will not increase proportionately via proposed treatment within the reach, however. There is a possibility that some newly hatched individuals will need to travel an undetermined distance downstream from their point of emergence to find unoccupied or underutilized fry rearing habitat. This possible outcome represents a completely natural behavior pattern within any anadromous salmonid river system.

D. LRMP Fish Habitat – Anadromous Assemblage; ESA Critical Habitat, Essential Fish Habitat, and other Hydrologic Considerations

The 'formally' designated habitats listed in this section actually comprise the same substrate found within the boundaries of the proposed action treatment reach. They will therefore be addressed collectively.

1. Direct Effects to Fish Habitat and Aquatic Resources.

Alternative 1. Pursuing no action will not directly affect the fish habitat and other aquatic resources within the proposed action area in any manner.

Alternative 2. Fish habitat and other aquatic resources will be both directly created and manipulated during implementation of the proposed action. Doing so represents the very intent of the proposed action. Substrate will be added in copious quantities (at least 5,000 cubic yards) to accommodate fish spawning, egg incubation, and aquatic invertebrate production. River bed manipulation is also scheduled to occur in part to increase substrate deposition areas. This portion of the proposed action will also help facilitate some additional rearing habitat advantageous to juvenile fish successfully hatched from within the introduced substrate.

Fry habitat area and quality for Chinook salmon and steelhead does not change appreciably after project implementation, and may even decrease somewhat from existing conditions in overall quality. This is in large part because by operating within a relatively fixed boundary such as that of the treatment reach, different kinds of habitat could tend to counter each other in a 'zero-sum' context. The large projected net increase in spawning habitat, however, is clearly much greater than the possible slight decrease in available habitat for fry rearing when considering both steelhead and Chinook salmon habitat needs together.

Implementation of the proposed action is therefore clearly beneficial to all fish species overall. If an increase in fry are produced from the substrate so as to fully utilize and possibly exceed the available fry rearing habitat within the treatment reach, then the fry will transport themselves downstream along the riverbank margins until unoccupied or underutilized rearing habitat is located. This kind of 'search' behavior is a completely normal response for newly hatched fry in any river system that accommodates salmon, steelhead, and trout.

2. Indirect Effects to Fish Habitat and other Aquatic Resources

Alternative 1. Taking no action indirectly affects fish habitat and aquatic resources inconsequentially.

Alternative 2. Project-related pulses of turbidity are certain to result during implementation. A small percentage of the suspended material comprising the turbidity is likely to settle throughout portions of the treatment reach characterized by slow water velocity. A thin veil of 'settleable' material may cover substrate directly under slow velocity water within and perhaps downstream from the treatment reach, possibly impinging on aquatic invertebrates and the ease of salmonid fry to ingest them. This veil of material will be easily transported out of the system upon experiencing just a slight increase in river discharge.

The total aquatic volume of nearby pools may be decreased by deposition of such suspended material, but any changes are likely to be immeasurable and inconsequential. The volume of water associated with the river mainstem, even at the lowest seasonal discharges from Lewiston Dam (as opposed to what could occur in a much smaller tributary) will greatly limit any comparative adverse effect resulting from such deposition in the short term and eliminate the result altogether once controlled flows are again increased.

Beneficial indirect effects will materialize upon project completion as a result of the increased discharges expected to occur from Lewiston Dam during upcoming winter and spring seasons. A portion of the introduced substrate will become transported downstream during periods of greater discharge. Although this material will represent a constant total introduced load until replenished in the treatment reach at future dates, it will still affect areas downstream from the lower boundary of the proposed action area. The affect will in most cases be favorable. Any partial filling of downstream pools should be short-lived because pools become most turbulent during periods of greater discharge for all but the end of the descending portions of flow discharge response hydrographs.

E. Riparian Reserves

A relatively sparse and poorly established corridor of riparian habitat borders the river's edge along the proposed treatment reach. Some of this riparian vegetation will be obliterated during the designed expansion of the wetted perimeter along some river segments. The vegetation to be affected will be surveyed for any wildlife use prior to removal, and will be removed purposefully at a time of year when potential critical wildlife use is minimized. The planned project operational window will more than likely meet this standard. The quality of the riparian habitat along this particular reach of the river clearly pales compared to the expected quantity and quality of the aquatic habitats created and/or improved via project implementation. Likely the most important aspect of this riparian removal is the certain outcome of there being no functional change in how the extent of riparian habitat will affect the river itself in any measurable or meaningful way upon completion due to it's rather poor existing quality. Terrestrial insect production for aquatic benefit and potential river surface shading are currently inconsequential due to the site-specific and northern bank location.

In contrast, applicable Aquatic Conservation Strategy (ACS) objectives found in the LRMP, elaborated upon in the proposed action section of this EA, clearly indicate several aquatic benefits resulting from project implementation. As stated in the Northwest Forest Plan Record of Decision, which sets the context for the intent of protecting riparian habitat as per the ACS:

> "Under the Aquatic Conservation Strategy, Riparian Reserves are used to maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide for greater connectivity of the watershed. The Riparian Reserves will also serve as connectivity corridors among Late-Successional Reserves."

Riparian reserve habitat found along the proposed action riverbanks at most serves a comparatively minor function regarding any riparian-dependent species when considering all of the probable project-related benefits described elsewhere in this document.

F. Cumulative Effects to Threatened Coho Salmon, Management Indicator Fish Species, Essential Fish Habitat, and other Aquatic Resources

Cumulative impacts are the impacts on the environment that result from the incremental impacts of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or entity undertakes other actions. These impacts can result from individually minor but collectively significant actions taking place over time.

Forty seven mechanical rehabilitation projects are identified in the Trinity River Mainstem Fishery Restoration Project FEIS/EIR. Two of these projects have been completed. The proposed action, along with the Bureau of Reclamation's Indian Creek Rehabilitation project and the Canyon Creek Suite of rehabilitation Projects are scheduled to be implemented in 2006 through 2008.

Additional river restoration project sites are also scheduled for implementation during the following few years within the upper forty miles of river below Lewiston Dam.

Long term maintenance needs of the proposed action will be incorporated into a more comprehensive Spawning Gravel Management Plan (Plan) for the Trinity River, where 10,300 cubic yards of substrate on average may get deposited into the river annually (ranging from zero yards up to 67,000 cubic yards depending on water year type and storm severity). There is no doubt that the Plan will recommend implementation and maintenance of the proposed action because the site is repeatedly described and urged to be implemented in numerous aforementioned documents. The Biological Opinion written by NMFS on the 'Programmatic' Trinity River Restoration BA related to the FEIS/EIR, for example, included as a Reasonable and Prudent Measure to: 'Complete the first phase of the channel rehabilitation projects in a timely fashion'. The proposed action is one of those first-phase projects specifically identified in the Mainstem Fishery FEIS/EIR and ROD.

The control of the streamflow below the TRD has greatly contributed to the impairment of the Trinity River below Lewiston Dam. The reduction in available coarse sediment particularly upstream from Rush Creek (which includes the proposed project area) has severely affected the sediment flux in the river.

Under **Alternative 1**, the proposed action would not be implemented and the Trinity River within and just downstream from the site boundary would function strictly in response to managed flows from the TRD. The effects on fishery resources would be similar to those that have occurred since the operation of the TRD began over forty years ago. No additional significant cumulative impacts to fish and aquatic resources are anticipated to result from this alternative that have not already happened, primarily because the more generous future flow schedule would at least slow or perhaps halt additional overall degradation.

Under **Alternative 2**, the proposed action: fluvial geomorphologic characteristics will benefit, rather than be adversely impacted. No significant cumulative impacts to water quality are anticipated to occur as well. This proposed action is purposefully staged geographically and chronologically with other actions identified in the FEIS/EIR to minimize compounded degradation to water quality to the upper Trinity River below Lewiston Dam. It is possible that a small level of cumulative degradation of water quality via turbidity and short-term sedimentation could occur within the Trinity River resulting from this and the other combined 'phase one' construction periods. Meeting the standards described in the water quality 401 permit along with implementation of Best Management Practices (Appendix A) should substantially minimize and mitigate, respectively, for potential water quality impacts associated with turbidity, sedimentation, accidental spills, etc. Turbidity will effectively cease upon project completion except for some possible short-term pulses regenerated once TRD discharges increase later in the water year. Any other possible short-term impacts relating to minor substrate sedimentation downstream should be eliminated as soon as both controlled discharges from the TRD and tributary discharges increase later in the fall after project completion.

Wildlife

The Proposed Action was analyzed to determine the impacts to wildlife in the project area. A more comprehensive analysis is included in the Wildlife Biological Assessment/Evaluation (BAE) located in the Trinity River Coarse Sediment Injection and Rehabilitation Project EA project file at the Shasta Trinity National Forest Supervisors Office.

The Wildlife BAE considered the effects of the proposed action for all Threatened/Endangered, Proposed Threatened/Endangered and Forest Sensitive species that may occur in the project area or be affected by the proposed action. After field review of the project area, 25 species were eliminated from further study because the project area does not provide adequate habitat for the 25 species. Effects to the bald eagle were considered, one nest site is known to occur approximately one mile northwest of the project area.

Survey and Manage (S&M) wildlife species are not known or expected to occur in or near the project area. The project area lies outside the known or expected ranges of S&M freshwater mollusk species (Frest and Johannes 1999). The project area experiences frequent natural soil disturbance, annual inundation and intense sun exposure that would exclude occupation by S&M terrestrial wildlife species (e.g., mollusks or salamanders).

The project area has been totally mechanically manipulated (reshaped) during and after the dam construction. Eagles are commonly seen flying past the project area to forage roughly 200 yards downstream especially from approximately October through January when they take advantage of high anadromous fish densities backed up because of the dam. Eagles do occasionally forage in the project area (1 or 2 at a time) but, again, generally concentrate a few hundred yards downstream (5 or 6 at a time in October-January) possibly because of the high human activity associated with the fish hatchery.

Cumulative Effects

Forty-four mechanical rehabilitation projects are identified in the Trinity River Mainstem Fishery Restoration Project FEIS. Two of these projects have been completed. The proposed action and another, the Indian Creek Rehabilitation site, are scheduled between now and 2008. Each of these would have effects to the bald eagle similar to those described for this project.

Alternative 1 (No Action)

Under the no action alternative there would be no direct effects to the bald eagle. The project would not be implemented. There would not be an increase in fish (eagle prey) populations from to the project that would likely benefit bald eagles in the area at an unknown level.

Alternative 2 (Proposed Action)

Direct Effects (Mortality, Harm, Failed Breeding Attempts, Displacement)

No direct effects to nesting bald eagles are expected because no nest sites occur within the project area. The disturbance created during project implementation (mid-July through August) would likely prompt eagles to forage at other locations in the river (i.e., farther downstream) at a time when fish

density and thus eagle foraging (occasionally 1 or 2 eagles generally early in the morning) is at a low point in and near the project area.

Indirect Effects (i.e., Habitat, Prey)

The project would not affect existing or potential bald eagle nest sites. The project is designed to improve anadromous fish habitat and populations. Fish and thus foraging eagles are expected to start using the project area immediately after implementation. An increase in fish (eagle prey) populations due to the project would likely benefit bald eagles in the Trinity River Basin at an unknown level.

The proposed action may affect but would not likely adversely affect the bald eagle based upon the following rationale: Eagles are not known nor expected to nest within or near the project area. There is a potential to temporary displace foraging eagles for 2½ to 3 weeks at a time of relatively low eagle foraging activity in the area. Other nearby areas of the Trinity River would remain undisturbed and available for foraging eagles. Fish and thus foraging eagles are expected to start reusing the area immediately following project implementation. Increased fish populations related to the project would benefit eagles in the long-term.

Botany

The Proposed Action was analyzed to determine the impacts to sensitive plant and fungi species and survey and manage species in the project area. A more comprehensive analysis is included in the Sensitive Plant and Fungi Biological Evaluation located in the Trinity River Coarse Sediment Injection and Rehabilitation Project EA project file at the Shasta-Trinity National Forest Supervisors Office.

Suitable habitat for Sensitive species (plants and fungi) specific to the west side of the Shasta-Trinity National Forest is typically not found in riverine riparian systems because of frequent natural soil disturbance, periodic inundation, and open, sunny exposure.

Alternative 1 – No Action

Under the no action alternative there would be no direct or indirect effects to any sensitive plants or fungi or survey and manage species. The project would not be implemented.

Alternative 2 – Proposed Action

Based on the lack of suitable habitat the proposed action will not have any direct or indirect effects on any Sensitive plant or fungi species.

Ten survey and manage species were considered in analyzing the proposed action. The habitat in the project area is sandy soil that experiences regular flooding disturbance and sedimentation. No suitable habitat for the ten species occurs in the project area. Based on the lack of suitable habitat, the proposed action will not have any direct or indirect effects on survey and manage species. Since there are no direct or indirect effects anticipated, there will be no cumulative effects.

Cultural Resources

The Proposed Action was analyzed to determine the impacts to cultural resources in the project area. A more comprehensive analysis is included in the Archaeological Reconnaissance Report located in the Trinity River Coarse Sediment Injection and Rehabilitation Project EA project file at the Shasta-Trinity National Forest Supervisors Office.

Surveys were done over the project area. No historic sites were found.

Alternative 1 – No Action

Under the no action alternative there would be no direct or indirect effects to any historical sites in the project area. Since there are no direct or indirect effects anticipated, there will be no cumulative effects to historic sites in the project area.

Alternative 2 – Proposed Action

There are no historic sites found within the project area, therefore there would be no direct or indirect effects from the proposed action. Since there are no direct or indirect effects anticipated, there will be no cumulative effects to historic sites.

Section V: NEPA Significance Factors

Consequences Relative to Significance Elements

In 1978, the council on Environmental Quality disseminated regulations for implementing the National Environmental Policy Act. These regulations include a definition of the word "significantly." The definition includes consideration of context and of ten elements of intensity.

Context

The proposed action is limited to Forest lands north of the town of Lewiston, and downstream of the Lewiston Dam, specific location is shown on Fig. 2. The proposed action was first identified in the Trinity River Mainstem Fishery Restoration Project FEIS (2000). Forty-four similar mechanical rehabilitation projects are identified in the FEIS. Two of these projects have been completed. The project area covers approximately 20 acres of Forest land. In terms of the affected area, the proposed action affects a very minute portion of the total Forest area, less than .01%. In the context of seasonality and duration of activities, analysis prepared in support of this EA, indicate that the proposed action would not pose significant short- or long-term effects.

The end result of the proposed action is to provide fish habitat and fish habitat diversity, creating a functional, dynamic, alluvial river system.

Intensity

A. **Impacts may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.**

Effects determinations are summarized in supporting analysis and in Section IV of this analysis. Beneficial effects have not, however been used to offset or compensate for potential adverse effects.

A potential short-term effect of the proposed action is due to the disturbance in the project area during project implementation, eagles would likely forage at other locations in the river (i.e., further downstream) at a time when fish density and thus eagle foraging (occasionally 1 or 2 eagles generally early in the morning) is at a low point in and near the project area.

The long term benefits of fish habitat, fish habitat diversity and a functional dynamic alluvial river system have not been used to reduce the temporary short-term adverse effects to non-significance.

B. **The degree to which the proposed action affects public health or safety.**

Potential short-term adverse affects on public health and safety are related to air quality (dust) and dangers inherent in construction operations. These potential adverse effects are of limited scope and duration and will be minimized to the extent possible using applicable State and Federal regulations. Implementation of the proposed action will follow strict project design standards, including applicable best management practices (Appendix A).

C. **Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers (Wild & Scenic Rivers), or ecologically critical areas.**

Cultural resource surveys were done in and around the project area. No historic properties were found during the surveys. Monitoring by Forest Service officials during implementation would further deter possible disturbance to an unknown historic property, object of antiquity, or artifact.

In the Final Environmental Impact Statement for Proposed Designation of Five California Rivers in the National Wild and Scenic River System (1980), the Trinity River was specifically determined to possess Outstandingly Remarkable anadromous fishery values.

The proposed action will result in a minor amount of disturbance to river attributes while enhancing the outstandingly remarkable value (anadromous fishery) for which the river was designated in the Wild and Scenic System. The 1,800 foot reach that will be affected by the proposed action has already been mechanically manipulated (reshaped) during and after the dam construction.

The proposed action will not affect the free-flowing condition of this segment of the Trinity River. The proposed action will have direct positive affects on the Trinity River's Outstandingly Remarkable value of anadromous fisheries.

D. **The degree to which the effects on the quality of the human environment are likely to be highly controversial.**

Environmental effects are not likely to be highly controversial to the public as a whole. The proposed action is similar to two projects that have already been implemented on the Trinity River. The only controversial effect identified during public scoping was a concern that the coarse material brought in may not be from the Trinity basin and introduced sediment may be contaminated with mercury.

The gravel shall be purchased from local Trinity River Basin sources and will be washed to meet or exceed a cleanness value of 85 according to CalTrans cleanness test # 227 specifications. Because turbidity is caused primarily by disturbance of small diameter sediment particles and mercury is associated almost exclusively with fine sediment materials, use of washed materials which exclude fines (<2.0 mm in diameter) ensures that Water Quality Control Plan (Plan) objectives for Trinity River turbidity and mercury will be met. In addition, real time monitoring of turbidity, settleable materials, and sediment will ensure that Plan beneficial uses are protected.

All placed gravel would pass the CalTrans cleanness test # 227 with a value of 85 or greater. Since mercury is associated with fine materials that would be removed in washing, there would be no chance of transporting mercury to the site or of impacting the public with this hazardous material.

E. **Degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.**

The proposed action was developed to achieve objectives identified in the LRMP, the Mainstem Trinity River Watershed Analysis, and the Trinity River Mainstem Fishery Restoration FEIS. Strict project design standards including applicable best management practices (Appendix A) have been incorporated in the project design. A small number of projects, similar to the proposed action have

been implemented in the Trinity River basin and multiple projects similar to the proposed action have been implemented in the neighboring Sacramento River basin for over 10 years. Research and monitoring to date have not shown any possible effects on the human environment to be highly uncertain, or involve unique or unknown risks.

F. **The degree to which the action may establish a precedent for future action with significant effects or represents a decision in principle about future consideration.**

A precedent would not be set for future decisions with significant effects. Any future decision would need to consider all relevant scientific and site-specific information available at that time.

G. **Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.**

The proposed action does not represent potential significant cumulative adverse impacts when considered in combination with other past or reasonably foreseeable actions, described in Section IV. In Section II, Table 3, effects for aquatics, wildlife, botany and cultural resources are described. There are some adverse indirect and direct effects to aquatics, however it will not lead to significant cumulative impacts.

H. **The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources.**

There are no known significant scientific resources or previously designated historic properties such as districts, sites, highways, structures, or objects listed in the National Register of Historic Places within the project boundary. An inventory and Archaeological Reconnaissance Report has been completed and is located in the project file at the Shasta-Trinity National Forest Supervisors Office.

I. **The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973 (ESA).**

A biological opinion addressing foreseeable Trinity River Restoration Program activities (National Marine Fisheries Service 2000) was written in response to a biological assessment that reflected the findings in the Mainstem Fishery Restoration EIS. The opinion was written because Trinity River coho salmon are federally listed as Threatened. The opinion describes the coarse sediment supplementation need found in the EIS' preferred alternative: "Annual gravel supplementation activities would occur prior to adult coho salmon entering the project area to spawn (October through November), so no adverse affects to this life stage are anticipated" (NMFS 2000). Smolts should be absent from the reach, but a few juveniles may be present that could be displaced from further rearing. Such adverse effects were concluded as minor and short-lived, dwarfed by the long-term beneficial outcome via implementing the proposed action. This displacement of juvenile coho salmon "…is not expected to result in lethal take of these fish." (NMFS 2000).

The project implementation window for this project is on or around July 22 and completion of the project would be no later than September 15. This window was purposefully chosen in part to minimize impacts to adult life stages of these fish; spawning activities do not normally occur during the planned timeframe of implementation. Eggs will also not be incubating in the project area at the time of implementation.

The proposed action may affect but would not likely adversely affect the bald eagle based upon the following rationale: Eagles are not known nor expected to nest within or near the project area. There is a potential to temporarily displace foraging eagles for up to 3 weeks at a time of relatively low eagle foraging activity in the area. Other nearby areas of the Trinity River would remain undisturbed and available for foraging eagles. Fish and thus foraging eagles are expected to start reusing the area immediately following the project implementation.

J. **Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.**

The proposed action does not threaten a violation of Federal, State, or local environmental protection laws. It is consistent with the LRMP, NEPA, NFMA, and the Clean Water Act, the Clean Air Act, the Endangered Species Act, the Wild and Scenic Rivers Act, and the National Historic Preservation Act as documented in this EA.

Findings Required by other Applicable Laws and Regulations

Environmental Justice. Executive Order 12898 relating to Environmental Justice requires an assessment of whether implementation of this decision would disproportionately affect minority or low-income populations. Although there are a high proportion of lower income people living in this portion of the State, as well as a number of tribal groups of Native Americans, neither action alternative will affect them any differently than any other member of the public. Adverse environmental effects and effects on human health are minimal.

Section VI: Persons, Groups, or Agencies Contacted and/or Consulted

William Brock, Shasta-Trinity National Forest
Rocko Brown, University of California, Davis
Sherry Chilcott, Shasta-Trinity National Forest
Heidi Crowell, U.S. Fish and Wildlife Service, Red Bluff Field Office
Tom Dunbar, Regional Water Quality Control Board
Susan Erwin, Shasta-Trinity National Forest
Loren Everest, Shasta-Trinity National Forest
Brandt Gutermuth, Bureau of Reclamation, Weaverville
Andreas Krauss, Bureau of Reclamation, Weaverville
Byron Leydecker, Friends of the Trinity River
Sid Mickelson, Trinity list server
N.O.A.A. National Marine Fisheries Service
Northern California Fly Fishing Board
Al Olson, Shasta-Trinity National Forest
Dr. Gregory Pasternak, University of California, Davis
Tom Quinn, Shasta-Trinity National Forest
Regional Water Quality Control Board
Joe Riess, Bureau of Reclamation, Weaverville
Ed Solbos, Bureau of Reclamation, Weaverville
U.S. Army Corps of Engineers
U.S. Fish and Wildlife Service
Kelly Wolcott, Shasta-Trinity National Forest
Kevin Wolf, Trinity list server

Section VII: Literature Cited

Anthony, R.G., R.L. Knight, G.T. Allen, B.R. McClelland and J.I. Hoges. 1992. Habitat use by nesting and roosting bald eagles in the Pacific Northwest. Trans. N. Am. Wildl. Nat. Res. Conf. 68pp.

Courtney, S.P.; J.A. Blakesley; R.E. Bigly; M.L. Cody; J.P. Dumbacher; R.C. Fleischer; A.B. Franklin; J.F. Franklin; R.J. Gutierrez; J.M. Marzluff; and L. Sztukowski. 2004. Scientific evaluation of the status of the northern spotted owl. Sustainable Ecosystem Institute; Portland, Oregon.

Freel, M. 1991. A literature Review for the Management of the Marten and Fisher on National Forests in California. Unpublished document. USDA Forest Service, San Francisco, CA.

National Marine Fisheries Service Southwest Region 2000. Biological Opinion for the Trinity River Mainstem Fishery Restoration EIS and it's Effects on Southern Oregon/Northern California Coast Coho Salmon, Sacramento River Winter-run Chinook Salmon, Central-Valley Spring-run Chinook Salmon, and Central Valley Steelhead.

Ralph, C. John; Hunt, George L., Jr.; Raphael, Martin G.; Piatt, John F., Technical Editors. 1995. Ecology and conservation of the Marbled Murrelet. Gen. Tech. Rep. PSW-GTR-152. Albany, CA; Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; 420 p.

Thomas, J.W., E.D. Forsman, J.B. Lint, E.C. Meslow, B.R. Noon, and J. Verner. 1990. A Conservation Strategy for the Northern Spotted Owl. Interagency scientific committee to address the conservation of the northern spotted owl.

U.S. Bureau of Land Management. 1995. Mainstem Trinity River Watershed Analysis. Redding, CA.

U.S. Bureau of Reclamation. 2006. Trinity River Restoration Program: Canyon Creek Suite of Rehabilitation Sites: Trinity River Mile 73 to 78. Vol. I and II: Northstate Resources.

U.S. Department of Agriculture, and U.S. Department of Interior. 2001. Record of decision and standards and guidelines for amendments to the survey and manage, protection buffer, and other mitigation measures, standards and guidelines.

U.S. Department of Agriculture, Forest Service and U.S. Department of the Interior Fish and Wildlife Service. 1991. Protocol for surveying for spotted owls in proposed management activity areas and habitat conservation areas, March 12, 1991.

U.S. Department of Agriculture, U.S. Department of the Interior, U.S. Department of Commerce, and the Environmental Protection Agency. 1993. Forest Ecosystem Management: An Ecological, Economic, and Social Assessment. Report of the Forest Ecosystem Management Assessment Team. Forest Service, Fish and Wildlife Service, National Marine Fisheries Service, National Park Service, Bureau of Land Management, Environmental Protection Agency.

USDA Forest Service and USDI Bureau of Land Management. 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (Northwest Forest Plan). Portland, Oregon.

U.S. Department of the Interior Fish and Wildlife Service. 2002. Recovery Plan for the California Red-legged Frog. U.S. Fish and Wildlife Service, Portland, Oregon. 173pp.

U.S. Department of the Interior Fish and Wildlife Service. 1986. Pacific Bald Eagle Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon. 163pp.

U.S. Department of the Interior. 1992a. Recovery Plan for the Northern Spotted Owl. Final Draft. Portland, Oregon: U.S. Department of the Interior. 2 Volumes.

U.S. Department of Interior. 2000. Record of Decision. Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement/Environmental Impact Report.

U.S. Department of Interior. 1980. Proposed Designation of Five California Rivers in the National Wild and Scenic Rivers System Final Environmental Impact Statement.

U. S. Fish and Wildlife Service, Hoopa Valley Tribe 1999. Trinity River Flow Evaluation Final Report.

U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, Hoopa Valley Tribe, and Trinity County. 1999. Draft environmental impact statement/report for the Trinity River Mainstem Fishery Restoration.

U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation, Hoopa Valley Tribe, and Trinity County. 2000. Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement/Report.

U.S. Fish and Wildlife Service, U.S. Bureau of Reclamation 2000. Biological Assessment for those Actions in the Preferred Alternative of the Proposed Preferred Trinity River Mainstem Fishery Restoration Program that may Affect Listed Species and their Critical Habitat.

USDA Forest Service. 1995. Shasta-Trinity National Forest Land and Resource Management Plan (LRMP).

Wilson, R.A., A.J. Lind, and H.Welsh, Jr. 1991. Trinity River Riparian Wildlife Survey-1990, Final Report Prepared for Wildlife Task Group Trinity river Restoration Project, Weaverville, California. USDA Forest Service, Pacific Southwest Experiment Station, Redwood Sciences Laboratory, 1700 Bayview Drive, Arcata, CA.

Appendix A: Applicable Best Management Practices

Streamcourse and Aquatic Protection (PRACTICE: 1-19)

a. Objective:

1) To conduct management actions within these areas in a manner that maintains or improves riparian and aquatic values.
2) To provide unobstructed passage of stormflows.
3) To control sediment and other pollutants entering streamcourses.
4) To restore the natural course of any stream as soon as practicable, where diversion of the stream has resulted from timber management activities.

b. Explanation: This management practice employs administrative, preventive, and corrective measures to meet the objectives.

Streams within proposed timber sale areas are surveyed and protection zones are prescribed during TSPP. The IDT formulates stream protection requirements, and includes the prescription in the decision document. The requirements are then included in the TSC and identified on the SAM.

The following principles are fundamental to protecting streamcourses:

1) Location and method of streamcourse crossings must be agreed to by the SA prior to construction. This is done at the same time as agreements are made with the purchaser or purchaser representative for the locations of landings, skid trails, tractor roads, and temporary roads.

2) Repair of all damage to a streamcourse, including damage to banks and channels, to the extent practicable.

All sale-generated debris is removed from streamcourses, unless otherwise agreed to by the SA and in an agreed upon manner that will cause the least disturbance.

4) Limit, or exclude equipment use in designated SMZs. Widths of SMZ and restrictions pertaining to equipment use are defined by onsite project investigation and are included in the TSC. These areas are identified by the Forest Service on the Sale Area Map prior to advertising. Boundaries of zones will be modified by agreement between the contractor and SA, to compensate for unforeseen operation conditions.

5) Methods for protecting water quality while utilizing tractor skid trail design in stream course areas where harvest is approved include: 1) end lining 2) falling to the lead and 3) utilizing specialized equipment with low ground pressure such as a feller buncher harvester. Permit equipment to enter streamside areas only at locations agreed to by the SA and the purchaser.

6) Water bars and other erosion control structures will be located so as to disperse concentrated flows and filter out suspended sediments prior to entry into streamcourse.

7) Material from temporary road and skid trail streamcourse crossings is removed and streambanks restored to the extent practicable.

8) In cable log yarding operations logs will be fully airborne within the SMZ, when required by the TSC.

9) Special slash treatment site preparation activities will be prescribed in sensitive areas to facilitate slash disposal without use of mechanized equipment.

c. Implementation: The SA works with the purchaser's representative to ensure that the TSC clauses covering the above items are carried out on the ground. Specialists can be called upon to help the SA with decisions. In the event the purchaser causes debris to enter streamcourses in amounts which may adversely affect the natural flow of the stream, water quality, or fishery resource. Purchaser will remove such debris as soon as practicable, but not to exceed 48 hours and in an agreed upon manner that will cause the least disturbance to streamcourses.

Erosion Control Structure Maintenance (PRACTICE: 1-20)

a. Objective: To ensure that constructed erosion control structures are stabilized and working.

b. Explanation: Erosion control structures are only effective when they are in good repair and function as designed. Once the erosion control structures are constructed there is a possibility that they may not become adequately effective, or they will become damaged from subsequent harvest activities. It is necessary to provide follow-up inspection and structural maintenance in order to avoid these problems and ensure adequate erosion control.

c. Implementation: During the period of the TSC, the purchaser will provide maintenance of soil erosion control structures constructed by the purchaser until they become stabilized, but not for more than one year after their construction. After one year, accomplish needed erosion control maintenance work using other funding sources under TSC provisions B6.6 and B6.66.

The Forest Service may agree to perform such structure maintenance under TSC provision B4.225 (Cooperative Deposits), if requested by the purchaser, subject to agreement on rates. If the purchaser fails to do seasonal maintenance work, the Forest Service may assume the responsibility and charge the purchaser accordingly.

General Guidelines for the Location and Design of Roads (PRACTICE: 2-1)

a. Objective: To locate and design roads with minimal resource damage.

b. Explanation: The following are some general considerations, which must be incorporated into the planning process of road location and design. These measures are preventive, apply to all transportation activities, and indirectly protect water quality.

1) A basic requirement for transportation facility development and operation is the formulation and evaluation of alternatives that will best meet the resource management objectives with the least adverse effect on environmental values.

2) The location, design, and construction of roads include the use of IDTs. These teams include professional personnel with skills in road, resources and water quality management. The team evaluates the effects of road system development or modification proposals on the environment, and formulates alternative.

3) All resource-coordinating instructions for the protection and prevention of damage to NFS lands, resources, and ecological systems, including wetlands and floodplains will apply to the planning, development, and operation of transportation facilities. The following instructions apply to permanent roads:

a) Locate roads to complete the area transportation system, to fit the terrain, and to minimize damage to improvements and resources. Avoid sensitive areas such as wetlands, inner gorges and unstable ground to the extent practical.

b) Base road design standards on design criteria such as traffic requirements of a timber sale, or the overall transportation plan, road management objectives or resource objectives, and minimize the effects on Forest resources including water quality.

c) Design stream crossing structures to provide the most cost efficient drainage facility consistent with resource protection, facility needs, and legal obligations. The design involves a hydrologic analysis to determine runoff volumes, flood conditions, velocities, scour, and open

channel shapes. An economic comparison of various flood frequencies versus structure sizes and types is also done to meet resource and legal requirements and cost/benefit comparisons. All crossings will be designed to provide for unobstructed flows and fish passage, and to minimize diversion potential and alteration of stream channels.

c. Implementation: The IDT is selected by the line officer to assist in locating the road to best fit resource objectives, and to develop detailed mitigation measures. For force account projects, Forest engineers will be responsible for developing and meeting design specifications.

The COR, ER or FSR ensures compliance with project plan requirements and the operating plan.

Erosion Control Plan (PRACTICE: 2-2)

a. Objective: To limit and mitigate erosion and sedimentation through effective planning prior to initiation of construction activities and through effective contract administration during construction.

b. Explanation: Land disturbing activities can result in short term erosion. By effectively planning for erosion control, sedimentation can be controlled or prevented. Within a specified period after award of a contract (presently 60 days prior to the first operating season in Timber Sale Contracts, per C6.3) the purchaser will submit a general plan which, among other things, sets forth erosion control measures. Operations cannot begin until the Forest Service has given written approval of the plan. The plan recognizes the mitigation required in the contract. A similar plan is required of miners and special use permittees.

c. Implementation: Design engineers develop detailed mitigation using an IDT. The detailed mitigations are reflected in the contract specifications and provisions. The intent of mitigation is to prevent construction-generated erosion, as well as that generated from the completed road, from entering watercourses. Contracted projects are implemented by the contractor or operator. Compliance with contract specifications and operating plans is ensured by the COR, ER, or FSR through inspection.

This practice is commonly applied to all road construction through contract clauses and specifications and will apply to road construction for timber sales, mining, recreation, special uses and other roadwork on NFS lands.

Timing of Construction Activities (PRACTICE: 2-3)

a. Objective: To minimize erosion by conducting operations during minimal runoff periods.

b. Explanation: The amount of erosion and sedimentation from road construction are affected by the magnitude of water runoff. An essential element of effective erosion control is to schedule operations during the dry season or when rain and runoff are unlikely. Purchasers will be required to schedule and conduct operations during the dry season or when rain and runoff are unlikely. Purchasers will be required to schedule and conduct operations to minimize erosion and sedimentation. Equipment will not be allowed to operate when ground conditions are such that excessive rutting and soil compaction could result. Such conditions will be identified by the COR or ER with the assistance of an earth scientist or other specialists as needed.

Erosion control work will be kept as current as practicable on active road construction projects. Construction of drainage facilities and performance of other contract work to control erosion and sedimentation will be required in conjunction with earthwork projects. The operator should limit the amount of area being graded at a site at any one time, and should minimize the time that an area is laid bare. Erosion control work must be kept current when road construction occurs outside of the normal operating season.

c. Implementation: Detailed mitigations developed by design engineers and an IDT will be included in the environmental analysis and in subsequent project plans and contracts.

Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and as specified in the project plan. Contracted projects are implemented by the contractor, or operator. Compliance with plans, specifications, and the operating plan will be achieved by the COR or ER through inspection.

Stabilization of Road Slope Surfaces and Spoil Disposal Areas (PRACTICE: 2-4)

a. Objective: To minimize erosion from exposed cut slopes, fill slopes, and spoil disposal areas.

b. Explanation: This is a preventive practice using bioengineering and other techniques to prevent or minimize erosion. Depending on site factors such as slope angle, soil type, climate, and proximity to waterways, many fill slopes, some cut slopes, and some spoil disposal areas will require vegetative and/or mechanical measures to provide surface soil stability. The level of stabilization effort needed is determined on a case-by-case basis by trained and qualified employees.

Revegetation includes the seeding of plant species grass, legumes, or browse species--or the planting of brush, or trees. Revegetation may also include fertilizer, soil amendments, and mulching or even watering to ensure success. A combination of plant types with both woody root systems and fiberous root systems usually produce better results than a single plant type such as grass. Native species are preferred and used wherever feasible. Where local native seed is not available, not economically

feasible or native plants would be ineffective in controlling erosion sterilized grass or cereal grain seed is applied.

Mechanical measures may include, but are not limited to: wattles, erosion nets, terraces, side drains, blankets, mats, riprapping, mulch, tackifiers, pavement, soil seals, and windrowing construction slash at the toe of fill slopes.

c. Implementation: Vegetative measures are generally a supplementary device, used to improve the effectiveness of mechanical measures, but can be effective and complete by themselves. They may not take effect for several seasons, depending on the timing of project completion in relation to the growing season.

Mechanical and vegetative surface stabilization measures will be periodically inspected to determine effectiveness. In some cases, additional work will be needed to ensure that the vegetative and/or mechanical surface stabilization measures continue to function as intended.

Initial project location, mitigation measures and management requirements are developed during the environmental analysis process. These are translated into project plans, contract provisions and specifications.

Project road inspectors, and their supervisors monitor work accomplishment and effectiveness, to ensure that design standards, project plan management requirements, and mitigation measures are met.

Control of Road Drainage (PRACTICE: 2-7)

a. Objective: Is to minimize the erosive effects of water concentrated by road drainage features; to disperse runoff from disturbances within the road clearing limits; to lessen the sediment yield from roaded areas; to minimize erosion of the road prism by runoff from road surfaces and from uphill areas.

b. Explanation: This is a preventive practice. A number of treatments can be used, alone, or in combination, to control unacceptable effects of road drainage. Methods used to reduce erosion include but are not limited to such controls as construction of properly spaced cross drains, water bars or rolling dips; installing energy dissipaters, apron, downspouts, gabions, flumes, overside drains and debris racks; armoring of ditches, drain inlets and outlets and removing or adding berms to control runoff. Accomplish dispersal of runoff on the road surface by such means as rolling the grade, outsloping or crowning. Installing water spreading ditches or contour trenching can disperse road water after the water leaves the road surface.

Dispersal of runoff reduces downstream peak flows and associated scouring of the channels and sediment transport.

Reduce sediment loads from road surfaces by adding aggregate or paving surfaces or by installing such controls as: sediment filters, settling ponds, and contour trenches. Soil stabilization can reduce sedimentation by lessening erosion on borrow and waste areas, on cut and fill slopes, and on road shoulders.

c. Implementation: Project location, design criteria and detailed mitigation are determined and documented during the environmental analysis process. These are then incorporated into the project plan.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications, and project criteria. Contracted projects are implemented by the contractor, or operator. Compliance with plans, specifications, and operating plans is ensured by the COR, ER, or FSR.

This practice is required in contracts when the need is identified in the project planning process.

Control of Road Drainage (PRACTICE: 2-7)

a. Objective: Is to minimize the erosive effects of water concentrated by road drainage features; to disperse runoff from disturbances within the road clearing limits; to lessen the sediment yield from roaded areas; to minimize erosion of the road prism by runoff from road surfaces and from uphill areas.

b. Explanation: This is a preventive practice. A number of treatments can be used, alone, or in combination, to control unacceptable effects of road drainage. Methods used to reduce erosion include but are not limited to such controls as construction of properly spaced cross drains, water bars or rolling dips; installing energy dissipaters, apron, downspouts, gabions, flumes, overside drains and debris racks; armoring of ditches, drain inlets and outlets and removing or adding berms to control runoff. Accomplish dispersal of runoff on the road surface by such means as rolling the grade, outsloping or crowning. Installing water spreading ditches or contour trenching can disperse road water after the water leaves the road surface.

Dispersal of runoff reduces downstream peak flows and associated scouring of the channels and sediment transport.

Reduce sediment loads from road surfaces by adding aggregate or paving surfaces or by installing such controls as: sediment filters, settling ponds, and contour trenches. Soil stabilization can reduce sedimentation by lessening erosion on borrow and waste areas, on cut and fill slopes, and on road shoulders.

c. Implementation: Project location, design criteria and detailed mitigation are determined and documented during the environmental analysis process. These are then incorporated into the project plan.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications, and project criteria. Contracted projects are implemented by the contractor, or operator. Compliance with plans, specifications, and operating plans is ensured by the COR, ER, or FSR.

This practice is required in contracts when the need is identified in the project planning process.

Constraints Related to Pioneer Road Construction (PRACTICE: 2-8)

a. Objective: To minimize sediment production and mass wasting from pioneer road construction.

b. Explanation: Pioneer roads are built to allow equipment access for construction of planned roadways. Pioneering is usually done within the roadway construction corridor of the planned road. To meet the objective of minimizing sediment the following constraints will be followed:

1) Confine construction of pioneer roads to the planned roadway construction limits unless otherwise specified or approved by the ER or COR.

2) Locate and construct pioneering roads to prevent undercutting of the designated final cut slope, avoid deposition of materials outside the designated roadway limits, and accommodate drainage with temporary culverts or log crossings.

3) Complete erosion control work prior to the rainy season and in accordance with contract, or project plan requirements.

4) Dewater sites on live streams crossed by pioneer roads with diversion devices (see Practice 2-15).

c. Implementation: Determine and document project location and describe mitigations set forth during the environmental analysis process. Incorporate them into subsequent project plans and/or contracts.

Project crew leaders and supervisors will be responsible for implementing force account projects according to construction specifications and as specified in the project plan.
Contracted projects are implemented by the contractor, or timber sale operator. Compliance with plans, specifications, and operating plans is ensured by the COR, FSR, or ER.

Timely Erosion Control Measures on Incomplete Roads and Stream Crossing Projects (PRACTICE: 2-9)

a. Objective: To minimize erosion and sedimentation from disturbed ground on incomplete projects.

Explanation: The best drainage design can be ineffective if erosion control has not been completed by the end of the normal operating season. Affected areas can include roads, road fills, tractor trails, skid trails, landings, stream crossings, bridge excavations, and firelines.

Preventive measures include:

1) Removal of temporary culverts, culvert plugs, diversion dams, or elevated stream crossings.

2) Installation of temporary culverts, side drains, flumes, cross drains, diversion ditches, energy dissipaters, dips, sediment basins, berms, debris racks, or other facilities needed to control erosion.

3) Removal of debris, obstructions and spoil material from channels and floodplains.

4) Planting vegetation, mulching, and/or covering exposed surfaces with jute mats or other protective material.

c. Implementation: Apply protective measures to all areas of disturbed, erosion-prone, unprotected ground that is not to be further disturbed in the present year. When conditions permit operations outside of the normal operating season, update the operating plan as necessary and keep erosion control measures sufficiently current with ground disturbance to allow rapid closure when weather conditions deteriorate. Do not leave project areas for the winter with remedial measures incomplete.

Develop project mitigation measures and layout requirements during the environmental analysis process. Incorporate them into subsequent project plans and/or contracts.

Project crew leaders and supervisors are responsible for ensuring that force account projects meet construction specifications and project criteria.

Contracted projects are implemented by the contractor or operator. Compliance with project plan criteria, contract specifications and operating plans is ensured by the COR, ER, or FSR.

Control of Sidecast Material During Construction and Maintenance (PRACTICE: 2-11)

a. Objective: To minimize sediment production originating from sidecast material during road construction or maintenance.

b. Explanation: Unconsolidated materials including rocks and boulders that are cast over the side of the road shoulder can roll directly into streams, damage downslope vegetation and create bare areas that are difficult to stabilize with vegetation. Where spoil does not directly reach a stream, it is still highly susceptible to erosion, dry ravel and mass instability, and subsequently can directly deliver sediment to a nearby stream. Site-specific limits and controls for side casting or end hauling are developed and documented during environmental analysis. Loose, unconsolidated sidecast material must not be permitted to enter SMZs, (see Practice 2-17).

Sidecasting is an unacceptable construction alternative in areas where it can adversely impact water quality. Prior to the start of construction, or maintenance activities, waste areas must be located where excess material can be deposited and stabilized. During road maintenance operations, potential sidecast and other waste material will be utilized on the road surface or removed to designated disposal sites.

The roadway will be constructed within reasonable limits of the lines, grades, and dimensions given in the engineering drawings and designated on the ground. Provisions for waste material disposal are included in every road construction and maintenance contract.

c. Implementation: Project location, selected disposal areas, and mitigation will be developed and documented during the environmental analysis.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria. Road maintenance plans are developed for each forest and include slide and slump repairs and disposal site locations for excess material.

Contracted projects are implemented by the contractor or timber sale operator. Compliance with project criteria, contract specifications, and operating plans will be enforced by the COR, ER, or FSR. Standard maintenance specifications have been prepared which include disposal area operation, disposal methods, and surface treatment.

Timber sale contracts include clause C5.4 to address temporary road maintenance specifications, which includes slide and slump repair, surface blading, and side casting during road maintenance.

Servicing and Refueling of Equipment (PRACTICE: 2-12)

a. Objective: 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.

b. Explanation: During servicing and refueling of logging and road construction equipment, any spilled pollutants can be transported by runoff to surface waters. If the volume of fuel exceeds 660 gallons in a single container, or if total storage at a site exceeds 1,320 gallons, project Spill Prevention, Containment and Counter Measures (SPCC) plans are required. Contaminated upland soils can be a long-term threat to surface and ground water quality. This threat must be managed by disposing of waste material properly, selecting service and refueling areas well away from wet areas and surface water; by using berms around such sites and by utilizing impermeable liners or other techniques to contain spills according to the Forest SPCC plan.

c. Implementation: The COR, ER, CI, or TSA are authorized to designate the location, size and allowable uses of service and refueling areas. Operators are required to remove service residues, waste oil and other materials from National Forest land. They must also be prepared to take responsive actions in case of a hazardous substance spill, according to the Forest SPCC plan.

Control of Construction and Maintenance Activities Adjacent to SMZs (PRACTICE: 2-13)

a. Objective: To protect water quality by controlling construction and maintenance actions within and adjacent to any streamside management zone so that the following SMZ functions are not impaired:

1) Acting as an effective filter for sediment generated by erosion from bare surfaces, road fills, dust drift, and oil traces;

2) Maintaining shade, riparian habitat (aquatic and terrestrial), and channel stabilizing effects;

3) Keeping the floodplain surface in a resistant, undisturbed condition to slow water velocities and limit erosion by flood flows.

b. Explanation: Construction and maintenance fills, sidecast, and end-hauled materials are kept out of SMZs except at designated sites to minimize effects on the aquatic environment. Factors such as stream class, channel stability, sideslope steepness, ground cover, and sideslope stability are taken into account in developing zone widths. In some situations, SMZ widths are established by records of decision and by EIS standards and guidelines (e.g. PACFISH EA, Northwest Forest Plan ROD). It is also necessary to stabilize fill slopes to prevent sediment accumulations in the streamside zone.

SMZs are determined and documented during the environmental analysis process by the IDT, which includes hydrologists, fishery biologists, and other specialists as required.

c. Implementation: Project location alternatives are formulated, and mitigation measures developed by the IDT are included into the contract by design engineers. Project crew leaders and supervisors are responsible for ensuring that force account projects meet maintenance and construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with mitigation measures, contract specifications, and operating plans is ensured by the COR, FSR, or ER.

Controlling In-Channel Excavation (PRACTICE: 2-14)

a. Objective: To minimize stream channel disturbances and related sediment production.

b. Explanation: During construction, heavy equipment may need to cross, or work in and near streams or lakes. This is permitted only as necessary in the construction, or removal of culverts and bridges and other facilities (e.g. water sources, boat ramp/launching sites, etc.) and only under specific protection requirements. The Engineering Representative (ER) is authorized to designate the location of crossings or work sites and coordinate with the contractor to manage heavy equipment.

Excavation during the installation of instream structures must follow all of the following minimum water quality protection requirements.

1) Unless otherwise approved, no excavation will be made outside of caissons, cribs, cofferdams, or sheet piling.

2) The natural streambed or lake bottom adjacent to the structure will not be disturbed without prior approval of the ER or COR.

3) If any excavation, or dredging is made at the site of the structure before caissons, cribs, or cofferdams are sunk in place, all such excavations will be restored to the original surface and the streambed or lake bottom must be protected with suitable stable material.

4) Material deposited within the stream or lake area from foundation, or other excavation will not be discharged directly into live streams or lakes, but will be put into settling areas as shown on the engineering drawings or as approved by the ER, or COR. (See Practice 2-15)

5) If the channel or lake bottom is disturbed during construction, it must be restored to its original configuration while minimizing any additional disturbance.

6) Disturbances of stream or lake banks are kept to a minimum. Disturbed banks are stabilized.

c. Implementation. Mitigation measures developed by the IDT are set forth in the environmental documentation and incorporated into the contract by design engineers. Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria.

Contracted projects are implemented by the contractor or operator. Compliance with mitigation measures, contract specifications, and operating plans is enforced by the CI, COR, FSR or ER.

Disposal of Right-of-Way and Roadside Debris (PRACTICE: 2-19)

a. Objective:

1) To ensure that organic debris generated during road construction is kept out of streams so that channels and downstream facilities are not obstructed.

2) To ensure debris dams are not formed which obstruct fish passage, or which could result in downstream damage from high water flow surges after dam failure.

b. Explanation: As a preventive measure, construction debris and other newly generated roadside slash developed along roads in the streamside management zone is disposed of by the following means as applicable: (See also Practice 2-11)

1) On Site:
   a) Piling and burning
   b) Burying
   c) Chipping
   d) Scattering
   e) Disposal in cutting units
   f) Windrowing at the base of fill slopes
   g) Incorporation {only in temporary roads}
2) Removal to agreed upon locations (especially stumps from the road prism).
3) A combination of the above.
4) Large limbs and cull logs are removed to designated sites outside the SMZ or relocated within the zone to meet aquatic resource management objectives.

c. Implementation: Criteria for the disposal of right-of-way and roadside debris will be established during onsite evaluation by an IDT. Project location and detailed mitigation measures are also developed and set forth in the environmental analysis and incorporated into project plans and/or contracts.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications.

Contracted projects are implemented by the contractor or operator. Compliance with plans, specifications, and operating plans is ensured by the CI, COR, or ER.

Maintenance of Roads (PRACTICE: 2-22)

a. Objective: To maintain roads in a manner which provides for water quality protection by minimizing rutting, failures, sidecasting, and blockage of drainage facilities all of which can cause erosion and sedimentation, and deteriorating watershed conditions.

b. Explanation: Roads normally deteriorate because of use and weather. This deterioration can be corrected by adequate maintenance and/or restriction of use occasionally new groundwater springs and seeps appear after a wildfire or unusually wet periods and saturate road surfaces. All roads are maintained to at least the following level:

1) Provide the basic maintenance required to protect the road investment and to ensure that damage to adjacent land and resources is prevented. This level of maintenance often requires an annual inspection to determine what work, if any is needed to keep ditches, culverts and other drainage facilities functional and the road stable. This level is the normal prescription for roads closed to traffic.

2) As a minimum measure, maintenance must protect drainage facilities and runoff patterns. Higher levels of maintenance will be chosen to respond to greater use or resource administrative needs.

3) Additional maintenance measures include surfacing and resurfacing, outsloping, clearing debris from dips and cross drains, armoring of ditches, spot rocking, culvert replacement and installing new drainage features.

For maintenance of all roads on active timber sales and other projects the responsible FSR and the purchaser or user agree on an Annual Road Maintenance Plan outlining responsibilities and timing of maintenance, before the beginning of the operating season. If the road is subjected to other commercial use, the Forest Service may collect deposits of facilitate road maintenance and to equitably assess maintenance cost of each user.

c. Implementation: Work is managed by the Forest Engineer who develops a road condition survey and a maintenance plan. Maintenance levels are designated for each road in a timber sale area, as part of the TSPP, with road maintenance levels documented in the sale plan. Maintenance is a timber purchaser or user responsibility, and compliance is administered by the ER and SA.

On system roads outside of active timber sales, project crews, or contract crews perform road maintenance under supervision of a crew leader.

Road Surface Treatment to Prevent Loss of Materials (PRACTICE: 2-23)

a. Objective: To minimize the erosion of road surface materials and consequently reduce the likelihood of sediment production from those areas.

b. Explanation: Unconsolidated road surface material is susceptible to erosion during precipitation events. Likewise, dust derived from road use may settle onto adjacent water bodies and streamcourses. Contractors, purchasers, special users and Forest Service project Leaders undertake measures to minimize loss of road material when the need for such action is identified.

Road surface treatments include watering, dust oiling, penetration oiling, sealing, aggregate surfacing, chip-sealing, or paving, depending on traffic, soils, geology, and road design specifications.

c. Implementation: Project location and detailed mitigation will be developed by the design engineer, using an interdisciplinary approach, to meet project criteria.

Project crew leaders and supervisors will be responsible for ensuring that force account projects meet construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with project criteria, contract specifications, and operating plans is ensured by the COR, CI, ER, or FSR.

Obliteration or Decommissioning of Roads (PRACTICE: 2-26)

a. Objective: To reduce sediment generated from temporary roads or unneeded system roads by obliterating or decommissioning them at the completion of their intended use.

b. Explanation: System roads will be identified during transportation planning for decommissioning/obliteration. These roads will be analyzed under the NEPA process for removal from the transportation system or downgraded in maintenance level. Temporary roads are constructed for a specific short-term purpose and other roads will be found to no longer be necessary. For example, ski area development roads and logging spurs on a timber sale. In order to prevent continued low level casual use, such roads will be obliterated at the completion of their intended use. Use of any roads beyond its prescribed time should not be permitted, as the road would be subject to continued, uncorrected damage, and could become a chronic sediment source.

Effective decommissioning and obliteration is generally achieved through a combination of these measures:

1. Road is effectively drained (e.g. waterbars, rolling dips, outsloping and treated to return the road prism to near natural hydrologic function).

2. Road is effectively blocked to vehicle access.

3. Crossings are removed and natural drainage restored. (See also Practice 2-16)

4. Treated surfaces are stabilized through tillage, ripping, fertilization and/or revegetation.

5. Slideslopes are reshaped and stabilized.

c. Implementation: For timber sales, temporary road closure stabilization and removal of temporary structures are accomplished by the timber purchaser. Compliance with plans and TSC will be enforced by the SA.

Obliteration or decommissioning of the road to the level that it is blocked to vehicular traffic, culverts and bridges removed, and the roadway stabilized as required by the TSC. Further revegetation needs are addressed in sale area improvement plans to achieve resource production above that required for stabilization of the road bed surface.

Temporary road location and stabilization measures are determined by the SA by agreement with the purchaser. The SA may request the advice of an earth scientist in determining the most appropriate location for stabilization measures and which measures are required.

Project crew leaders and supervisors will be responsible for ensuring that other temporary roads, developed by force account, meet construction, specifications and project criteria. Temporary roads on NFS lands that are allowed through special use permits, or easements will be subject to the same obliteration or decommissioning requirements as temporary roads on timber sales. District Rangers or their representatives will be responsible for assuring the obliteration or decommissioning of such roads is accomplished.

Surface Erosion Control at Facility Sites (PRACTICE: 2-28)

a. Objective: Reduce the amount of surface erosion taking place on developed sites and the amount of soil entering streams.

b. Explanation: On lands developed for administrative sites, ski areas, campgrounds, parking areas, or waste disposal sites, substantial acreage may be cleared of vegetation. Erosion control methods must be implemented to keep the soil in place, and to minimize suspended sediment delivery to streams. Some examples of erosion control methods that could be applied at a site for keeping the soil in place would be applying grass seed, erosion blankets, tackifiers, hydromulch, paving, or rocking of roads, water bars, cross drains, or retaining walls.

To control the amount of soil entering streams, the natural drainage pattern of the area should not be changed; sediment basins and sediment filters will be established to filter surface runoff; and diversion ditches, and berms will be built to divert surface runoff around bare areas. Construction activities will be scheduled to avoid periods of the year when heavy runoff is likely to occur.

c. Implementation: This management practice is used as a preventative and remedial measure for any site development project that will remove the existing vegetation and ground cover and leave exposed soil. This practice is applied during the planning phase for NFS projects, or by special use permit requirements for private development on public land.

Mitigation measures will be developed by the IDT and incorporated in the project by the design engineer. Project crew leaders and supervisors will be responsible for implementing force account projects to construction specifications and project criteria.

Contracted projects are implemented by the contractor, or operator. Compliance with plans, specifications, and operating plans is ensured by the COR, ER, and FSR.

Control of Sanitation facilities (PRACTICE: 4-4)

a. Objective: The objective is to protect surface and subsurface water from bacteria, nutrients, and chemical pollutants resulting from the collection, transmission, treatment, and disposal of sewage at Forest Service sites.

b. Explanation: Toilet facilities are provided at developed recreation sites. The type and number depends on the capacity of a given site. Sanitation facilities (which may vary from a portable toilet to a sophisticated treatment plant) will be planned, located, designed, constructed, operated, inspected and maintained to minimize the possibility of water contamination. Toilet facilities may also be made available at dispersed sites with the same goal of preventing water contamination.

c. Implementation: The appropriate disciplines will perform field investigations to evaluate soil, geological, vegetative, climatic, and hydrological conditions. The location, design, inspection, operation and maintenance must be performed, or controlled by qualified personnel who are trained and familiar with the sanitation system and operational guidelines. Proximity of toilets to open water and other sensitive areas will follow guidelines.

State and local authorities will be consulted prior to the installation of new sanitation facilities, or modifications of existing facilities to assure compliance with all applicable State and local regulations. All phases of sanitation management (planning, design, inspection, operation, and maintenance) will be coordinated with State and local Health Departments and RWQCB representatives.

Slope Limitations for Mechanical Equipment Operation (PRACTICE: 5-2)

a. Objective: To reduce gully and sheet erosion and associated sediment production by limiting tractor use.

b. Explanation: This is a preventive measure that limits excessive surface disturbance and keeps surface water from concentrating. This measure facilitates making allowances for proper drainage of disturbed areas by limiting tractor operation to slopes where corrective measures such as water bars can be effectively installed.

Evaluation criteria used to determine slope restrictions are onsite evaluations of soil stability, mass stability and geology, climate conditions, and soil water holding capacity. These field determinations will be made as part of the environmental documentation process during project planning.

c. Implementation: The project planners will be responsible for insuring that appropriate tractor operations provisions are included in the decision and activity controlling documents. This practice will be implemented on vegetative manipulation projects where determined to be appropriate by the IDT.

The project leader will be responsible for application of the management requirements and mitigation measures on site-specific areas, with the assistance of selected IDT members.

The COR will be responsible for ensuring implementation of the contract provisions that pertain to tractor operation on steep slopes.

Forest and Hazardous Substance Spill Prevention Control and Countermeasure (SPCC) Plan (PRACTICE: 7-4)

a. Objective: To prevent contamination of waters from accidental spills.

b. Explanation: This is a preventive and corrective practice. The Forest SPCC Plan is a document designed to guide the emergency response to spills, or discovery of hazardous materials (HazMat) within the boundaries of each National Forest. Spills are defined as either a intentional or accidental release known, or unknown substance; or the incidental discovery of a known, or unknown substance. Each Forest SPCC Plan must be compatible with appropriate County SPCC Plans that also guide emergency responses to spills and discoveries of HazMat. Forest SPCC Plans are prepared according to references and County SPCC Plans are prepared according to State guidelines.

The composite of Forest and County SPCC Plans provide a process to coordinate the various local, State and Federal agencies that have emergency response capabilities, into a unified force that can effectively react to actual, or threatened releases or HazMat within the Forest boundary. Factors considered for each spill include, but are not limited to, the specific substance spilled, the quantity, its toxicity, proximity of the spill to waters, and the hazard to life and property.

A Spill Prevention Containment and Counter Measures Plan must be prepared if the total oil products on site in above-ground storage exceed 1320 gallons, or if a single container exceeds a capacity of 660 gallons. Other HazMat (pesticides, raw sewage, road oils) also have specific criteria that determine when a SPCC Plan must be prepared and implemented.

c. Implementation: Each Forest Supervisor will be responsible for designating emergency spill response coordinators and documenting names with telephone numbers of agencies to call regarding response to emergency incidents. Individual Forests should maintain an inventory of materials to use during the emergency response phase of HazMat within their capability. Disposal methods and sites must be coordinated with EPA, State, and local officials responsible for safe disposal.

All Forests will maintain a SPCC plan, which meets the criteria of the referenced directives in Section 13, and require appropriate special use permittees, timber sale operators, other contractors, and Forest users to develop companion SPCC Plans before operating within the National Forest boundary. Forest SPCC Plans and Forest users SPCC Plans must be approved by the Forest Supervisor. Timber sale SPCC Plans must be approved by a licensed, professional engineer.

Water Quality Monitoring (PRACTICE: 7-6)

a. Objective: To collect representative water data to determine base line conditions for comparison to established water quality standards which are related to beneficial uses for that particular watershed.

b. Explanation: Water quality monitoring is a mechanism, which evaluates the implementation and effectiveness of a management prescription in protecting water quality (beneficial uses identified in the environmental analysis.) A water quality monitoring plan will be part of an environmental document, a management plan, or a special use permit or it will be developed in response to other needs.

c. Implementation: A water quality monitoring plan will be written, or reviewed by a hydrologist and will be implemented by the hydrologist, or by other qualified Forest personnel. The actual analysis of the data will be performed by the hydrologist; State certified laboratory, or other trained Forest personnel, or combinations of these as appropriate. (See also Practices 4-2 and 4-3)

Interpretation of the data and any reporting will be accomplished by the hydrologist, or trained personnel. The EPA STORET system will be used for computer storage of all water quality data collected.

Management by Closure to Use (Seasonal, Temporary, and Permanent) (PRACTICE: 7-7)

a. Objective: To exclude activities that could result in damages to either resources or improvements, such as roads and trails, resulting in impaired water quality.

b. Explanation: A watershed may be in such a sensitive condition that any use during a given portion of the year, usually the rainy season, could result in soil and/or land stability problems and associated adverse effects to water quality. In other cases, water quality may already be impaired and improvement not considered to be practical without substantially reducing, or eliminating further use.

These conditions could have resulted from past land use, or from natural disasters. Closure to use will be used when the condition of the watershed must be protected to preclude adverse water quality effects. (See also Practices 1-5 and 2-9)

c. Implementation: Closures will be made when the Forest Supervisor, District Ranger, or Forest Service Officer responsible for resource protection, determines that a particular resource, or improvement needs protection from use. An IDT or resource specialist normally recommends closure. The decision will be made to close an area after an evaluation of alternative methods of protection dictates that closure is a required action. This is usually a last step protective measure.

Project Design Standards

The following project design standards intend to protect water quality during project implementation. Many are addressed at least peripherally within the BMPs and won't necessarily be repeated in their entirety here.

Areas where riverbank and adjacent ground disturbance will need to occur shall be identified in advance of construction and limited to areas approved by the USFS. Disturbance shall be limited to the minimum level necessary to complete construction activities. All supervisory construction personnel shall be informed of environmental concerns, permit conditions, and final rehabilitation specifications prior to and during construction. Timely measures taken for erosion control will be prioritized based on the proximity to the river of each particular disturbed location.

Filter fences and/or catch basins shall be placed below all construction activities at the edge of the Trinity River to intercept sediment before it reaches the waterway. The structures shall be installed prior to initiating any 'grubbing' or grading activities.

Spoil site(s) shall be located and shaped such that they do not drain in a 'point-source' manner directly into a water surface feature. If not an option, then catch basins shall be constructed to intercept sediment before it reaches the surface water. Spoil sites shall be graded and revegetated to reduce the potential for erosion.

Turbidity associated with proposed project activities shall not exceed the North Coast Regional Water Quality Control Board objectives for turbidity in the Trinity River Basin. Turbidity shall not increase more than 20% above naturally occurring background levels, except if greater levels are defined within dilution zones via the permit (or if obtaining a waiver thereof).

The Forest Service shall require the contractor to prepare and implement a spill prevention and containment plan in accordance with applicable federal and state requirements. Hazardous fuels, oil, and solvents shall not be stored or transferred within 150 feet of the Trinity River channel.

The Forest Service shall include a requirement in the construction contract documents that any construction equipment coming in contact with the Trinity River shall be inspected daily for leakage prior to entering the flowing channel. Equipment will be steam-cleaned to remove external oil, grease and mud.

The Forest Service shall include provisions in the construction bid documents indicating that the contractor shall implement a dust control program. Water sweeping shall occur regularly to minimize airborne dust from staging areas, parking areas, access roads, stockpiles, and disturbed soil surfaces. Dust- activating ground disturbance activities shall be suspended when sustained wind speeds exceed 20 miles per hour.