Chapter 3. Affected Environment and Environmental Consequences

3.1 Introduction to the Analysis

This chapter describes the existing resources at the Bucktail site and presents an analysis of the potential environmental impacts associated with implementing the proposed activities. The anticipated impacts of the alternatives are analyzed in this chapter. The analyses are presented by environmental resource area. The analysis for each resource area includes discussions of the existing environmental setting, applicable CEQA significance criteria, potential environmental impacts, environmental commitments, project design features and CEQA mitigation measures. The contents of each of these discussions are described briefly in the following subsections.

3.1.1 Affected Environment/Environmental Setting

The affected environment/environmental setting section for each resource area describes the existing conditions using the most current information available. Conditions existing at the time of the Notice of Preparation for the Master EIR (in March 2008) are used to establish the environmental baseline for CEQA purposes (CEQA Guidelines Section 15126.6(e)(1)). Throughout the remainder of this document, this baseline will provide the basis for determining whether the Proposed Project's environmental impacts are likely to be significant under CEQA.

3.1.2 Environmental Consequences/Impacts and Mitigation Measures

The requirements of NEPA and CEQA are not necessarily the same, however, both require the consideration of potential environmental impacts in the evaluation of a proposed agency action. CEQ regulations (40 CFR 1508.27) provide NEPA guidance as to the requirement to evaluate impacts in an environmental document. General NEPA procedures are set forth in the CEQ regulations (40 CFR 1500-1508). Under CEQA, the concept of environmental "impacts" or environmental "effects" (the terms are used synonymously), as well as the determination of the significance of those impacts, is focused on changes in the existing physical conditions in the affected environment. The project impacts are identified and the level of significance of the impacts is determined in the following sections of this chapter. The impact analyses consider the type, size, location, and intensity of the potential effects associated with the activities proposed at the Bucktail site. The subsections presented in the Environmental Consequences section for each resource area are described briefly below.

Methodology

This subsection identifies the methods used to analyze impacts, and the key assumptions used in the analysis.

CEQA Significance Criteria

This subsection presents the criteria and thresholds used to identify potentially significant effects on the environment. For the most part, the significance criteria discussed in these subsections apply to CEQA, in accordance with PRC section 21082.2 and CEQA Guidelines sections 15064 and 15065. CEQA "thresholds" include guidance provided by the CEQA Guidelines, agency standards, legislative or regulatory requirements, as applicable, and professional judgment. All impacts that do not exceed the stated significance criteria described for each section are assumed to be less than significant under CEQA and are therefore not discussed in detail (PRC, § 21100 and CEQA Guidelines § 15128). The exception is for Indian trust assets and environmental justice, which are not specifically CEQA issues.

Summary of Impacts Table for CEQA

At the beginning of the Impacts and Mitigation Measures subsection is a table that identifies all of the impacts evaluated for that particular environmental issue area. Included in this summary table are the various levels of CEQA significance (i.e., no impact, less than significant, significant) for the Proposed Project and No Project alternatives. The tables also indicate what the CEQA level of significance would be after mitigation is implemented.

Impacts and Mitigation Measures/Project Design Features

In this subsection, each impact statement is presented, followed by a detailed impact analysis. CEQA mitigation measures that would reduce significant impacts associated with implementation of the Proposed Project to less than significant levels are identified after each impact discussion and are also provided in Appendix B. Although these measures are referred to as mitigation measures for CEQA purposes, they are considered environmental commitments and/or project design features for the purposes of NEPA. For NEPA purposes, environmental commitments and project design features are incorporated into the Proposed Project to reduce or eliminate adverse effects during implementation. An alphanumeric coding system that corresponds to the mitigation measures found in Appendix E of the Master EIR is used to identify each mitigation measure. Throughout this document, the term mitigation measure means both CEQA mitigation measures and NEPA environmental commitments and design features.

3.1.3 Mitigation and Monitoring Program

California PRC section 21081.6, subdivision (a), requires lead agencies under CEQA to "adopt a reporting and mitigation monitoring program… in order to mitigate or avoid significant effects on the environment." CEQA mitigation measures (design features already incorporated into the Proposed Project for NEPA purposes) that will be implemented in association with the Proposed Project are clearly identified and presented in Appendix B in language that will facilitate establishment of a monitoring and reporting program. Relevant information described in Appendix B will also be included as environmental commitments in conjunction with any mitigation measures adopted by the Regional Water Board as conditions for project approvals. The conditions for project approvals will be included in a MMRP to verify compliance. The MMRP for the Proposed Project is included as Appendix B. The approval of such a program will be part of any action taken by the Regional Water Board with respect to the Proposed Project. When other state, regional, or local agencies subject to

CEQA approve portions of the Proposed Project under their jurisdiction or regulatory power, these "responsible agencies" will be required to adopt their own MMRPs (14 CCR 15097, subd. (d)). In working with the Regional Water Board (CEQA lead agency), Reclamation and the BLM (NEPA co-leads) have agreed to implement mitigation measures/project design features identified in the MMRP.

3.2 Land Use

This section describes existing and planned land uses in the project area vicinity and evaluates the potential impacts to land uses from project implementation. More information about this resource is presented in the Master EIR (Section 4.2); that information is incorporated herein by reference.

3.2.1 Affected Environment/Environmental Setting

Existing Land Uses

The land within the Bucktail site boundary (110.38 acres) is a mixture of public and private land. The BLM manages 39.95 acres of land within the ESL and the remainder (70.43 acres) is privately owned. The Bucktail site is located off of Browns Mountain Road west of Lewiston. At the downstream end of the site, there are homes located on river right in a residential development off of Steelhead Circle. The upstream end of the project area also has houses just outside the project boundary on river right; these are accessed from Salt Flat Road. On river left, there are homes and other structures located just outside the project area boundary that are accessed off Lewiston Road.

Public land in or adjacent to the project area is primarily used for resource management and recreation and is managed for multiple uses in conformance with specific agency guidance documents. BLM-managed lands are administered in accordance with BLM's Redding RMP. This plan discusses the general condition of natural resources in the plan areas and prescribes appropriate land use management for lands within the plan's jurisdiction. A discussion of BLM's Redding RMP in Section 4.2.2 of the Master EIR is hereby incorporated by reference.

Weaverville is the largest community in Trinity County with a 2010 population of 3,600 (U.S. Census Bureau 2011). It is located 45 miles west of Redding on SR-299, adjacent to Weaver Creek, a tributary to the Trinity River. Lewiston is 35 miles west of Redding, and 15 miles east of Weaverville. Lewiston has a population of approximately 1,300 people (U.S. Census Bureau 2000). The Bucktail site is located in the Lewiston Community planning area (Trinity County 1986).

The small community of Lewiston, which is near the project area, is situated adjacent to the Trinity River where terrain is relatively gentle. Development in this rural community is primarily residential, typified by scattered single-family residences and mobile homes. Future development is restricted by the proximity of parcels to the Trinity River, because many of these parcels are zoned Flood Hazard and Open Space. Existing land uses typical of the area are primarily residential, timber and other resource production, recreation, and open space. The Trinity River within and adjacent to the project area is used by anglers, rafters, wildlife watchers, and tourists. The river is accessible at several public and private locations throughout the area, including at the Bucktail Hole boat launch, which is in the project area.

Local Land Use Planning

Trinity County General Plan

The project area is located in Trinity County. The Trinity County General Plan (Trinity County 2003) applies to privately owned lands in the project area; these lands fall under several of the county's land use designations. The county has established zoning districts for planning purposes. For a detailed discussion of Trinity County General Plan land uses and definitions, refer to the Master EIR (Section 4.2, Table 4.2-1).

Lewiston Community Plan

The Lewiston Community Plan (Trinity County 1986) covers approximately 16 square miles (10,227 acres) centered around the Trinity River from Lewiston Lake to slightly downstream of Grass Valley Creek. There are approximately 7.9 miles of river frontage in the rural community of Lewiston; private lands account for 39 percent of lands bordering the river. Neighborhoods that are adjacent to the Trinity River include Rush Creek Road, the Community Core, the Historic District, Goose Ranch Road, Salt Flat, Old Lewiston Road, and Bucktail Subdivision. The variety of land uses along the river in Lewiston include commercial, residential, timber resource, agricultural, and open space. These occur at varying densities, which generally reflect available public services and environmental constraints. There is a trend in Lewiston to subdivide parcels, which has resulted in the creation of smaller lots and increased densities. This has led to a slight increase in residential land uses in the Lewiston Community Plan area.

The Bucktail site is within the Lewiston Community plan area and would be located in the Old Lewiston Road neighborhood. This neighborhood typically includes Rural Residential, Village, Open Space, and Resource land use designations. These land uses occur at varying densities that generally reflect available public services and environmental constraints. Public and private fishing and river access areas occur throughout the plan area.

Trinity County Zoning

The Trinity County Zoning Ordinance is discussed in Section 4.2 of the Master EIR, including details about Trinity County zoning districts that apply to lands in the area. Substantial portions of the project area are located in the 100-year floodplain of the Trinity River as determined by the Federal Emergency Management Agency (FEMA). Areas in the 100-year floodplain have been designated as Zone A, Zone AE, Zone X, and Zone X500 Flood Hazard Areas[1] and all sites within the 100-year floodplain are designated by Trinity County as Scenic Conservation Zones.

[1] Zone A is an area inundated by 100-year flooding for which no Base Flood Elevation (BFE = 100-year flooding water surface elevation) has been determined. Zone AE is an area inundated by 100-year flooding for which the BFE has been estimated. Zone X is an area inundated by 100-year flooding with average depth of less than 1 foot, or with drainage areas less than 1 mi^2, or areas protected by levees from a 100-year flood event. Zone X500 is an area between the 100- and 500-year floodplain.

Relevant Land Use Plan

BLM's Redding Field Office manages public lands in the Trinity River Basin in accordance with its Redding RMP (USDI BLM 1993), which in turn requires compliance with the Aquatic Conservation Strategy for Management of Habitat for Late-Successional and Old-Growth Related Species within the Range of the Northern Spotted Owl. The RMP discusses the general condition of natural resources in the plan area and prescribes appropriate land use management for lands within the plan jurisdiction, including BLM-managed lands encompassed within the site boundaries for the Proposed Project. See Section 4.2.2 of the Master EIR for more information about the RMP and Appendix C of this EA/IS for the Aquatic Conservation Strategy Consistency Evaluation for the Proposed Project.

The Proposed Project applies a 2006 Pechman Exemption from a stipulation entered by the court in litigation regarding Survey and Manage species and the 2004 ROD related to Survey and Manage requirements[2]. In 2006, the District Court (Judge Pechman) invalidated the 2004 RODs, eliminating Survey and Manage requirements due to NEPA violations. Following the District Court's 2006 ruling, parties to the litigation entered into a stipulation exempting certain categories of activities from the Survey and Manage standards and guidelines, including both pre-disturbance surveys and management of known sites. The Proposed Project meets Exemption C because it is a river restoration project that incorporates the placement of large wood and channel and floodplain reconstruction. Appendix D of this EA/IS shows the Pechman exemptions.

The TRRP project reach is federally designated with a recreational status under the Wild and Scenic System. BLM is the federal river manager from Lewiston Dam to the North Fork Trinity. As the river manager, BLM must follow management guidelines identified in the WSRA. More information on Wild and Scenic River management is provided in Section 4.8 of the Master EIR and Section 3.8 of this EA/IS. In addition, public lands in the Trinity River corridor are managed to meet the BLM Visual Resource Management Class II objective: "to retain the existing character of the landscape. The level of change to the characteristic landscape should be low." Therefore, management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape (USDI BLM 1993).

3.2.2 Environmental Consequences/Impacts and Mitigation Measures

Methodology

The methodology used for the land use impact analysis involved an assessment of the compatibility of the Proposed Project with relevant plans and policies and a review of the Trinity County General Plan, the Lewiston Community Plan, applicable land use plans, and zoning in relation to surrounding land uses and site features. The analysis was conducted through a literature review and site visit.

[2] *Northwest Ecosystem Alliance v. Rey*, No. 04-844-MJP (W.D. Wash., Oct. 10, 2006).

CEQA Significance Criteria

The following significance criteria were developed in the Master EIR and are based on guidance provided by CEQA guidelines. Impacts to land uses would be significant under CEQA if they would:

- Result in land uses that are incompatible with existing and planned land uses adjacent to actions described as part of the Proposed Project;
- Conflict with any applicable land use plan, policy, ordinance, or regulation of an agency with jurisdiction over the Proposed Project adopted for the purpose of avoiding or mitigating an environmental effect;
- Disrupt or divide the physical arrangement of an established community;
- Result in substantial nuisance effects on sensitive land uses that would disrupt use over an extended time period;
- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use; or
- Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan.

Impacts and Mitigation Measures/Project Design Features

Table 5 summarizes land use impacts that could result from implementation of the No Project and Proposed Project alternatives.

Table 5. Summary of Potential Land Use Impacts for the No Project and Proposed Project Alternatives.

No Project Alternative	Proposed Project	Proposed Project With Mitigation
Impact 3.2-1. Implementation of the project could disrupt existing land uses adjacent to the rehabilitation site.		
No Impact	Less than significant	Not applicable[1]
Impact 3.2-2. Implementation of the project could be inconsistent with the goals, policies, and objectives of the BLM RMP, the USFS LRMP, the Trinity County General Plan, or other local community plans, policies, and ordinances.		
No Impact	Less than significant	Not applicable[1]
Impact 3.2-3. Implementation of the project may affect the availability of a locally important mineral resource recovery site.		
No Impact	Less than significant	Not applicable[1]

[1] Because this potential impact is less than significant, no mitigation is required.

Impact 3.2-1: Implementation of the Proposed Project could disrupt existing land uses adjacent to the rehabilitation site.

No Project Alternative

Under the No Project alternative, no restoration activities would occur. Therefore, there would be no impact.

Proposed Project

The Proposed Project would not introduce a new land use within the boundaries of the site, nor would it obstruct the water conveyance functions of the 100-year floodplain. Project activities that aim to restore floodplain functions would have long-term benefits for many land uses that are located along the Trinity River.

The Proposed Project is designed to minimize short-term disruptions to the community of Lewiston that could occur because of rehabilitation activities in the project area. Construction and staging areas would be located in and adjacent to the 100-year floodplain, which is designated as a Scenic Conservation overlay. Activities at the Bucktail site would occur on both BLM-managed public lands and private lands (refer to Figure 2). Staging, construction, and access on private lands in and adjacent to the site boundaries would require landowner approval. Any work within adjacent road easements would require Trinity County encroachment permits and traffic control for ingress and egress. Residential development located near the project area would be outside the areas of direct impact associated with the Proposed Project. There are no residential developments within the ESL boundaries, but residences are located nearby. Although private residences are located near the boundaries, project activities would not interfere with, preclude, or conflict with adjacent land uses.

Based on the analysis above, potential conflicts with or disruptions to adjacent land uses resulting from activities associated with the Proposed Project would be temporary and less than significant. As discussed in Section 3.16, Transportation and Traffic, no road closures would result from implementation of the Proposed Project. Access to adjacent residences would be maintained during project construction and post-construction monitoring activities (refer to Appendix B).

Construction activities in the river channel could interrupt adjacent land uses for short periods; but they would not preclude the use of nearby businesses or residences. Construction and transportation associated with the Proposed Project could produce minor nuisance effects (i.e., air quality, visual resources, and noise) at some nearby residences; however, such impacts would be temporary and would not significantly affect the ability to use adjacent lands. Project impacts associated with air quality, visual resources, and noise are discussed in Sections 3.11, 3.12, and 3.14, respectively.

Impact 3.2-2: Implementation of the Proposed Project may be inconsistent with the goals, policies, and objectives of the STNF LRMP, BLM's RMP, and the Trinity County General Plan, as well as local community plans, policies, and ordinances.

No Project Alternative

Under the No Project alternative, project activities would not occur. Therefore, there would be no impact.

Proposed Project

Implementation of activities at the Proposed Project site would not introduce land uses that are incompatible with existing or proposed land uses, nor would rehabilitation activities conflict with any applicable land use plan, policy, or ordinance. The discussion provided for this impact in Section 4.2.2 of the Master EIR summarizes the Proposed Project's consistency with federal, state, and local plans, policies, and ordinances. The impacts would be less than significant.

Impact 3.2-3: Implementation of the Proposed Project may affect the availability of a locally important mineral resource recovery site.

No Project Alternative

Under the No Project alternative, no rehabilitation activities would be implemented. Therefore, there would be no impact.

Proposed Project

There are no active mining claims within the project area, and there are no locally important mineral recovery sites identified by the state within the boundaries of the site. The TRRP has worked closely with the mining community to locate site boundaries in a manner that minimizes any impacts to future mineral recovery efforts and would continue to be involved in dialog with the mining community to address concerns related to mining. Because there are no state-identified locally important mineral recovery sites within the boundaries of the Proposed Project site, this impact would be less than significant.

3.3 Geology, Fluvial Geomorphology, Minerals, and Soils

Section 4.3 of the Master EIR describes geologic, fluvial geomorphic, and soils resources in the vicinity of the Proposed Project site and that information is incorporated herein by reference. This section describes site-specific information important for the analysis and evaluates the potential impacts to these resources from implementation of the Proposed Project.

3.3.1 Affected Environment/Environmental Setting

Fluvial Geomorphology

A discussion of the regional and local fluvial geomorphology is included in the Master EIR (Section 4.3). The geomorphic environment of a site is directly affected by the hydrology, sediment regimes,

channel bed composition, and riparian vegetation present. Modification of the channel and floodplain configuration has altered and simplified the natural diversity of geomorphic processes and products within the area, hence limiting the variety of channel forms, habitats, and vegetation structures. Extensive modification of historic and modern alluvial landforms within the area is evident by the aerial extent of channel modifications resulting from historic mining and, more recently, impacts related to the TRD. A discussion of these modifications is provided in the Master EIR (Section 4.10). Table 6 provides a summary of the geomorphic features for the project area that are shown on Figure 4.

Table 6. Geomorphic Features within the Project Area Boundaries.

Geomorphic Feature	Acres
Modified Terrace*	58.48
Tailings	19.85
Floodplain	9.83
Upland Hillslope	5.28
Vegetated Riparian Berm*	3.54
Bar	1.01
Coarse Fill	0.04
Levee	0.03

* = Human induced geomorphic feature.

The mainstem Trinity River flows generally southwest through the Bucktail site. The following description uses the river left or left bank and river right or right bank concept to describe the location of resources on each side of the river. River left and river right are defined from the standpoint of someone looking downstream.

The Bucktail site is located on the Trinity River between RM 105.45 and 107.0. The site begins approximately at the Bucktail Bridge and extends upstream approximately 1.5 miles to just downstream of RM 107.0. The downstream end of the site is marked by Browns Mountain Road and the Bucktail Bridge. The hydrology of the site is influenced almost exclusively by the mainstem Trinity River and associated operation of the TRD (i.e., Lewiston Dam and Trinity Dam). To a lesser extent, development and runoff from adjacent roads and hillsides following precipitation also affect the site. A review of historic aerial photographs between 1944 and 2012 provides insight into channel changes over time at this site (HVT et al. 2013). These photographs show a dramatic decrease in bankfull channel width between 1944 and 2012. Reduced flows from Trinity Dam operations narrowed the existing bankfull channel width of 200-250 feet down to its current bankfull width of between 100 and 120 feet. Safety of Dam releases, tributary floods, and ROD high flow releases have exacerbated the problem, depositing additional fine sediment along the left bank and scouring the channel into its current rectangular form with near vertical banks. The channel upstream of RM 105 is primarily comprised of gravel and cobble (HVT et al. 2013).

Several constraints at the Bucktail site may limit potential designs to the mainstem channel and left bank. Infrastructure constraints at the site include: 1) Bucktail Bridge (Browns Mountain Road Bridge) is located at RM 105.45 at the downstream end of the project reach; and 2) Private property inholdings and houses. In addition to the infrastructural constraints listed above, three geological/physical constraints exist at the site: 1) Valley wall and bedrock confinement along the entire right bank channel through the project reach (RM 105.65 – 106.0); 2) Need to maintain seasonal fishing access to the Bucktail boat launch; and 3) FEMA requires that the 100-year flood water surface elevation at the site not be raised or lowered by more than one foot. An existing bridge (Browns Mountain Road Bridge or the Bucktail Bridge) at the downstream end of the project reach constricts the channel and backs water up throughout the Bucktail site. The bridge is proposed for replacement; the currently proposed replacement bridge would have a longer span and would reduce the constriction through the bridge section.

Mineral Resources

The geologic properties of many of the units in the Klamath Mountains Province (KMP) are related to their origins as oceanic crust and/or their intrusion by plutonic bodies. These properties have resulted in mineralization that is widely distributed. Many minerals of economic importance are present, including gold, copper, zinc, chromite, manganese, platinum, silver, and mercury. These minerals have been mined from the advent of European settlement to the present by a variety of methods.

Trinity County was historically a gold mining region, and many unpatented mining claims exist along the Trinity River. Both lode (hardrock) mines and placer (alluvial gravel) mines were present in the watershed, with activity from 1848 to the present. A map of 2009 active mining claims is provided in the Master EIR.

The tailing deposits associated with large-scale placer mining provide a substantial source of aggregate required in various construction projects. Since World War II, mineral extraction activities have focused on aggregate resources. Effective January 1, 2016, Senate Bill 637 amended Fish and Game Code Section 5653 and added Section 13172.5 to the Water Code, making it illegal to use suction dredges in California. Some gold mining activity continues throughout the Trinity River basin in the form of panning and other non-motorized techniques. Placer mining has left tailing deposits that are apparent at the rehabilitation sites and that continue to influence the form and function of the Trinity River. Over time, aggregate mining of alluvial deposits and reworking of hydraulic tailings have resulted in additional channel modifications and changes in sediment supply.

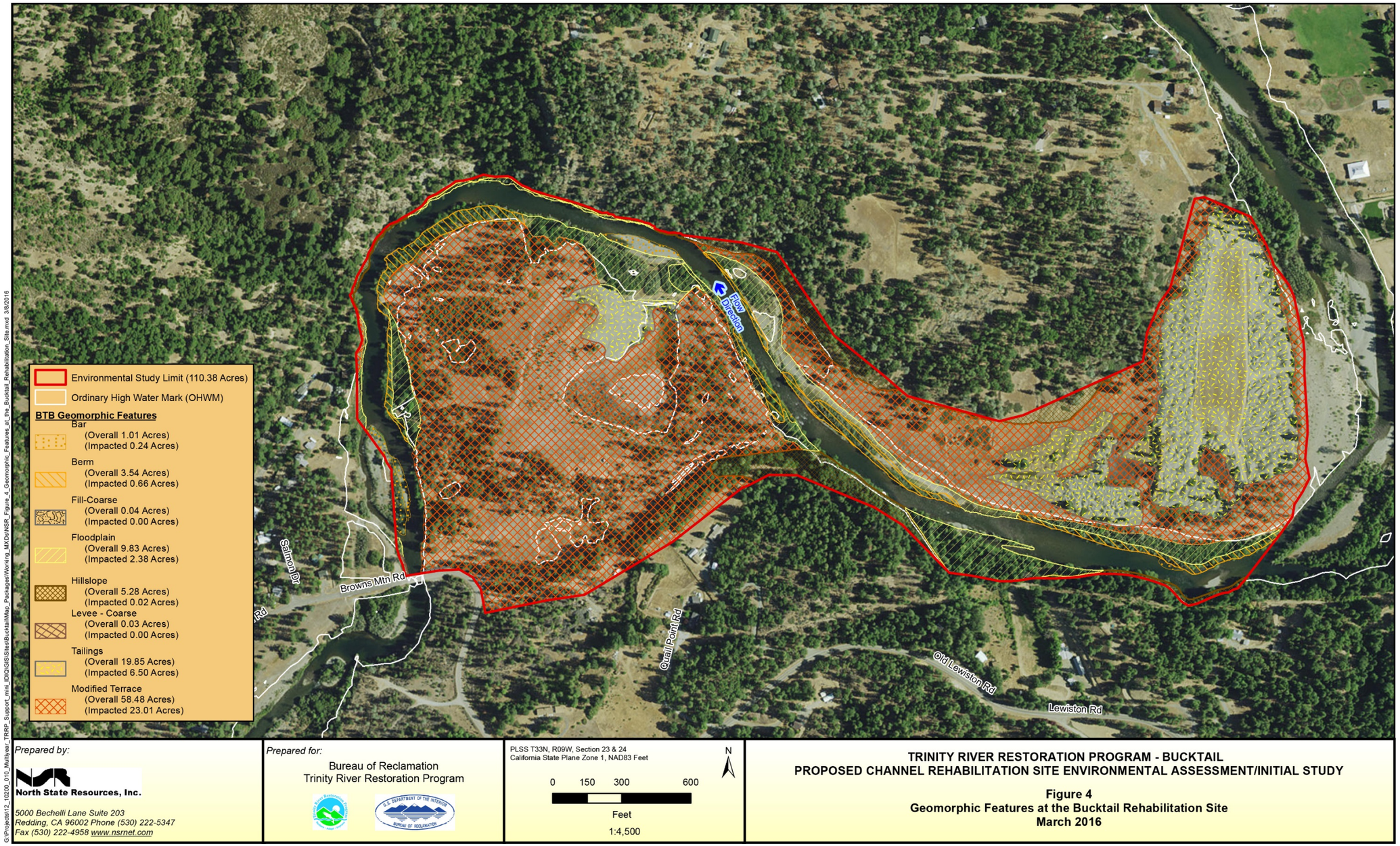

Figure 4. Geomorphic Features at the Bucktail Rehabilitation Site.

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The General Mining Law of 1872 is one of the major statutes that directs the federal government's land management policy. The law grants free access to individuals and corporations to prospect and mine for minerals in public domain lands and allows them, upon making a discovery, to stake (or "locate") a claim on that deposit. However, the Assistant Secretary of the Interior for Policy, Management and Budget proposed to withdraw, subject to valid existing rights, on behalf of the BLM, public lands located in Trinity County, California, from location and entry under the United States mining laws, but not from mineral material sales or mineral or geothermal leasing, to protect the cultural, recreational, and biological resources within and along the recreational segments of the Wild and Scenic River segment of the Trinity River (Federal Register, Vol. 78, No. 162, Wednesday, August 21, 2013, 51741-51743). The Notices of Proposed Withdrawal temporarily segregated the lands for up to two years from location and entry under the United States mining laws. The Secretary of the Interior withdrew this land from location of new claims effective August 21, 2015 as published in the Federal Register on September 9, 2015 (Federal Register, Vol. 80, No. 174, September 9, 2015, 54317-54318). The TRRP will continue to work with the BLM to ensure that construction efforts are consistent with BLM's long-term management goals for sites that contain BLM-managed lands.

In its 2014 EA for mineral withdrawal on BLM lands along the Trinity River, the BLM stated that there were 23 active placer claims. However, there were no plans of operations or notices filed for these claims and activity in these claims was limited to casual use (USDI BLM 2014). Placer claims are established with the intent to sort and wash unconsolidated alluvial materials for precious metals (e.g., gold, platinum). While suction dredging has been the principal mining method used on the Trinity River, it is now illegal in California with the passage of Senate Bill 637.

Other than for mining activities authorized under the Surface Mining and Reclamation Act (SMARA), information on private mining activities in Trinity County is limited. There are two active mining operations in the region that operate under a County SMARA permit, the Eagle Rock Mine and the Smith Mine. The Eagle Rock Mine, a sand and gravel extraction company, is currently operating at the site of the historic La Grange Hydraulic Gold Mine. The Smith Mine is located within the boundary of the completed Hocker Flat site and is active on an intermittent basis based on market conditions. Both of these mine sites are downstream of the project area.

New mining on public lands on the Trinity River has been precluded by a BLM and USFS mineral withdrawal (as described on p. 46 of this document). A USFS map is available at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3854273.pdf.

The proposed project area has been heavily disturbed by previous mining activities. The project area has large volumes of dredge tailings that are artifacts of this mining era. Evidence of this activity can be seen from the banks of the Trinity River within the site boundaries. These remaining tailing deposits continue to influence the form and function of the Trinity River.

Geologic Hazards

A discussion of the regional seismicity and seismic hazards is provided in the Master EIR (Section 4.3). No local active Quaternary faults have been identified, although little detailed mapping of Quaternary geologic features has been conducted in the area. The soils bordering the Trinity River are predominantly alluvial in nature and have the potential to experience liquefaction – a process whereby water-saturated granular soils are transformed to a liquid state during ground shaking;

however, the type of activities described in Chapter 2 would not affect the potential for liquefaction or be affected by liquefaction were it to occur.

Soils

The soils in the project area are described in the Soil Survey of Trinity County, California, Weaverville Area (U.S. Department of Agriculture [USDA] 1998). There are six main soil types in the Bucktail project area. They are 102 – Atter-Dumps, Dredge Tailings-Xerofluvents Complex, 2 to 9 percent slopes; 179 – Musserhill Gravelly Loam, 15 to 30 percent slopes; 182 – Musserhill-Weaverville Complex, 30 to 50 percent slopes; 198 – Tallowbox-Minersville Complex, 50 to 75 percent slopes; 213 – Xeralfs-Xerorthents Complex, 5 to 50 percent slopes; and 217 – Xerofluvents-Riverwash Complex, 0 to 5 percent slopes. Brief descriptions of these main soil types are included below:

- **102 – Atter-Dumps, Dredge Tailings-Xerofluvents Complex, 2 to 9 percent slopes.** This map unit is on alluvial fans, stream terraces, and floodplains that have been altered by dredging operations. This unit is about 50 percent Atter extremely gravelly loamy sand, 20 percent Dumps, dredge tailings, and 15 percent Xerofluvents. The Atter soil is very deep and is somewhat excessively drained. Permeability is rapid in the Atter soil. Available water capacity is very low. Runoff is slow, and the hazard of water erosion is slight. Dumps and dredge tailings consist of nearly barren mounds deposited along stream channels by dredge mining activities. Permeability is rapid in areas of the dumps. Runoff is medium, and the hazard of water erosion is slight. Xerofluvents consist of well-drained soils that formed in alluvium derived from mixed rock sources. Permeability is moderate or rapid in the Xerofluvents. Available water capacity is very low or low. Runoff is slow or medium, and the hazard of water erosion is slight or moderate. These soils are subject to flooding during prolonged, high-intensity storms. The frequency of the flooding ranges from rare to frequent; channeling and deposition are common along streambanks (USDA 1998).

- **179 – Musserhill Gravelly Loam, 15 to 30 percent slopes.** This map unit is found on hillslopes, is well drained, and is not subject to flooding or ponding. The map unit composition is 85 percent Musserhill and similar soils and 2 percent Xerofluvents. The available water capacity is low and the hydric rating is partially hydric.

- **182 – Musserhill-Weaverville Complex, 30 to 50 percent slopes.** This map unit is found on hillslopes and is well drained. It is not subject to flooding or ponding. The available water capacity is low for Musserhill but very high for Weaverville. The map unit composition is 45 percent Musserhill, 30 percent Weaverville, and 2 percent Xerofluvents. The hydric rating is partially hydric.

- **198 – Tallowbox-Minersville Complex, 50 to 75 percent slopes.** This map unit is found on mountain slopes is somewhat excessively drained, and shows no frequency of flooding or ponding. Available water capacity is low for Tallowbox and high for Minersville. The map unit composition is 60 percent Tallowbox, 20 percent Minersville, and 2 percent Xerofluvents. The hydric rating for this map unit is partially hydric.

- **213 – Xeralfs-Xerorthents Complex, 5 to 50 percent slopes.** This map unit is located on hills and terraces. Much of the soil has been removed by hydraulic mining. Areas are dissected by perennial streams. This unit is about 40 percent Xeralfs and 40 percent Xerorthents. The Xeralfs consist of well-drained soils of variable depths. Permeability is very slow to moderate in the Xeralfs. Available water capacity is very low to moderate, and runoff is rapid. The Xerorthents consist of well-drained soils of variable depths. Permeability is slow or moderate in the Xerorthents. Available water capacity is very low or low, and runoff is very rapid. This soil map unit is on the terrace above the river and floodplain and is not subject to flooding (USDA 1998).

- **217 – Xerofluvents-Riverwash Complex, 0 to 5 percent slopes.** This map unit is located on floodplains and stream terraces. It formed in alluvium derived from mixed rock sources. This unit is approximately 45 percent Xerofluvents and 35 percent Riverwash. Varying areas of the stream channel occur within this map unit that are under water during parts of the year. Xerofluvents consist of well-drained soils that formed in alluvium from mixed rock sources. Permeability is moderate to rapid in the Xerofluvents. Available water capacity is very low or low, and runoff is slow or medium. These soils are subject to flooding during prolonged, high-intensity storms. Channeling and deposition are common along streambanks. Riverwash consists of nearly barren, unstabilized, stratified sandy, silty, clayey, stony, cobbly, or gravelly alluvium derived from mixed rock sources. Areas of Riverwash are flooded, channeled, and reworked nearly every winter (USDA 1998).

3.3.2 Environmental Consequences/Impacts and Mitigation Measures

Methodology

Data for the following analysis were taken from existing reports on regional and local geology as well as on-site assessments during field reviews. These reports include the following documents: Geology of Northern California (USGS 1966); Soil Survey of Trinity County, California, Weaverville Area (USDA 1998); wetland delineations (North Wind 2013; North State Resources 2005); Trinity River Mainstem Fisheries Restoration Program EIS; Trinity River Maintenance Flow Study Final Report (McBain and Trush 1997); Trinity County General Plan; and online and GIS data sources.

CEQA Significance Criteria

A project would have a significant impact related to geology, geomorphology, soils, and minerals if it could subject people, structures, or other resources to geologic or seismic hazards or disrupt, eliminate, or otherwise render geologic, soil, or mineral resources unusable or unavailable. Impacts to geology, fluvial geomorphology, minerals, and soils would be significant under CEQA if the project would:

- Expose people, structures, or critical utility facilities to major geologic hazards (including seismicity, landslides, seiches, and liquefaction);

- Involve changes in topography that would result in unstable soil conditions;

- Increase erosion rates to a level at which associated sedimentation levels could affect streams, rivers, or other water bodies;
- Interfere with existing, proposed, or potential development of mineral resources; or
- Be inconsistent with the 10 Trinity River healthy alluvial river attributes.

Impacts and Mitigation Measures/Project Design Features

Table 7 summarizes the potential geology, fluvial geomorphology, minerals, and soils impacts that would result from the No Project and Proposed Project alternatives.

Table 7. Summary of Geology, Fluvial Geomorphology, Soils, and Minerals Impacts for the No Project and Proposed Project Alternatives.

No Project Alternative	Proposed Project	Proposed Project With Mitigation
Impact 3.3-1. Implementation of the Proposed Project could result in the exposure of structures and people to geologic hazards, including ground shaking and liquefaction.		
No impact	No impact	Not applicable[1]
Impact 3.3-2. Construction activities associated with the Proposed Project could result in increased erosion and short-term sedimentation of the Trinity River.		
No impact	Significant	Less than significant
Impact 3.3-3. Implementation of the Proposed Project would interfere with existing, proposed, or potential development of mineral resources.		
No impact	Less than significant	Not applicable[1]

[1] Because this potential impact is less than significant, no mitigation is required.

Impact 3.3-1: Implementation of the Proposed Project could result in the exposure of structures and/or people to geologic hazards, including ground shaking and liquefaction.

No Project Alternative

Under the No Project alternative, no construction activities would occur. There would be no new exposure of structures and/or people to geologic hazards. Therefore, there would be no impact.

Proposed Project

Under the Proposed Project, no permanent structures or facilities would be constructed. There would be no new exposure of structures and/or people to geologic hazards. Thus, there would be no impact.

Impact 3.3-2: Construction activities associated with the Proposed Project could result in increased erosion and short-term sedimentation of the Trinity River.

No Project Alternative

Under the No Project alternative, the Proposed Project would not be constructed. Therefore, no construction-related erosion or associated sedimentation of the Trinity River would occur, and there would be no impact.

Proposed Project

Implementation of the Proposed Project has a potential to increase erosion and subsequent short-term sedimentation of the Trinity River. The amount of erosion in the project area would likely be influenced by the following:

- The extent that disturbed soils are exposed to flowing water,
- The extent that disturbed soils are exposed to energetic weather conditions, and
- The extent of soil compaction and associated runoff.

During or after excavation and other related construction activities, the highest rate of soil erosion would most likely occur near the margins of constructed features (e.g., side channels and floodplains). At these locations, the exposure of fine-textured soils during and after construction would increase the potential for soil erosion and sedimentation. Impacts of turbidity levels specific to water quality degradation are analyzed below, in Section 3.5, Water Quality, and associated impacts to anadromous fisheries are analyzed in Section 3.6, Fishery Resources.

A large portion of proposed rehabilitation activities would occur in proximity to flowing water and could expose newly disturbed and/or stable sediments and other alluvial materials to flowing water. Specifically, in-channel activities would likely disturb areas in proximity to flowing water. Riverine work areas may generally be isolated so that flowing water does not reach these areas until they are "opened" to the river. Sediment exposed to flowing water has an increased potential to mobilize and be transported downstream resulting in impacts such as short-term increases in surficial and channel erosional processes; increases in turbidity levels downstream (varying distances); and changes to type, volume, and character of deposition downstream. Monitoring results from previous TRRP channel rehabilitation projects (i.e., Hocker Flat, Canyon Creek, Indian Creek, and Lewiston-Dark Gulch) demonstrate that these impacts decrease rapidly once construction activities have ceased. However, downstream turbidity levels may remain elevated for a longer duration post-construction when winter high flows wash over newly disturbed areas and seasonal fluctuations in hydrologic conditions further shape the disrupted area into a more stable geometry.

Construction activities in the river and uplands have the potential to significantly decrease soil cohesion and armoring, thus increasing soil exposure to energetic weather conditions and increasing the short-term potential for wind and water erosion. Increased wind and water erosion and subsequent downstream sediment transport in the Trinity River would occur if any soils were left exposed during the wet season (typically November through May) as well as other infrequent precipitation events (summer thunderstorms). These areas would be replanted with native vegetation after project completion. The potential watering of the planted areas post-project would result in

negligible disturbance to project area soils. Watering would assist plants in establishing their roots and would help restore the land to its natural condition, which may reduce potential erosion and sedimentation.

The use of heavy equipment for restoration activities would likely increase soil compaction, potentially causing surface water runoff. An increase in the volume of surface water runoff increases the potential for erosion. Thus, any substantial increase in soil compaction would cause a potentially significant increase in erosion. Therefore, this impact is significant.

Mitigation Measures/Project Design Features

Construction activities associated with the Proposed Project could result in increased erosion and short-term sedimentation of the Trinity River. Therefore, the environmental commitments and project design features presented in Chapter 2, in conjunction with CEQA mitigation measures 4.3-2a and 4.3-2b described in Appendix B, will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of the specified mitigation measures would reduce the impacts to less than significant.

Impact 3.3-3: Implementation of the Proposed Project would interfere with existing, proposed, or potential development of mineral resources.

No Project Alternative

Under the No Project alternative, the project would not be constructed. Therefore, no interference with existing, proposed, or potential development of mineral resources would occur, and there would be no impact.

Proposed Project

The development of mineral resources may be inhibited where a mining claim occupies a rehabilitation site. Currently, BLM has no authorized operating plans for mines along this reach of the Trinity River. There are no active claims in the project area. Because there are no current or proposed mining activities operating under either a federally authorized operating plan or through a County SMARA permit within the rehabilitation site there would be no impacts to mineral activities. Therefore, the impact would be less than significant.

3.4 Water Resources

This section presents a discussion of the water resources known to occur in the Trinity River Basin in proximity to the Proposed Project site. It evaluates potential impacts to water resources from implementation of the Proposed Project. Additional information about the affected environment for water resources is addressed in the Master EIR (Section 4.4).

3.4.1 Affected Environment/Environmental Setting

Surface Water Hydrology

The Trinity River Basin encompasses approximately 2,965 square miles, about one-quarter of which is upstream of the TRD. Since 1960, the TRD has been the major determinant of the hydrologic conditions affecting the mainstem Trinity River, particularly in the 40-mile reach downstream of Lewiston Dam. Figure 1 shows the locations of the proposed rehabilitation sites along the Trinity River.

Prior to authorization of the 2000 ROD for the Trinity River Mainstem Fishery Restoration FEIS/EIR, the average annual flow volumes released from the TRD into the Trinity River at Lewiston Dam were reduced from pre-dam conditions by as much as 90 percent. Consequently, channel form and function in this reach have been substantially altered. From 1962 to 1979, CVP diversions delivered nearly 90 percent of the water from the TRD to the Sacramento River for urban and agricultural use. After 1979, river releases were increased from 110,000 to 340,000 afa, substantially increasing the available flow to the Trinity River during the period between 1979 and 2002 (ROD flows). Although the 2000 ROD for the Trinity River FEIS/EIR established an annual volume based on water year types, litigation in federal court prevented implementation of the flow releases specified in the ROD in water years 2001-2004. Ultimately, the ROD was upheld, and the 2005 water year incorporated the schedule established by the TRRP in accordance with the ROD. This schedule is revised each year based on water year type.

Groundwater

Most usable groundwater in the mountainous Trinity River Basin occurs in widely scattered alluvium-filled valleys, such as those immediately adjacent to the Trinity River. These valleys contain only small quantities of recoverable groundwater and are therefore not considered a major source. A number of shallow wells adjacent to the river provide water for domestic purposes. These infiltration wells are often located near the river and may be affected by spring ROD flow releases (i.e., up to 11,000 cfs). Consequently, the TRRP in cooperation with Trinity County implemented the Trinity River Potable Water and Sewage Disposal System Assistance Program (Assistance Program) to allow qualifying landowners to relocate, replace, modify, or otherwise improve their potable water and sewage systems to better resist damage from ROD flows intended to benefit fisheries. The Assistance Program was a one-time only opportunity to receive financial assistance from the TRRP to ensure that ROD flows do not negatively affect existing infrastructure and site improvements (e.g., water sources and wastewater disposal systems). At the time the Master EIR was completed, approximately 75 wells/septic systems had been improved. Since that time, over 150 well/septic systems were replaced or improved with TRRP funding. The Assistance Program was discontinued in 2013 after a five-year open period, with approximately two-thirds of the landowners with qualifying systems obtaining assistance. Not all wells/septic systems were negatively impacted by the fishery flows, and there are a number of wells that are designed to be inundated, and often are, during the course of a water year.

Floodplain Hydrology and Hydraulics

The floodplain of the Trinity River is identified in FEMA's Flood Insurance Study, Trinity County, California, and Incorporated Areas (1996). Actual floodplain designations are contained in the

accompanying Flood Insurance Rate Map (FIRM). The countywide FIRM became effective on August 16, 1988, with an update in 1996.

Within the 40-mile reach of the Trinity River below Lewiston Dam, the river has adjusted to a flow and sediment regime imposed in large part by the TRD. While the degree of berm development varies within the 40-mile reach, the river channel has been simplified and the channel has narrowed over time. In general, the aquatic habitat in this reach of the river lacks complexity and is typified by a recurring sequence of pools, runs, glides, and low-slope riffle habitat. Though the annual hydrograph is influenced by accretion flow from tributaries, the main influence on river flows is the Lewiston Dam release. The closer to the dam, the greater its relative influence on river flows. In the vicinity of the dam (downstream to approximately Weaver Creek), the OHWM is equal to the normal year ROD flow release of 6,000 cfs. Downstream of Weaver Creek, winter flows have the dominant influence on the OHWM. Winter peak flows here frequently exceed spring ROD releases. The OHWM in the Canyon Creek area was estimated at 6,600 cfs (North Coast Regional Water Board and Reclamation 2006). The timing of peak flow and ramping-down releases under the ROD corresponds to the typical annual period of peak snowmelt floods in the watershed for each of the water year classes described in the ROD. Additional information on morphologic processes and Trinity River flows is provided in Sections 4.3 and 4.4, respectively, of the Master EIR.

The best available hydraulic analysis for the Trinity River is the Trinity River Hydraulic Flow Study: North Fork Trinity to Lewiston Dam developed by the California DWR for the TRRP using flow data from the 2005 Reclamation study (California DWR 2007). The California DWR study summarizes flow modeling of the mainstem Trinity River from Lewiston Dam to its confluence with the North Fork Trinity River, 40 miles downstream. The model estimates WSE based on a controlled flow release of 11,000 cfs from Lewiston Reservoir with 10-year and 100-year spring tributary flows. The TRRP has defined the 11,000 cfs release plus 100-year spring tributary flow event as the maximum fishery flow (MFF) for project planning and risk assessment purposes. Using the well grant assistance program, the TRRP has funded the structural improvement and relocation (or otherwise addressed problems with existing structures) within the MFF inundation zone to allow this maximum ROD flow to be implemented.

3.4.2 Environmental Consequences/Impacts and Mitigation Measures

Methodology

Hydraulic models allow the preliminary evaluation of risks to Trinity River properties by comparing the WSE of the Proposed Project site's design conditions with the existing conditions. The comparison indicates how the features of the Proposed Project site could affect the base flood elevation (BFE) estimated by FEMA for the 100-year flood. One of the design criteria for the Proposed Project was developed to ensure that none of the proposed activities would result in an obstruction to flow or an increase in the BFE of more than 12 inches.

CEQA Significance Criteria

Impacts to water resources would be significant under CEQA if one of the following conditions occurred:

- It could subject people, structures, or other resources to substantial changes in flood hazards; or
- It would result in modification of groundwater resources.

Under CEQA, the Proposed Project would result in a significant impact related to hydraulics if one of the following conditions occurred:

- The base flood WSE would increase by more than 1 foot;
- There would be a substantial alteration of the existing drainage pattern of a site or area, including the alteration of the course of a stream or river, or a substantial increase in the rate or amount of surface runoff in a manner that would result in flooding on- or off-site; or
- It would expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

Under CEQA, the Proposed Project would result in a significant impact to groundwater if one of the following conditions occurred:

- There would be a long-term decline in groundwater elevations (or a net reduction in groundwater storage) due to interference with recharge;
- There would be detectable land subsidence;
- Any water quality standards or waste discharge requirements intended to protect groundwater quality would be violated; or
- There would be a detectable degradation of groundwater quality.

Groundwater impacts were assessed at the scale of a groundwater basin or sub-basin. The significance of declining (or increasing) water levels depends in part on the duration and permanence of the impact. Because groundwater elevations fluctuate naturally due to changes in rainfall, short-term changes in groundwater elevations are not considered significant impacts.

Impacts and Mitigation Measures/Project Design Features

Table 8 summarizes the potential water resources impacts that would result from the No Project and Proposed Project alternatives.

Table 8. Summary of Potential Water Resource Impacts for the No Project and Proposed Project Alternatives.

No Project Alternative	Proposed Project	Proposed Project With Mitigation
Impact 3.4-1. Implementation of the project could result in a temporary or permanent increase in the BFE.		
No impact	Less than significant	Not applicable[1]
Impact 3.4-2. Implementation of the project could result in a permanent decline in groundwater elevations or a permanent change in groundwater quality.		
No impact	Less than significant	Not applicable[1]
Impact 3.4-3. Implementation of the project would expose people or structures to a significant risk of injury, death, or loss involving flooding or erosional processes.		
No impact	Less than significant	Not applicable[1]

[1] Because this potential impact is less than significant, no mitigation is required.

Impact 3.4-1: Implementation of the Proposed Project could result in a temporary or permanent increase in the base floodwater elevation.

No Project Alternative

Under the No Project alternative, the Trinity River floodplain would not be altered and the existing BFE would not change because the project would not be constructed. Therefore, there would be no impact.

Proposed Project

The elevation and extent of the floodplain of the Trinity River would be modified through the activities associated with the Proposed Project, as described in Chapter 2. The Proposed Project would be consistent with the overall project objectives and design criteria established by the TRRP and the Regional Water Board and the hydraulic analysis indicates that removing all the excavated material from the riverine rehabilitation areas and placing it as coarse sediment within the channel or above the BFE in upland activity areas would not result in an increase in the FEMA BFE. Therefore, the impact would be less than significant.

Impact 3.4-2: Implementation of the Proposed Project could result in a permanent decline in groundwater elevations or permanent changes in groundwater quality.

No Project Alternative

Under the No Project alternative, no effects on local groundwater levels would occur because the project would not be constructed. Therefore, there would be no impact.

Proposed Project

The displacement of channel and floodplain materials has only a minimal potential to change the groundwater hydraulics within the boundaries of the Proposed Project site. Groundwater table elevations and water volumes in nearby off-channel wetlands would not be affected because groundwater elevations in these areas are associated with river stage. The tendency of the surface water-groundwater system to move to equilibrium conditions and the overall absence of impacts to the regional driving mechanisms of groundwater recharge (seasonal precipitation and Trinity River flow regimes) suggest that no long-term impacts on water table elevations would occur. Therefore, this impact would be less than significant.

Impact 3.4-3: Implementation of the Proposed Project would expose people or structures to a significant risk of injury, death, or loss involving flooding or erosional processes.

No Project Alternative

Under the No Project alternative, no people or structures would be exposed to additional flood risks because the project would not be constructed. Therefore, there would be no impact.

Proposed Project

The Proposed Project would not result in activities intended to increase the BFE at the rehabilitation site. Activities intended to modify the bed and banks of the Trinity River could have ancillary impacts to the bed and banks downstream. To date, TRRP staff have identified several locations downstream of activity areas where the bank of the river appears to be responding to post-ROD changes in the flow and sediment regime.

While the fundamental objective of the activities associated with the Proposed Project is to reestablish the alluvial features of the river, isolated instances of bank erosion may result in the loss of river bank and associated vegetation or, to a lesser extent, constructed features such as wells, utilities, and landscape features. In addition to the Assistance Program for water and sewer, bank stabilization measures, specifically the bio-engineering measures described in Appendix A of the Draft EA/IS, are intended to address these impacts on a case-by-case basis, consistent with all federal, state, and local requirements. In concert with the ongoing efforts of the TRRP and the activities described in Chapter 2 and Appendix A of the Draft EA/IS, the Proposed Project is designed to avoid exposing people or structures to a significant risk of injury, death, or loss involving flooding. Therefore, this impact would be less than significant.

3.5 Water Quality

This section describes water quality conditions in the vicinity of the Proposed Project site along the Trinity River. It also evaluates potential impacts to water quality from implementation of the Proposed Project. The principal components of the TRD are Lewiston Dam, Trinity Dam, and the facilities that divert runoff from the Trinity River watershed to the Sacramento River Basin. Prior to full implementation of the ROD, up to 90 percent of the natural Trinity River flow was diverted, which substantially altered water quality in the Trinity River, particularly its temperature and sediment regimes. Additional information on the affected environment as it relates to water quality is

provided in the Master EIR, Section 4.5, Water Quality. Information related to this topic is also provided in the Master EIR in Section 4.4, Water Resources, and Section 4.6, Fisheries.

3.5.1 Affected Environment/Environmental Setting

The releases from the TRD influence flow volumes and velocities, water quality, and channel geometry downstream of Lewiston Dam. These influences are particularly important to water quality parameters such as temperature, turbidity, and suspended sediments. A dramatic decrease in the abundance of Trinity River coldwater fishes has taken place since the TRD began operation (USFWS and HVT 1999). Water quality in the Trinity River may also be affected by acid mine drainage from abandoned mines and past mining activities, sediment releases from land use practices associated with unstable soils and decomposed granite (e.g., roads, vegetation management, and subdivisions), septic tanks, aboveground and underground storage tanks, and lumber mills (Regional Water Board 2011).

The Proposed Project is subject to compliance with the Water Quality Control Plan for the North Coast Region (Basin Plan; Regional Water Board 2011). The beneficial uses for the Trinity River defined in the Basin Plan are listed in Table 4.5-1 of the Master EIR. In addition to municipal and domestic water supply, the beneficial uses affected by the water quality of the Trinity River are primarily those associated with supporting high-quality habitat for fish. Recreation (contact and non-contact) is another important beneficial use potentially affected by various water quality parameters (e.g., sediment and temperature). The Basin Plan identifies both numeric and narrative water quality objectives for the Trinity River. Table 4.5-2 in the Master EIR summarizes the water quality objectives for each of the categories that have been established by the Regional Water Board to protect designated beneficial uses.

Temperature

The influence of Trinity Lake and Lewiston Reservoir on downstream conditions diminishes with distance. In general, the greater the release volumes from Lewiston Dam, the less susceptible the river's temperature is to other factors. Releases from the TRD are generally cold (42 to 47 degrees Fahrenheit [°F]). These temperatures are transmitted through Lewiston Reservoir to the Trinity River below Lewiston Dam.

Sediment

In 1992, the Environmental Protection Agency (EPA) added the Trinity River to its list of impaired rivers under the provisions of Section 303(d) of the CWA in response to a determination by the State of California that the water quality standards for the river were not being met due to excessive sediment. In 2001, the EPA established a Total Maximum Daily Load for sediment in the river. The Regional Water Board has continued to identify the Trinity River as impaired in subsequent listing cycles. The primary adverse impacts associated with excessive sediment in the Trinity River pertain to degradation of habitat for anadromous salmonids. The restriction of streamflows downstream of the TRD has greatly contributed to the impairment of the Trinity River below Lewiston Dam (EPA 2001). With implementation of ROD flows and placement of coarse sediment in the Lewiston area, local reductions in fine sediment in the river bed have been observed and fish spawning has increased. Recent measurements to compare in-channel fine sediment concentrations, pre- and post-ROD flows,

have indicated that gravel quality and river bed oxygen permeability have increased through the 40-mile reach. The percent fines measured in Trinity River samples at 2001 sites revisited in 2010, was measurably less than found in 2001 (Graham Matthews and Associates 2010).

Local fishermen (e.g., the Trinity River Guides Association) have recently expressed concern that TRRP addition of gravel to the river has resulted in the filling, or partial filling, of fishing holes (adult holding habitat) with gravel. In high-flow gravel augmentation areas, primarily the Sawmill and Lowden Ranch locations, holes have decreased in depth. Furthermore, due to high fishery flows released in spring 2011 (11,000 cfs from Lewiston Dam), riverbed and floodplain gravel have also moved more than in earlier years. While increased erosion and gravel movement during high flow years is to be expected, the TRRP has examined data, collected pre- and post-high flows, to determine the extent and type of change that has occurred on the river's bottom and an Assessment of Pool Depth Changes in the Trinity River between Lewiston Dam and the North Fork Trinity River (Gaeuman and Krause 2013) has been developed. The results, in combination with results of the Phase 1 review, are assisting the TRRP in determining how to proceed with future gravel augmentation at rehabilitation sites and during high flow augmentation efforts.

Turbidity

The Basin Plan (Regional Water Board 2011) contains water quality objectives to protect present and probable future beneficial uses of water and to protect existing high quality waters of the state. Water quality objectives form the basis for establishment of waste discharge permits. The Basin Plan contains a water quality objective for turbidity that applies to the Trinity River, including the Proposed Project site. The water quality objective for turbidity states, "Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon issuance of discharge permits or waiver thereof." An allowable zone of turbidity dilution is an area within water where turbidity discharges may increase the naturally occurring turbidity level by more than 20 percent. An allowable zone of turbidity dilution may only be granted in waste discharge permits if all beneficial uses (identified in Table 4.5-1 of the Master EIR) remain protected.

The turbidity level in a water body is related to the concentration of suspended solids, which are predominantly less than 0.5 millimeter (mm) in diameter. Water clarity has historically been measured as the concentration of suspended solids (milligrams per liter [mg/L]) or more recently as turbidity, which is measured in NTUs. Turbidity generally does not cause acute adverse effects to aquatic organisms unless concentrations are extremely high (Lloyd 1985). Noggle (1978) estimated an acute lethal concentration causing 50 percent mortality of juvenile coho salmon at 1,200 mg/L during summer (approximately 900 NTUs). At relatively high levels, suspended solids can adversely affect the physiology and behavior of aquatic organisms and may suppress photosynthetic activity at the base of food webs, affecting aquatic organisms either directly (e.g., ability to feed) or indirectly (e.g., impact to food supply or spawning substrate) (Alabaster and Lloyd 1980). However, at lower levels, effects of turbidity last as long as the perturbation in clarity and are limited to reducing reactive distance to prey as well as predation risk. For instance, if periods of increased turbidity occur during periods of merganser (fish predator) activity, the turbidity would probably be used as protective cover that would provide an overall benefit to the fish (Regional Water Board and Reclamation 2009). In the laboratory, benthic feeding success of coho salmon in water with turbidity

levels as high as 100 NTUs has been found to be at least 70 percent of their feeding success in clear water (Harvey and White 2008). During low flow restoration activities, adult salmon have been observed using the more turbid sections of the river (10 to 15 NTUs) as protective cover during their spawning migrations through the project areas (Gutermuth, pers. obs.). Finally, the Alaska Department of Environmental Conservation (ADEC; 2008) has determined that turbidity levels for protection of aquaculture in flowing conditions may not exceed 25 NTUs above natural conditions, and that this level is protective of fishery resources.

The Trinity River is typically very clear with natural background turbidity levels in the range of 0 to 1 NTU during summer low flow conditions. Due to the very low background concentrations during the summer, turbidity levels immediately downstream of the most carefully planned and implemented in-channel restoration activities will likely be increased by more than 20 percent above background levels, and plumes extending downstream of restoration activities may be visible. However, short-term increases in turbidity levels that occur during permitted restoration activities are generally not considered to be biologically detrimental to aquatic organisms; they are short in duration and fish are able to move away from the activity area. Reduction of these turbidity levels to within 20 percent above background is very expensive if not impossible using BMPs. Monitoring turbidity increases during implementation of previous Trinity River restoration projects has shown that periods of increased turbidity are brief (generally less than 24 hours); turbidity levels have not exceeded 50 NTUs at monitoring points located 500 feet downstream and beneficial uses were still protected. In addition, the quantity of fine sediment introduced to the river during low flow restoration activities is typically small.

In contrast, sediment particles between 0.5 mm and 8.0 mm in diameter tend to settle more quickly. These larger sediment particles can decrease the permeability of the channel bed and cover spawning sites, causing negative impacts on the aquatic community (USFWS and HVT 1999). However, as long as the larger sediment particles are only mobilized into the water column from completed restoration activity areas and off-site sources during high flows, the larger sediment particles will be transported far down-river or deposited on adjacent alluvial features (e.g., floodplains) where these particles contribute to riparian form and function (e.g., plant growth).

Post construction monitoring data from the Indian Creek site and the Canyon Creek suite of sites indicate that downstream turbidity levels may be increased by overland flow during the initial high flow events that occur following completion of construction activities. During high flow spring-time releases from Lewiston Dam (e.g., clear water released from the dam during ROD flows), turbidity levels may be increased by more than 20 percent at monitoring locations 500 feet or more downstream of recently completed channel rehabilitation sites. However, when the high flows are caused by natural storm water runoff in the Trinity River Basin, and the river is already carrying a substantial sediment load (e.g., turbidity greater than 40 NTUs), background levels are generally not increased by more than 20 percent at monitoring locations downstream of recently completed activities. Furthermore, during natural high flow events the relative addition of fine sediment from recently completed channel rehabilitation sites is minimal compared to the sediment load already being transported by the river (Gutermuth, pers. obs.). In both of these high flow scenarios, impacts to the Trinity River from the addition of TRRP related fine sediment is minimal because the materials that increase turbidity levels are maintained in suspension and transported downriver or deposited on the floodplain in the same manner as fine sediment from other sources. In both low flow and high

flow scenarios, as long as project related turbidity level increases are limited in concentration and duration, impacts to aquatic life and beneficial uses are expected to be minimal in comparison to the long-term aquatic habitat benefits that the Proposed Project is designed to create.

Mercury

Another source of potential water quality impairment of the Trinity River is mercury. Although the river is not listed under Section 303(d) of the CWA for mercury impairment, elevated concentrations have been found in water, sediment, and biota (i.e., fish, frogs, and predatory aquatic insects) in the upper Trinity River Basin upstream of Lewiston Dam (USGS, unpublished data). The general significance of mercury as a biological toxin and the likely sources of mercury in regional and local contexts are discussed in Section 4.13, Hazards and Hazardous Materials, of the Master EIR.

Early in the planning phases for the mechanical channel rehabilitation projects along the Trinity River, the TRRP recognized the possibility that mercury in placer tailings and/or fluvial fine sediments could be disturbed and mobilized by the rehabilitation activities. USGS monitoring suggests that the alluvial materials that are subject to project-related disturbance contain levels of mercury well below the numeric criteria promulgated by the EPA for priority toxic pollutants. Overall, the USGS assessment of site-specific methylation data suggests that the bioavailability of mercury in the Trinity River and its floodplain is not presently high and would not likely be modified by the Proposed Project.

3.5.2 Environmental Consequences/Impacts and Mitigation Measures

Methodology

For the past 11 years, the TRRP has implemented a number of channel rehabilitation projects and completed similar activities to those proposed at the Proposed Project site. While the type and intensity of these activities vary, the effects of the activities on water quality in the Trinity River are well understood. Impacts on water quality were determined by analyzing whether the proposed modification of the physical features and biological conditions at the Proposed Project site would comply with Basin Plan objectives for the Trinity River.

CEQA Significance Criteria

The Proposed Project would result in significant adverse impacts to water quality under CEQA if it would result in any of the following:

- Violations of state or federal numerical water quality standards or state or federal narrative water quality objectives;
- Substantial degradation of water quality, such that existing beneficial uses are precluded specifically because of degraded water quality;
- Violation of any waste discharge requirements and/or Section 401 Certification conditions;

- Substantial alterations of the course of a stream or river in a manner that would result in substantial erosion or siltation onsite or offsite; or

- Violation of site-specific temperature objectives for the Trinity River contained in the Basin Plan (Regional Water Board 2011).

Impacts and Mitigation Measures/Project Design Features

Table 9 summarizes the potential water quality impacts that would result from the No Project and Proposed Project alternatives.

Table 9. Summary of Potential Water Quality Impacts for the No Project and Proposed Project Alternatives.

No Project Alternative	Proposed Project	Proposed Project With Mitigation
Impact 3.5-1. Construction of the project could result in short-term, temporary increases in turbidity and total suspended solids levels during construction.		
No impact	Significant	Less than significant
Impact 3.5-2. Construction of the project could result in short-term, temporary increases in turbidity and total suspended solids levels following construction.		
No impact	Significant	Less than significant
Impact 3.5-3. Construction of the project could cause contamination of the Trinity River from hazardous materials spills.		
No Impact	Significant	Less than significant
Impact 3.5-4. Construction of the project could result in increased stormwater runoff and subsequent potential for erosion.		
No impact	Less than significant	Not applicable[1]
Impact 3.5-5. Construction and maintenance of the project could result in the degradation of Trinity River beneficial uses identified in the Basin Plan.		
No impact	Significant	Less than significant

[1] Because this potential impact is less than significant, no mitigation is required.

Impact 3.5-1: Construction of the Proposed Project could result in short-term, temporary increases in turbidity and total suspended solids levels during construction.

No Project Alternative

Under the No Project alternative, no construction-related short-term increases in turbidity or total suspended solids levels would occur because the project would not be constructed. Therefore, there would be no impact.

Proposed Project

The activities described in Chapter 2 for the Proposed Project would temporarily increase turbidity and total suspended solids in the Trinity River. The incorporation of design elements and construction criteria described in Appendix B (e.g., in-river construction, water pollution prevention, and construction schedules) are intended to limit the total addition of fine suspended sediment to the Trinity River. Additionally, river's edge and in-channel construction activities would be staged to minimize potential turbidity effects. During in-channel construction activities, increases in turbidity levels could occur because of excavation of alluvial material. Connection of isolated and newly constructed side channels with the mainstem (e.g., the first flush of flowing water) would result in short-term increases in turbidity levels as this material is removed from and/or redistributed within the channel. Fine sediments may be suspended in the river for several hours following construction activities. The extent of downstream sedimentation would be a function of the size and mobility of the substrate. For example, fine-grained sediments like silts and clays can be carried several thousand feet downstream of construction zones, while larger-sized sediments like coarse sands and gravels tend to drop out of the water column within several feet of the construction zone. Collectively, the activities included in the Proposed Project could result in short-term increases in turbidity and suspended solids concentrations in the water column that could potentially violate the Basin Plan objectives for turbidity in the Trinity River. Short-term increases in turbidity and suspended solids levels during construction would be a significant impact.

The temporary crossing at the site would provide access for in-channel and riverine work areas. The low-flow channel crossing would be constructed of appropriately sized alluvial materials. Placement of alluvial fill materials could temporarily increase turbidity and suspended materials during and immediately following crossing construction. Removal and distribution of alluvial materials upon deconstruction of the low-flow channel crossing could also increase turbidity and suspended materials during and immediately following excavation.

Mitigation Measures/Project Design Features

Construction of the Proposed Project could result in short-term, temporary increases in turbidity and total suspended solids levels during construction. Therefore, mitigation measures 4.5-1a, 4.5-1b, 4.5-1c, 4.5-1d, and 4.5-1e described in Appendix B will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of the specified mitigation measures would reduce impacts to less than significant.

Impact 3.5-2: Construction of the Proposed Project could result in short-term, temporary increases in turbidity and total suspended solids levels following construction.

No Project Alternative

Under the No Project alternative, no short-term increases in turbidity or total suspended solids levels would occur following construction because the project would not be constructed. Therefore, there would be no impact.

Proposed Project

The character and location of alluvial features associated with the Trinity River were modified by the construction and operation of the TRD in response to changes in the flow and sediment regimes, particularly the loss of scouring associated with peak flows. Modification or reconstruction of these alluvial features at strategic locations would promote the river processes necessary for the restoration and maintenance of Trinity River alternate bars, thereby enhancing salmonid rearing habitat. These activities would also increase the habitat available for salmonid rearing under various flows.

Activities associated with implementing the Proposed Project would increase turbidity and total suspended solids in the river and fluvial surfaces following construction. These increases in turbidity levels would occur when newly disturbed areas are exposed to elevated river stages during high river flows. Ground-disturbing activities including tree removal have the potential to result in short-term, temporary increases in turbidity and total suspended solids levels after construction. Erosion control measures (water bars, hay, baffles, etc.) may be utilized in tree removal areas if soil erosion conditions arise to reduce potential impacts to water quality from these activities. Fine sediments may be suspended in the river for several hours following such exposure and erosion. The extent of downstream sedimentation would be a function of the rainfall intensity and/or instream flow velocity, as well as the particle size of exposed sediments. Lower intensity rainfalls would be unlikely to mobilize fine sediments because precipitation would be absorbed. If fine sediments are mobilized by flow over newly disturbed areas, they could be carried several thousand feet downstream of the activity areas, while larger sized sediments (i.e., sands and gravels) would tend to drop out of the water column within several feet of the activity areas.

Post-construction exposure of sediments to rainfall and/or flows would result in short-term increases in turbidity and suspended solids concentrations in the water column that could potentially be in violation of the Basin Plan turbidity objective for the Trinity River. A short-term increase in turbidity and suspended solids levels following construction would be a significant impact.

Mitigation Measures/Project Design Features

Construction of the Proposed Project could result in short-term, temporary increases in turbidity and total suspended solids levels following construction. Therefore, mitigation measures 4.5-2a, 4.5-2b, and 4.5-2c described in Appendix B will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of the specified mitigation measures would reduce the impacts to less than significant.

Impact 3.5-3: Construction of the Proposed Project could cause contamination of the Trinity River from hazardous materials spills.

No Project Alternative

Under the No Project alternative, no construction-related contamination of the Trinity River from spills of hazardous materials would occur because the project would not be constructed. Therefore, there would be no impact.

Proposed Project

Construction staging activities could result in a spill of hazardous materials (e.g., oil, grease, gasoline, and solvents) into the Trinity River. In addition, operation of construction equipment in or adjacent to the river would increase the risk of a spill of hazardous materials into the river (e.g., from leaking of fluids from construction equipment). Spills of hazardous materials into or adjacent to the Trinity River could degrade water quality and have deleterious effects on salmonids of any life stage that are in close proximity to construction activities. Section 3.13, Hazards and Hazardous Materials, evaluates potential effects associated with exposing the public to hazards associated with the transportation and use of hazardous materials at the rehabilitation site. Requirements outlined in Chapter 2 and mitigation measures described in Appendix B would be incorporated into the Proposed Project to reduce the potential impact. However, because construction activities could result in a spill of hazardous material, this would be a potentially significant impact.

Mitigation Measures/Project Design Features

Construction of the Proposed Project could cause contamination of the Trinity River from hazardous materials spills. Therefore, mitigation measures 4.5-3a, 4.5-3b, and 4.5-3c described in Appendix B will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of these mitigation measures would reduce the impacts to less than significant.

Impact 3.5-4: Construction and maintenance of the Proposed Project could result in increased stormwater runoff and subsequent potential for erosion.

No Project Alternative

Under the No Project alternative, there would be no increases in stormwater runoff and the potential for subsequent erosion because the project would not be constructed. Therefore, there would be no impact.

Proposed Project

Implementation of the Proposed Project as defined in Chapter 2, including those measures described in Appendix B, would not result in an increase in impervious surface areas (e.g., structures and roadway approaches) that could subsequently generate additional stormwater runoff and potential for erosion. Grading activities, including the use of rippers during grading activities, are expected to eliminate surface runoff during the first year after construction. Access routes would be located on gentle terrain and would require minimal grading. The impact associated with runoff and erosion would, therefore, be less than significant.

Impact 3.5-5: Construction and maintenance of the Proposed Project could result in the degradation of Trinity River beneficial uses identified in the Basin Plan.

No Project Alternative

Under the No Project alternative, no degradation of Trinity River beneficial uses would occur because the project would not be constructed. Therefore, there would be no impact.

Proposed Project

Under the Proposed Project, significant impacts to beneficial uses of the Trinity River could occur in the following categories of water quality objectives listed in the Basin Plan:

- Sediment,
- Toxicity,
- Turbidity,
- Settleable material,
- Suspended material, and
- Chemical constituents.

The impacts would be associated with riverine and in-channel work including the placement and deconstruction of low-flow channel crossings. Although the design elements and construction methods described in Chapter 2 are intended to minimize these impacts, the activities associated with construction, particularly in riverine and in-channel activity areas, would result in significant impacts that would be mitigated by the measures listed in Appendix B.

Mitigation Measures/Project Design Features

Construction and maintenance of the Proposed Project could result in the degradation of Trinity River beneficial uses identified in the Basin Plan. Therefore, mitigation measures identified above for Impacts 3.5-1, 3.5-2, and 3.5-3 and described in Appendix B will be implemented to reduce the potential for impacts associated with the Proposed Project. These particular mitigation measures address potential impacts to multiple resources, but they are only listed once in an attempt to reduce the size of the document. Implementation of the specified mitigation measures would reduce the impacts to less than significant.

3.6 Fishery Resources

This section describes the fishery resources and aquatic habitats that are known to occur within the boundaries of the Proposed Project site and evaluates the impacts of the Proposed Project on these resources. The TRFEFR (USFWS and HVT 1999) determined that lack of spawning and rearing habitat for juvenile salmonids is likely a primary factor limiting the recovery of salmonid populations in the Trinity River. Activities at the Proposed Project site are specifically designed to increase the abundance of habitat for Trinity River salmonids by reconnecting the river with its floodplain, increasing channel sinuosity, and providing shallow low velocity habitats in close proximity to the river's edge. The discussion of fisheries resources is based on a focused literature review, informal consultation with resource agencies, and observations made during site visits. These resources are discussed in the Master EIR (Section 4.6 and Appendix G). The Magnuson-Stevens Fishery Conservation and Management Act and Essential Fish Habitat (EFH) are also described in the Master EIR (Section 4.6).