Chapter 3

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction to the Analysis

This chapter describes the existing resources at the Lower Steiner Flat and Upper Junction City Channel Rehabilitation Sites as well as in the proposed spoil area within the boundary of the Lower Junction City Rehabilitation Site and presents an analysis of the potential environmental impacts associated with implementing the proposed activities. The anticipated impacts of the alternatives, including those required for both CEQA and NEPA, 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 significance criteria, potential environmental impacts, and 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 (NOP) for the Trinity River Channel Rehabilitation and Sediment Management for Remaining Phase 1 and Phase 2 Sites Master EIR (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.

3.1.2 Environmental Consequences/Impacts and Mitigation Measures

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 impacts of these projects 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 Lower Steiner Flat (LSF) and Upper Junction City (UJC) Channel Rehabilitation Sites. The subsections presented in the Environmental Consequences section for each resource area are described briefly below.

3.1.2.1 Methodology

This subsection identifies the methods used to analyze impacts, as well as the key assumptions used in the analysis process.

3.1.2.2 Significance Criteria

This subsection presents the criteria and thresholds used to identify potentially significant effects on the environment, in accordance with Public Resources Code section 21082.2 and CEQA

Guidelines sections 15064 and 15065. "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 and are therefore not discussed in detail (Pub. Resources Code, § 21100 and CEQA Guidelines § 15128).

3.1.2.3 Summary of Impacts Table

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 significance (i.e., no impact, less than significant, significant) for the Proposed Project and No-Project alternatives. The tables also indicate what the level of significance would be after mitigation is implemented.

3.1.2.4 Impacts and Mitigation Measures

In this subsection, each impact statement is presented followed by a detailed impact analysis. 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 provided in Appendix A. 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.

3.1.3 Mitigation and Monitoring Program

California PRC section 21081.6(a), 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." Mitigation measures that will be implemented in association with the Proposed Project are clearly identified and presented in Appendix A in language that will facilitate establishment of a monitoring and reporting program. In addition, Appendix A includes a number of design elements and construction criteria that are incorporated into the Proposed Project. Relevant information described in Appendix A 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 this project is included as Appendix A. 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 (Cal. Code Regs., tit. 14, § 15097, subd. (d)).

3.2 Land Use

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

3.2.1 Affected Environment/Environmental Setting

3.2.1.1 Existing Land Uses

All of the land within the Lower Steiner Flat Rehabilitation Site boundary (81.62 acres) is managed by the BLM (see Figure 2). Privately owned land (39.27 acres), BLM-managed land (18.29 acres), and a small amount of county land (0.53 acres) are present within the boundary of the Upper Junction City Rehabilitation Site (see Figure 3). The land within the Lower Junction City Rehabilitation Site where the U-3 spoil area is located is on private land. Public land in and adjacent to the Proposed Project sites 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 Resource Management Plan (RMP), and USFS lands are managed in accordance with the Shasta-Trinity National Forest (STNF) Land and Resource Management Plan (LRMP). These plans discuss the general condition of natural resources in the respective plan areas and prescribe appropriate land use management for lands within the plan jurisdiction. Relevant land use plans are summarized in Section 4.2.2 of the Trinity River Master EIR.

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. Douglas City, near the junction of SR-3 and SR-299 approximately 6 miles south of Weaverville, has an estimated population of 713. Junction City, located on SR-299 approximately 9 miles west of Weaverville, has an estimated population of 680.

The small communities of Junction City and Douglas City, which are near the Proposed Project sites, are situated adjacent to the Trinity River in areas where terrain is relatively gentle. Development in these rural communities is primarily residential, typified by scattered single-family residences and mobile homes. The landscaping of residential developments within the Trinity River corridor has often encroached on the river's floodplain and that of its tributaries. The Trinity River near the Proposed Project sites is used by anglers, rafters, wildlife watchers, and tourists. The river is accessible at several public and private locations throughout the area.

Existing land uses typical of the area are primarily residential, timber and other resource production, recreation, and open space. In general, privately owned parcels within and adjacent to these sites have been subdivided to the fullest extent possible under existing zoning designations. Therefore, future rural residential development on the uplands, above the river's floodplain, would be minimal. Future development is further restricted by the proximity of parcels to the Trinity River; many of these parcels are zoned Flood Hazard and Open Space. Proposed channel rehabilitation activities would not result in any changes that would conflict with future proposed land uses.

3.2.1.2 Local Land Use Planning

TRINITY COUNTY GENERAL PLAN

The project sites are located in Trinity County. The Trinity County General Plan (Trinity County 2003) applies to privately owned lands in the Upper Junction City 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 Trinity River Master EIR (Section 4.2, Table 4.2-1).

JUNCTION CITY COMMUNITY PLAN

The Junction City Community Plan (Trinity County 1987) covers approximately 42 square miles (27,000 acres) centered around the Trinity River from Maxwell Creek to Helena. There are approximately 16.5 miles of river frontage in the rural community of Junction City; private lands account for 36 percent of these lands. Neighborhoods that are adjacent to the river include Dutch Creek Road, Sky Ranch Road, Community Core, and Red Hill Road. Land uses along the river in Junction City vary by neighborhood and include timber and other resource production, agricultural, residential, commercial, village, and open space. These land uses occur at varying densities, which range from 2.5 to 160 acres.

The Upper Junction City Rehabilitation Site is within the Junction City Community Plan area, between the Community Core and Dutch Creek Road neighborhoods, and the U-3 spoil area within the Lower Junction City Rehabilitation Site boundary is located between the Community Core and the Red Hill Road neighborhoods. Land use designations in these neighborhoods are typical of the community plan area, primarily Rural Residential, Open Space, and Resource designations, with a small area in the Community Core neighborhood designated as Village.

DOUGLAS CITY COMMUNITY PLAN

The Douglas City Community Plan (Trinity County 1987) covers approximately 35 square miles (22,400 acres) centered on the Trinity River from slightly downstream of Grass Valley Creek to slightly downstream from Steiner Flat. Approximately 32.2 miles of river frontage exist in the rural community of Douglas City; private lands account for 46 percent of the lands bordering the river.

The Lower Steiner Flat Rehabilitation Site is within the Douglas City Community Plan area in the Steiner Flat neighborhood. The neighborhoods in this area typically include 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 Trinity River Master EIR, including details about Trinity County zoning districts that apply to lands in the area. All areas in the 100-year floodplain of the Trinity River have been designated by Trinity County as Scenic Conservation Zones. Nearly all of the Upper Junction City Rehabilitation Site and a portion of the Lower Steiner Flat Rehabilitation Site and the Lower Junction City Rehabilitation Site are located in the 100-year floodplain of the Trinity River as determined by FEMA. Sites in the 100-year floodplain have been designated as Zone A, Zone AE, Zone X, and Zone X500 Flood Hazard Areas[6] and areas within the 100-year floodplain are designated by Trinity County as Scenic Conservation Zones. Both the Lower Steiner Flat and the Upper Junction City sites are within the AE zone where detailed flood insurance study has defined the 100 year flood zone.

3.2.1.3 Relevant Land Use Plan

BLM's Redding Field Office manages public lands in the Trinity River basin in accordance with BLM's Redding RMP (BLM 1993) which in turn requires compliance with the Aquatic Conservation

[6] 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 one foot, or with drainage areas less than one 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.

Strategy (ACS) for Management of Habitat for Late-Successional and Old-Growth Related Species within the Range of the Northern Spotted Owl. This 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 Proposed Project site boundaries. See section 4.2.2 in the Trinity River Master EIR for more information about the RMP and Appendix A of the Master EIR for the Project's Aquatic Conservation Strategy Consistency Evaluation. 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 Wild and Scenic Rivers Act (WSA). More information on Wild and Scenic River management is provided in the recreation section of the Trinity River Master EIR (4.8) and this EA/IS (Section 3.8).

3.2.2 Environmental Consequences/Impacts and Mitigation Measures

3.2.2.1 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, Junction City Community Plan, Douglas City Community Plan, and zoning in relation to surrounding land uses and site features. The analysis was conducted through a literature review and site visits.

3.2.2.2 Significance Criteria

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

- Result in land uses that are incompatible with existing and planned land uses adjacent to actions described as part of the project;
- Conflict with any applicable land use plan, policy, ordinance, or regulation of an agency with jurisdiction over the 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.

3.2.2.3 Impacts and Mitigation Measures

Table 4 summarizes land use impacts that could result from implementation of the No-Project and Proposed Project alternatives.

Table 4. 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 sites.		
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 project could disrupt existing land uses adjacent to the rehabilitation sites.

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 sites, 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 communities of Junction City and Douglas City that could occur because of rehabilitation activities at the sites. Construction and staging areas would be located in and adjacent to the 100-year floodplain, which is designated as a Scenic Conservation overlay and is generally free of development. All of the activities at the Lower Steiner Flat Rehabilitation Site would be located on public lands (refer to Figure 2). Because activities at the Lower Steiner Flat site would occur in two phases there would be two periods of disruption, one in 2012 and one at a future date. A percentage of the activities at the Upper Junction City Rehabilitation Site would be located on public lands but some would also be located on private lands and all of the activity at the U-3 spoil area in the Lower Junction City Rehabilitation Site boundary would be on private lands (refer to Figure 3). Staging, construction, and access on private lands in and adjacent to the Upper Junction City and Lower Junction City site boundaries would require landowner approval. Work within the Dutch Creek Road and Steiner Flat Road easements would require Trinity County encroachment permits and traffic control for ingress and egress. Residential and commercial development located within or near the Upper Junction City Rehabilitation Site would be outside the areas of direct impact associated with the Proposed Project; there are no residential and commercial developments within the Lower Steiner Flat Rehabilitation Site or within the U-3 spoil area in the Lower Junction City Rehabilitation Site. Project staging and construction activities at the Upper Junction City Rehabilitation Site would occur in proximity to several residences which exist on river left adjacent to Dutch Creek Road; however, 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 A).

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, aesthetics, 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, aesthetics, and noise are discussed below 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, rehabilitation activities would not occur. Therefore, there would be no impact.

PROPOSED PROJECT

Implementation of activities proposed at the Proposed Project sites 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 Trinity River Master EIR summarizes the 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 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

Currently, there are two active aggregate mining operations near the Proposed Project sites. The Smith aggregate mine (operated by Concrete Aggregate Products from Weaverville) is located approximately half a mile downstream from the Upper Junction City site, within the Hocker Flat ESL. This operation does not entail activities in the active river channel and is buffered from the active channel by a large berm. Implementation of the Proposed Project would not affect mineral resource extraction at Hocker Flat. The Eagle Rock mine is another aggregate mining operation located upstream of Junction City. This operation is adjacent to Poison Gulch, which is a tributary of Oregon Gulch. This aggregate mining operation does not include operations in or adjacent to the Trinity River. Implementation of the Proposed Project would not affect mineral resource extraction in Poison Gulch.

Although there are two active mining claims at the Lower Steiner Flat site, there are no locally important mineral recovery sites identified by the state within the boundaries of the Proposed Project sites. 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 sites this impact would be less than significant.

3.3 Geology, Fluvial Geomorphology, Minerals, and Soils

Section 4.3 of the Trinity River Master EIR describes geologic, fluvial geomorphic, and soils resources in the vicinity of the Proposed Project sites 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

3.3.1.1 Fluvial Geomorphology

A discussion of the regional and local fluvial geomorphology is included in the Trinity River Master EIR (Section 4.3). The geomorphic environment of the Proposed Project sites is directly affected by the hydrology, channel bed composition, sediment regimes, 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 sites, hence limiting the variety of channel forms, habitats, and vegetation structures.

Extensive modification of historic and modern alluvial landforms within the sites is evident by the aerial extent of channel modifications resulting from historic mining and, more recently, impacts related to the TRD. A comprehensive discussion of these modifications is provided in the Trinity River Master EIR (Section 4.10, Cultural Resources). Table 5 provides a summary of the geomorphic features for the sites.

Table 5. Geomorphic Features within the Proposed Project Boundaries

GEOMORPHIC FEATURE	LOWER STEINER FLAT (ACRES)	UPPER JUNCTION CITY (ACRES)
Vegetated Riparian Berm*	3.625	4.063
Floodplain	3.505	2.283
Bedrock	0.858	0.078
Bar	1.305	0.483
Modified Terrace*	39.641	27.072
Upland Hillslope	18.327	5.566
Water	13.553	6.81

* = Human induced geomorphic feature

The mainstem Trinity River flows generally northwest to west through the Upper Junction City site and southwest to northwest through the Lower Steiner Flat 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 Lower Steiner Flat site is located on the Trinity River between RM 90.2 and 91.3. This reach of the river is confined by relatively narrow valley walls and adjacent steep topography (Figure 7). The approximately 1-mile long reach includes two 90-degree right (facing downstream) bends separated by a straight section 0.3 miles long; the two 90-degree bends are forced by geologic constraints (the valley walls), but they also contribute to the geomorphic potential of the reach. Because of the geologic characteristics of the reach, much of this area is not accessible to even the highest flows.

The Trinity River in this reach is confined by narrow, steep valley walls, and by high terraces underlain by large boulders or by dredge tailings. Through most of the reach, the river is a single-thread, but the downstream end includes a split flow section or anabranch. The reach contains riffles, pools, and some alternating bars typical of meandering rivers, but the river is not freely meandering. In general, the planform features of the reach are fixed by valley constraints (large bends in the valley), rather than from self-formed meanders (CH2MHill 2011).

Most of the floodplain habitat through the reach is near the channel margins, with wider areas generally on the right bank more than on the left bank. The area includes two high terraces on the right bank (between RM 91.2 and 91.7 and between RM 90.1 and 90.5) which have active mining claims. The downstream right bank terrace also contains the popular Steiner Flat campground, which is used extensively by the public. Fishing, rafting, and swimming are popular activities through the Lower Steiner Flat reach.

The valley floor through the reach ranges in width from 500 to 1,500 feet; however, the wider zones in the reach are occupied by high terraces, some of which are underlain by boulders and/or bedrock. The two large benches on the right bank (approximately centered on RM 90.9 and 90.3) are too high to be accessed except during extreme flows (and any rehabilitation actions in these areas may also be constrained by mining claims). The elevated surface bordering the left bank in the upper third of the reach (from RM 91.2 to 90.8) also appears to be underlain by large boulders and dredge tailings. This surface is too high to be inundated during ROD releases, even during the highest estimated releases.

There is a vegetated medial bar or island near the downstream end of the reach that bifurcates flow in the mainstem; the secondary channel west of the medial bar was observed to convey approximately 20 to 30 percent of the flow (approximately 520 cfs), even during mid-summer low flow (CH2MHill 2011). This feature appears to be sustainable from a geomorphic and sediment transport perspective, and it provides high quality rearing and spawning habitat during low flow.

Another notable feature in the Lower Steiner Flat reach is a long, constructed side channel located on the right bank between RM 90.15 and RM 90.5. This side channel was constructed in the early 1980s (Glase 1994), and it generally follows a remnant channel created by the dredging. It has a single primary inlet and outlet with one area near the middle that provides lateral flow exchange with the main channel at higher flows, as confirmed by the hydraulic model (discussed below).

Even though this side channel has persisted at least 30 years, its year-round habitat value could be enhanced (CH2MHill 2011).

The Upper Junction City Rehabilitation Site is located on the Trinity River between approximately RM 79.8 and 80.4. The river segment in the Upper Junction City Rehabilitation Site has been severely impacted by historical mining activities. Both the dredging and river re-incision into mining debris washed down from the tributaries have likely contributed to channelization of the present stream and its disconnection from the adjacent bottom lands.

The site consists of two long bends around two arc-shaped terraces (Figure 8). The more upstream terrace on river left consists of high barren flats of compacted tailings and several piles of loose tailings, one of which is currently being actively recruited into the river near the center of the site. Pockets of vegetation are located in pits and swales at the base of the tailings. The more downstream terrace on river right includes barren tailings flats with a fringe of riparian vegetation along the river bank, and a vegetated swale along the distal edge of the terrace adjacent to the valley hillslope (USFWS and USBR 2011).

Channel morphology includes two subtle crossing riffles in the upper half of the site, pool habitat along the right bank of the more upstream bend, and a large bar complex in the downstream third of the site. This bar complex is formed from gravel recruited off the eroding tailings pile on river left, and in 2010 created a backwater that, at baseflow, extended as far as the most upstream riffle crossing. The 2011 spring high-flow release from Lewiston Dam, which peaked at close to 12,900 ft3/s at the site, caused considerable additional erosion along the full length of that tailings pile, as well as along the left stream bank for a distance of about 200′ downstream from the tailings. The extreme upstream end of the site is occupied by a long (> 700 feet) riffle. The overall slope of the site is 0.0024, however, the drop is concentrated on the long riffle at the far upstream end of the site and on the slip face of the bar complex at the far downstream end of the site. The slope through the backwatered center of the site is nearly flat (USFWS and USBR 2011).

Through most of the site, the channel is entrenched between the terraces, as well as a portion of the Highway 299 embankment and other high surfaces with structures. As a result, the average channel width through the upstream half of the site is about 90 feet. The channel gets progressively wider in the downstream direction due to the presence of the bar complex and the backwatered zone upstream from it. The Dutch Creek Bridge locks the position of the downstream end of the reach in place. Overall, the potential for large-scale changes in channel planform is limited, short of undertaking massive excavation of the left-hand terrace (USFWS and USBR 2011).

3.3.1.2 Mineral Resources

The geologic properties of many of the units in the 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.

Figure 7. LSF Geomorphic Features

LEGEND

Environmental Site Limit (ESL) (81.619 Acres)

Ordinary High Water Mark (OHWM)

LSF Geomorphic Features

Bar
(Overall 1.305 Acres)
(Impacted Phase A 0.143 Acres)
(Impacted Phase B 0.030 Acres)

Bedrock
(Overall 0.858 Acres)
(Impacted Phase A 0.000 Acres)
(Impacted Phase B 0.003 Acres)

Berm
(Overall 3.625 Acres)
(Impacted Phase A 0.817 Acres)
(Impacted Phase B 0.506 Acres)

Floodplain
(Overall 3.505 Acres)
(Impacted Phase A 0.111 Acres)
(Impacted Phase B 0.551 Acres)

Hillslope
(Overall 18.327 Acres)
(Impacted Phase A 0.491 Acres)
(Impacted Phase B 2.486 Acres)

Modified Terrace
(Overall 39.641 Acres)
(Impacted Phase A 11.521 Acres)
(Impacted Phase B 5.945 Acres)

California State Plane Zone 1, NAD83 Feet

Imagery collected by Watershed Sciences Inc., on 8-25-2011

\\lf-gis-wsicorp_gis\Projects\Trinity River\Project\Lower Steiner Flats\Draft Final\Figure 6 - Lower Steiner Flat Geomorphic Features.mxd

Prepared for the Bureau of Reclamation
Trinity River Restoration Program

TRINITY RIVER RESTORATION PROGRAM - LOWER STEINER FLAT
2012 PROPOSED CHANNEL REHABILITATION SITE ENVIRONMENTAL ASSESSMENT/INITIAL STUDY

DATE: 12-21-2011

0 500 1,000 1,500 2,000 Feet

SCALE: 1:4,200

North Wind Services
1425 HIGHAM ST.
IDAHO FALLS, ID 83402
WEB: www.northwindarp.com
Phone: (208) 528-8718 FAX: (208) 528-8714

Figure 8. UJC Geomorphic Features

LEGEND

Environmental Site Limit (58.10 acres)

Ordinary High Water Mark (OHWM)

UJC Geomorphic Features

Bar
(Overall 0.483 Acres)
(Impacted 0.075 Acres)

Bedrock
(Overall 0.078 Acres)
(Impacted 0.000 Acres)

Berm
(Overall 4.063 Acres)
(Impacted 0.764 Acres)

Fill
(Overall 0.232 Acres)
(Impacted 0.00 Acres)

Floodplain
(Overall 2.283 Acres)
(Impacted 1.641 Acres)

Hillslope
(Overall 5.566 Acres)
(Impacted 0.654 Acres)

Tailings
(Overall 13.058 Acres)
(Impacted 4.912 Acres)

Modified Terrace
(Overall 27.072 Acres)
(Impacted 10.980 Acres)

LJC Geomorphic Features

Fill
(Impacted 0.001 Acres)

Tailings
(Impacted 4.292 Acres)

Modified Terrace
(Impacted 0.615 Acres)

California State Plane Zone 1, NAD83 Feet

Imagery collected by Watershed Sciences Inc., on 8-25-2011

Prepared for the Bureau of Reclamation
Trinity River Restoration Program

TRINITY RIVER RESTORATION PROGRAM - UPPER JUNCTION CITY
2012 PROPOSED CHANNEL REHABILITATION SITE ENVIRONMENTAL ASSESSMENT/INITIAL STUDY

DATE:
1-03-2012

0 300 600 900 1,200 Feet

SCALE:
1:3,100

North Wind
A CIRI COMPANY
North Wind Services
1425 HIGHAM ST.
IDAHO FALLS, ID 83402
WEB: www.northwindarp.com
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Historically, the principal mineral of economic importance was gold. Both lode (hardrock) mines and placer (alluvial gravel) mines were present in the watershed with activity from 1848 to the present. 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, although some gold mining activity continues, primarily using suction dredging. 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.

The General Mining Law of 1872 is one of the major statutes that direct the federal government's land management policy. The law grants free access to individuals and corporations to prospect for minerals in public domain lands and allows them, upon making a discovery, to stake (or "locate") a claim on that deposit. Sections of the Trinity River that are under federal jurisdiction are therefore open to prospecting. There are 36 named active mining claims (BLM 2008) associated with the Trinity River in the 40-mile reach below Lewiston Dam. BLM records identify most of these claims as placer claims. Placer claims are established with the intent to sort unconsolidated alluvial materials for precious metals (e.g., gold, platinum). Currently, there are no authorized operating plans for placer mining activities within or in close proximity to any TRRP rehabilitation sites; however, there are two mining claims at the Lower Steiner Flat site where casual mining with non-motorized equipment frequently occurs. While suction dredging is the principal mining method used on the Trinity River, there is currently a moratorium on suction dredging throughout California pending completion of a Suction Dredge Permitting Program EIR by the CDFG that analyzes impacts of dredging on state fish and wildlife resources. The Draft Supplemental EIR for the Suction Dredge Permitting Program was made available for public comment in February 2011 (CDFG 2011) and the Final Supplemental EIR and regulatory updates are anticipated for February 2012. A Notice of Determination and CEQA Findings are expected by spring 2012.

Other than mining activities authorized under the Surface Mining and Reclamation Act (SMARA), information on private mining activities in Trinity County is limited. According to records provided by BLM and Trinity County, there are currently no approved mining activities operating under the provisions of the 1872 mining law or a county SMARA permit within, or in close proximity to, the Proposed Project sites. There are, however, 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 upstream of Junction City. The Smith Mine is active on an intermittent basis based on market conditions.

The Proposed Project sites have been heavily disturbed by previous mining activities. Dredger mining impacts in the Steiner Flat area (especially about 1 mile upstream of the Lower Steiner Flat Rehabilitation Site) were less devastating than in some other reaches along the Trinity River (USFWS and HVT 1999). However, historic aerial photographs of the reach from 1944 show an unvegetated and braided channel, confined by dredge spoils (CH2MHill 2011). Active mining claims exist on the two high terraces on the right bank (between RM 91.2 and 91.7 and between RM 90.5 and 90.1). TRRP is working closely with BLM to ensure that construction efforts are consistent with BLM's long-term management goals for the site, where mining claims presently exist.

The Upper Junction City Rehabilitation Site river segment is severely impacted by historical mining activities, which include valley and channel aggradations caused by upslope hydraulic mining, followed by bucket-line dredging of the channel and valley bottom (Krause et al. 2010). Both the dredging and river re-incision into mining debris washed down from the tributaries have likely contributed to channelization of the present stream and its disconnection from the adjacent bottom lands. There are no mining concerns at the Lower Junction City site.

3.3.1.3 Geologic Hazards

A discussion of the regional seismicity and seismic hazards is provided in the Trinity River 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.

3.3.1.4 Soils

The soils at the Proposed Project sites are described in the Soil Survey of Trinity County, California, Weaverville Area (USDA 1998). There are five main soil types in the project area at the Lower Steiner Flat Rehabilitation Site. They are 102 - Atter-Dumps, Dredge Tailings-Xerofluvents Complex, 2 to 9 percent slopes; 112 – Brownbear-Bamtush Complex, 30 to 50 percent slopes; 118 – Cargent-Demogul association, 50 to 75 percent slopes; 134 – Demogul Gravelly Loam, 50 to 75 percent slopes; and 217 – Xerofluvents-Riverwash Complex, 0 to 5 percent slopes. There are three main soil types at the Upper Junction City Rehabilitation Site. They are 101 – Atter Extremely Gravelly Loamy Sand, 9 to 15 percent slopes; 102 - Atter-Dumps, Dredge Tailings-Xerofluvents Complex, 2 to 9 percent slopes; and 217 – Xerofluvents-Riverwash Complex, 0 to 5 percent slopes. The soil types within the U-3 spoil area at the Lower Junction City Rehabilitation Site are 102 – Atter-Dumps, Dredge Tailings-Xerofluvents Complex, 2 to 9 percent slopes, and 218 – Xerorthents-Rock Outcrop Complex, 2 to 15 percent slopes. Brief descriptions of these are included below.

101 – Atter Extremely Gravelly Loamy Sand, 9 to 15 percent slopes. This map unit is found on alluvial fans and stream terraces. This unit is about 80 percent Atter and similar soils and 20 percent minor components consisting of xerofluvents (5 percent), rock outcrop (5 percent), Weaverville (5 percent), and xeralfs (2 percent). 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.

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).

112 – Brownbear-Bamtush Complex, 30 to 50 percent slopes. This map unit is on mountains. The unit is 50 percent Brownbear soils and 30 percent Bamtush soils. The Brownbear soil is moderately deep and well drained. The Bamtush soil is very deep and well drained. For both Brownbear and Bamtush soils, permeability is moderate, available water capacity is low, and runoff is rapid. This unit also includes about 20 percent minor components. This soil map unit is on the hillslope above the river and floodplain and is not subject to flooding (USDA 1998).

118 – Cargent-Demogul association, 50 to 75 percent slopes. This map unit is on mountain slopes and ridges. This soil unit is 45 percent Cargent soils, 35 percent Demogul soils and 20 percent minor components. The Cargent soil is moderately deep and is well drained. Permeability is moderately high to high in the Cargent soil. Available water capacity is low, and runoff is very rapid. This soil map unit is on the hillslope above the river and floodplain and is not subject to flooding (USDA 1998).

134 – Demogul Gravelly Loam, 50 to 75 percent slopes. This very deep, well-drained soil is on mountains. This unit is about 80 percent Demogul soils and 20 percent minor components. Permeability is moderately slow, available water capacity is high, and runoff is very rapid. This soil map unit is on the hillslope 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 on floodplains and stream terraces. It formed in alluvium derived from mixed rock sources. This unit is about 45 percent Xerofluvents and 35 percent Riverwash. Varying areas of the stream channel occur within this map unit that are under water during some times 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).

218 – Xerorthents-Rock Outcrop Complex, 2 to 15 percent slopes. This map unit represents a small portion of the area within the Lower Junction City boundary that is proposed for the U-3 spoil area. It eroded from hydraulic mining alluvium derived from igneous, metamorphic and sedimentary rock and is found on mountain slopes. This soil type is well drained and the available water capacity is very low. The erosion hazard is slight (USDA 1998).

3.3.2 Environmental Consequences/Impacts and Mitigation Measures

3.3.2.1 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 2011); Trinity River Mainstem Fisheries Restoration Program EIS; Trinity River Maintenance Flow Study Final Report (McBain and Trush 1997); Trinity County General Plan; and previously cited online and Geographic Information Systems (GIS) data sources.

3.3.2.2 Criteria for Determining Significance

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. Significant impacts would occur 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 ten Trinity River healthy alluvial river attributes.

3.3.2.3 Impacts and Mitigation Measures

Table 6 summarizes the potential geology, fluvial geomorphology, minerals and soils impacts that would result from the No-Project and Proposed Project alternatives.

Table 6. 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	Significant	Less than significant

[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 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 significant potential to increase erosion and subsequent short-term sedimentation of the Trinity River. The significance of erosion at each site 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, alcoves, 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. Because activities at the Lower Steiner Flat site would occur in two phases there would be an increased potential for sedimentation and erosion.

Construction activities in the river and the 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).

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 significant increase in soil compaction would cause a potentially significant increase in erosion. Therefore, this impact is significant.

MITIGATION MEASURES

Construction activities associated with the project could result in increased erosion and short-term sedimentation of the Trinity River. Therefore, mitigation measures 4.3-2a and 4.3-2b described in Appendix A 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

Trinity County was historically a gold mining region, and many unpatented mining claims exist along the Trinity River. A map of 2009 active mining claims is provided in the Trinity River Master EIR (NCRWQCB and USBR 2009). The development of mineral resources may be inhibited if a mining claim occupies a rehabilitation site. At these sites, mining would likely be precluded during construction for safety reasons. Post-construction, fishery habitat improvements and riparian plantings would either preclude mining that would negatively impact rehabilitation site habitat improvements, or if mining were to be permitted in the rehabilitation areas, reclamation to habitat rehabilitation standards would be required as a permit condition. Overall, the Proposed Project could inhibit the development and extraction of mineral resources, including precious metals and aggregate resources within, and close to, the Proposed Project sites. Channel rehabilitation activities could inhibit the development of mineral resources on mining claims or private lands and would be a significant impact if such activities occurred or were planned for the stretches of the river near the Proposed Project sites.

There are two current aggregate mining activities operating through a County SMARA permit, the Eagle Rock and Smith aggregate mines. The Eagle Rock Mine is not located within hydrologic influence of the Trinity River and would not likely be affected by the Proposed Project. The Smith Mine is located within the boundary of the completed Hocker Flat Rehabilitation Site and continues to operate intermittently following completion of the Hocker Flat Project. Additionally, there are at least 36 named mining claims along the Trinity River on public lands managed by BLM. Currently, BLM has no authorized operating plans for mines along this reach of the Trinity River. Mining activities are likely to occur on private lands in this reach; however, it is unlikely that land owners would authorize activities that would preclude their ability to develop mineral resources. There are no current mining operations in the Upper Junction City Rehabilitation Site. However, there are two active claims at the Lower Steiner Flat Rehabilitation Site. Therefore the project would have potentially significant impacts on the potential development of mineral resources at that site. This would be a significant impact.

The project could adversely affect mineral claimants or recreational miners by reducing potential flexibility for mining exploration and development. Future consequences to mineral claimants or recreational miners could entail increased reclamation costs, decreased land available for mining or dredging, reduced flexibility in developing exploration and mine plans, and diminished access to mineral claims. Project construction activities associated with the Proposed Project that occur in the river could temporarily or permanently preclude individuals from accessing and actively working their mining claims. This could threaten their ability to maintain individual claims. Because activities at the Lower Steiner Flat site would occur in two phases the potential disruption to mining would be extended.

The TRRP is working closely with BLM to ensure that the construction efforts are consistent with BLM's long-term management goals for the locations where mining claims presently exist. The TRRP would also work closely with the mining community to address concerns related to mining once the project is completed. Mineral claimants that may be affected by the restoration efforts would be contacted to discuss future mining plans and options to reduce Project impacts to these plans.

The improvement of fish and wildlife habitat falls within the parameters of a federal agency's authority to manage "other surface resources" on unpatented mining claims granted by the Surface Resources Act, 30 U.S.C. § 612(b) (1994). Two Interior Board of Land Appeals (IBLA) decisions are referenced that support this authority. IBLA 87-340, July 13, 1989 states that the locator of an unpatented mining claim subject to the Act may not interfere with the right of the United States to manage the vegetative and other surface resources of the land, or prevent agents of the federal government from crossing the locator's claim in order to reach adjacent land for purposes of managing wild-game habitat or improving fishing streams so as to thwart the public harvest and proper management of fish and game resources on the public lands generally, both on located and on adjacent lands. IBLA 92-531 and 92-532, October 7, 1997, states that an agency's right to manage the surface resources on unpatented mining claims is not confined to simply preserving those resources as they exist, but also embraces enhancing those resources. Accordingly, fish habitat enhancement techniques fall within an agency's authority to manage "other surface resources" on unpatented mining claims.

MITIGATION MEASURES

Implementation of the project could interfere with existing, proposed, or potential development of mineral resources. Therefore, mitigation measures 4.3-3a, 4.3-3b, and 4.3-3c described in Appendix A 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.

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 sites. 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 Trinity River Master EIR (Section 4.4).

3.4.1 Affected Environment/Environmental Setting

3.4.1.1 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 EIS, 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[7]. 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.

3.4.1.2 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 has 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 is 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 Trinity River Master EIR was completed, approximately 75 wells/septic systems had been improved and another 40 were planned for enhancement with TRRP funding. Additionally, there are a number of wells that are designed to be inundated, and often are, during the course of a water year.

3.4.1.3 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.

[7] The percentage of the Trinity River diverted to the CVP is the percentage of total reservoir release, not the percentage of the inflow.

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, or certainly past Canyon Creek (in the Proposed Project sites vicinity), 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 (U.S. Bureau of Reclamation and the North Coast Regional Water Quality Control Board 2006). For this document, the OHWM was field verified during the wetland delineation and that value is represented on all figures. The verified OHWM was at an elevation greater than the modeled 6,600 cfs line. 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 Trinity River 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 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 water-surface elevations (WSEs) 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 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

3.4.2.1 Methodology

Hydraulic models allow the preliminary evaluation of risks to Trinity River properties by comparing the WSE of the Proposed Project sites' design conditions with the existing conditions. The comparison indicates how the features of the Proposed Project sites could affect the 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.

3.4.2.2 Significance Criteria

The Proposed Project would have a significant impact related to water resources 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.

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

- The base floodwater surface elevation 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.

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.

3.4.2.3 Impacts and Mitigation Measures

Table 7 summarizes the potential water resources impacts that could result from construction of the project.

Table 7. 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 BFEs 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 hydraulics 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 established for the Proposed Project sites. 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 sites. Activities intended to modify the bed and banks of the Trinity River could have ancillary impacts to the bed and banks downstream. To date, the TRRP staff has 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, 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 TRRP and the activities described in Chapter 2 and Appendix A, 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 sites 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 Trinity River Master EIR, Section 4.5, Water Quality. Information related to this topic is also provided in the Trinity River 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 (North Coast Regional Water Quality Control Board 2007).

The Proposed Project is subject to compliance with the Water Quality Control Plan for the North Coast Region (Basin Plan). The beneficial uses for the Trinity River defined in the Basin Plan are listed in Table 4.5-1 of the Trinity River 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 Trinity River 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 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 Clean Water Act (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 TRGA) 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 Sawmill and Lowden 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 is now processing data, collected pre- and post-high flows, to determine the extent and type of change that has occurred on the river's bottom. Pre- and post-flow data on river bathymetry will be evaluated and reported in 2012. The results, in combination with Phase I reporting, will assist the TRRP in determining how to proceed with future gravel augmentation at rehabilitation sites and during high flow augmentation efforts. During 2012 high flow releases from Lewiston Dam, no coarse sediment (gravel) will be added and no addition of mobile gravel (<6 inch diameter) is included in the Proposed Project.

Turbidity

The Basin Plan (North Coast Regional Water Quality Control Board 2007) 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 sites. 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 Trinity River 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 (mg/L) or more recently as turbidity, which is measured in NTUs. Turbidity generally does not cause acute adverse affects 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 per liter (mg/L) during summer (approximately 900 NTU). 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 (North Coast Regional Water Quality Control Board and U.S. Bureau of Reclamation 2009). In the lab, benthic feeding success of coho salmon in water with turbidity levels as high as 100 NTU 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 NTU) as protective cover during their spawning migrations through the project areas (Gutermuth, pers. obs.). Finally, the Alaska Department of Environmental Conservation (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 NTU 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, so 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 these projects are 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 Trinity River 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. U.S. Geological Survey (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's 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

3.5.2.1 Methodology

For the past six years, the TRRP has implemented a number of channel rehabilitation projects and completed similar activities to those proposed at the Proposed Project sites. 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 sites would comply with Basin Plan objectives for the Trinity River.

3.5.2.2 Significance Criteria

The Proposed Project would result in significant adverse impacts 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 (North Coast Regional Water Quality Control Board 2007).

3.5.2.3 Impacts and Mitigation Measures

Table 8 summarizes the potential water quality impacts resulting from construction and operation of the project.

Table 8. 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

Under the Proposed Project, the activities described in Chapter 2 would temporarily increase turbidity and total suspended solids in the Trinity River. The incorporation of design elements and construction criteria described in Appendix A (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 the 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. Because activities at the Lower Steiner Flat site would occur in two phases there would be two distinct periods when short-term increases in turbidity and suspended solids concentrations could occur, one in 2012 and one when Phase B is implemented. Short-term increases in turbidity and suspended solids levels during construction would be a significant impact.

MITIGATION MEASURES

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 A 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 3.5-2: 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

Riverine activities associated with the Proposed Project, described in Chapter 2, emphasize excavation of anabranches or low flow side channels; retention of high flow side channels; excavation of alcoves; berm and vegetation removal; in-channel fill as point bars; and incorporation of hydraulic structures, mature alder cover, and large wood at the Lower Steiner Flat Rehabilitation Site; and excavating off-channel rearing ponds; developing split flows; lowering terraces and planting vegetation; dissecting riparian fringes and connecting to floodplain swales; and incorporation of large wood at the Upper Junction City Rehabilitation Site.

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.

Implementing the Proposed Project would increase turbidity and total suspended solids in the river and fluvial surfaces following construction. Because activities at the Lower Steiner Flat site would occur in two phases there is the potential for these impacts to occur at two distinct times, one in 2012 and one when Phase B is implemented. Following construction, increases in turbidity levels would occur when newly disturbed areas are exposed to elevated river stages during high river flows. 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 the 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, such as 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

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 A 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). At the Lower Steiner Flat site, impacts could occur during Phase A implementation in 2012 and during implementation of Phase B. 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 3.12, 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. Additional requirements outlined in Appendix A would be incorporated into the project descriptions to reduce the potential impact. However, construction activities could result in a spill of hazardous material, which would be a significant impact.

MITIGATION MEASURES

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 A 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, including those measures described in Appendix A, 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
- Chemical constituents.

Although the design elements and construction methods described in Appendix A are intended to minimize these impacts, the activities associated with construction, particularly in riverine and in-channel activity areas, would result in significant impacts.

MITIGATION MEASURES

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 A 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.

3.6 Fishery Resources

This section describes the fishery resources and aquatic habitats that are known to occur within the boundaries of the sites and evaluates the impacts of the Proposed Project on these resources. The Trinity River Flow Evaluation Report (USFWS and HVT 1999) determined that lack of spawning and rearing habitat for juvenile salmonids is likely a primary factor in limiting the recovery of salmonid populations in the Trinity River. Activities at the Proposed Project sites 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 Trinity River Master EIR (Section 4.6 and Appendix G). The Magnuson-Stevens Fishery Conservation and Management Act (MSA) and Essential Fish Habitat (EFH) are also described in the Master EIR (Section 4.6).

3.6.1 Affected Environment/Environmental Setting

3.6.1.1 Native Anadromous Fish Species

The native anadromous species of interest in the mainstem Trinity River and its tributaries are chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), steelhead (*Oncorhynchus mykiss irideus*) and Pacific lamprey (*Entosphenus tridentatus*). There are two spawning races of chinook salmon (spring- and fall-run) and two spawning races of steelhead (winter- and summer-run). The life histories and fresh water habitat requirements of these and other species and their distinct spawning populations are described in Appendix G of the Trinity River Master EIR.

3.6.1.2 Resident Native and Non-Native Fish Species

Resident native fish species found in the Trinity River Basin include game fish such as rainbow trout (*Oncorhynchus mykiss*) and non-game fish such as speckled dace (*Rhinichthys osculus*), Klamath smallscale sucker (*Catostomus rimiculus*), Pacific lamprey, Klamath River lamprey (*Lampetra similis*), three-spined stickleback (*Gasterosteus aculeatus*), coast range sculpin (*Cottus aleuticus*), and marbled sculpin (*Cottus klamathensis*). The abundance of resident native species and the factors affecting their abundance within the basin are not well understood; however, all these species evolved and existed in the Trinity River prior to the TRD and are presumably adapted to those conditions.

Non-native fish species found in the Trinity and Klamath River Basins include American shad (*Alosa sapidissima*), brown bullhead (*Ameiurus nebulosus*), green sunfish (*Lepomis cyanellus*), brown trout (*Salmo trutta*), and brook trout (*Salvelinus fontinalis*) (USFWS, unpublished data). American shad occur in the lowermost portions of the Trinity River Basin, but are primarily found in the Lower Klamath River Basin. Anadromous brown trout were propagated in the Trinity River Salmon and Steelhead Hatchery until 1977, when this practice was discontinued because of small numbers and the lack of anadromous characteristics of fish entering the hatchery. Currently, brown trout are largely limited to the upper portions of the river, although some brown trout exhibit anadromous characteristics. Brook trout provide a significant sport fishery in the tributary streams and high-elevation lakes of the Trinity River Basin. Its life cycle and habitat requirements are similar to those of brown trout. The structure and abundance of populations of these species in the Trinity and Lower Klamath River Basins are unknown.

3.6.1.3 Special-Status Species

Special-status fish species with the potential to occur at rehabilitation sites in the Trinity River are discussed in the Trinity River Master EIR (Section 4.6 and Appendix G) and are summarized below.

COHO SALMON

The Southern Oregon/Northern California Coasts (SONCC) Evolutionarily Significant Unit (ESU) of coho salmon was listed as threatened pursuant to the federal ESA on April 25, 1997. This listing includes coho salmon from the Trinity River and Klamath River Basins. Critical habitat for the SONCC ESU coho salmon was designated on May 5, 1999; in the Trinity River Basin, designated critical habitat for this species consists of the water, substrate, and adjacent riparian zone of those estuarine and riverine reaches (including off-channel habitats and accessible tributaries) downstream of Lewiston Dam (CFR Vol. 64, No. 86, May 5, 1999). The 2000 Biological Opinion on the Trinity River Mainstem Fishery Restoration EIS (NMFS 2000) found that the program *"is not likely to jeopardize the continued existence of the [SONCC ESU] coho salmon"*, and *"is not likely to destroy or adversely modify critical habitat for the [SONCC ESU] coho salmon."*

Both Reclamation's 2000 Biological Assessment and NMFS' subsequent 2000 Biological Opinion acknowledged that construction at channel rehabilitation projects would not occur "within the wetted channel." However, in-channel work would occur related to proposed activities at the Proposed Project sites. After considerable restoration planning and design work by TRRP staff, NMFS with support from the TMC now considers in-channel work a necessary component to successfully carry out and achieve program goals and objectives as detailed in the ROD. The TRRP concluded that reinitiation of formal consultation under Section 7 of the ESA was not warranted because effects to SONCC coho salmon were consistent with and not likely to rise above those that

were considered in the original 2000 Biological Opinion. In May 2006, NMFS concurred that reinitiation of formal consultation was not warranted if bank rehabilitation activities were authorized within the wetted channel (NMFS 2006).

STEELHEAD

The KMP ESU of steelhead, which includes stocks from the Trinity River, was proposed for federal listing as threatened on March 16, 1995; however, on February 7, 1998, NMFS determined that the population did not warrant threatened status, but that it did warrant candidate status (as defined by NMFS). Subsequent information on the KMP ESU steelhead was evaluated and NMFS made a final listing determination that the ESU did not warrant listing in April 2001 (CFR Vol. 66, No. 65). The summer-run population segment of this ESU remains a California Species of Special Concern, as well as a USFS sensitive species (Moyle et al. 1995; USFWS 1995).

CHINOOK

Similarly, in a 1998 status review of all west coast chinook salmon stocks (Myers et al. 1998), the Upper Klamath-Trinity Rivers ESU chinook salmon was determined to not warrant listing as a threatened or endangered species. However, spring-run chinook salmon within the Klamath-Trinity Basin is a California Species of Special Concern (Moyle et al. 1995).

PACIFIC LAMPREY

The Pacific lamprey, along with three other lamprey species, was petitioned for federal listing in 2003. On December 27, 2004, the USFWS announced that the petition along with additional information does not present substantial scientific or commercial information indicating that listing of these species may be warranted (CFR Vol. 64, No. 86, December 27, 2004). BLM lists the Pacific lamprey as a sensitive species.

LOCAL AQUATIC HABITAT

The aquatic environment in the general vicinity of the Proposed Project is characterized by a sequence of aquatic mesohabitat types. Each of these habitat types consists of distinctive combinations of depth, water velocity, water temperature, cover, substrate composition (bedrock, cobble, gravel, sand, silt, etc.), and adjacent riparian vegetation. Figures 9, 10, and 11 illustrate aquatic mesohabitat as qualitatively defined by the USFWS in a 2002 survey.

In general, moderate slope (near riffle) and low slope (glide) areas equate to faster reaches than deep pools, and runs, which are intermediate in depth. A low slope area may alternatively be named a glide and moderate slope areas (near riffle) often include aerated waters. Riparian vegetation directly adjacent to the river is referred to as shaded riverine aquatic (SRA) habitat and is included as a component of designated critical habitat for coho salmon, as well as a component of EFH for both coho and chinook salmon. Juvenile coho are expected to utilize suitable habitats in the 40-mile reach of the mainstem Trinity River below Lewiston Dam year-round (North Coast Regional Water Quality Control Board and U.S. Bureau of Reclamation 2009). Pool habitat associated with boulders and LWD is particularly preferred by rearing coho salmon (Hassler 1987; Sandercock 1991; Moyle 2002).

In 2003, a radio-telemetry study of migration and behavioral thermoregulation of adult spring-run chinook salmon was conducted in the upper Trinity River (Marine and Lyons 2004). Tagged fish used available run and glide habitats that were typically large (surface area) and offered depths up to 4 feet. These habitats held fish for longer periods than other portions of the study reach.

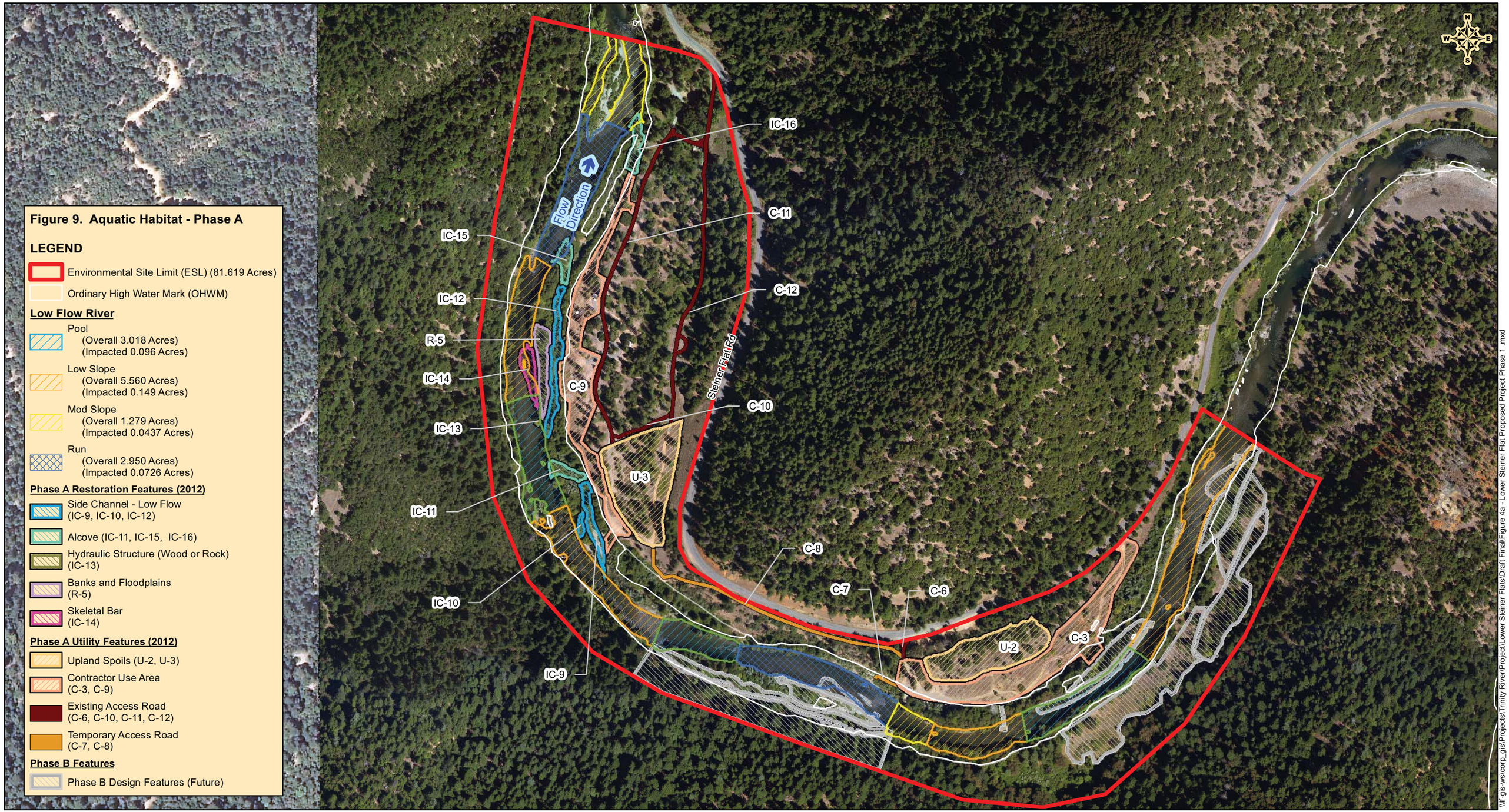

Figure 9. Aquatic Habitat - Phase A

LEGEND

- Environmental Site Limit (ESL) (81.619 Acres)
- Ordinary High Water Mark (OHWM)

Low Flow River

- Pool (Overall 3.018 Acres) (Impacted 0.096 Acres)
- Low Slope (Overall 5.560 Acres) (Impacted 0.149 Acres)
- Mod Slope (Overall 1.279 Acres) (Impacted 0.0437 Acres)
- Run (Overall 2.950 Acres) (Impacted 0.0726 Acres)

Phase A Restoration Features (2012)

- Side Channel - Low Flow (IC-9, IC-10, IC-12)
- Alcove (IC-11, IC-15, IC-16)
- Hydraulic Structure (Wood or Rock) (IC-13)
- Banks and Floodplains (R-5)
- Skeletal Bar (IC-14)

Phase A Utility Features (2012)

- Upland Spoils (U-2, U-3)
- Contractor Use Area (C-3, C-9)
- Existing Access Road (C-6, C-10, C-11, C-12)
- Temporary Access Road (C-7, C-8)

Phase B Features

- Phase B Design Features (Future)

California State Plane Zone 1, NAD83 Feet

Imagery collected by Watershed Sciences Inc., on 8-25-2011

\\lf-gis-ws\corp_gis\Projects\Trinity River\Project\Lower Steiner Flats\Draft Final\Figure 4a - Lower Steiner Flat Proposed Project Phase 1.mxd

Prepared for the Bureau of Reclamation
Trinity River Restoration Program

TRINITY RIVER RESTORATION PROGRAM - LOWER STEINER FLAT PHASE A (2012) AND PHASE B (FUTURE) PROJECTS
PROPOSED CHANNEL REHABILITATION SITE ENVIRONMENTAL ASSESSMENT/INITIAL STUDY

DATE: 2-02-2012

0 500 1,000 1,500 2,000 Feet

SCALE: 1:4,200

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