Trinity River Channel Rehabilitation Sites: Bucktail (River Mile 105.3-106.35) and Lower Junction City (River Mile 78.8-79.8)

Final Environmental Assessment/Initial Study
DOI-BLM CA-N060-2014-014-EA and TR-EA0114

April 2014

This document has been split into six parts to reduce the size of the document for distribution via the internet.

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To tier to:

The Trinity River Mainstem Fishery Restoration Environmental Impact Statement

And

The Channel Rehabilitation and Sediment Management for Remaining Phase 1 and Phase 2 Sites Master Environmental Impact Report (State Clearinghouse # 2008032110)

Previous Rehabilitation Site Photos (Douglas City and Lower Steiner Flat Rehabilitation Sites)

April 2014

California Lead Agency for CEQA
North Coast Regional Water Quality Control Board

Project Proponent and Federal Lead Agency for NEPA
Trinity River Restoration Program
U. S. Department of the Interior
Bureau of Reclamation

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Acronyms and Abbreviations

AEAM	Adaptive Environmental Assessment and Management
afa	acre feet annually
APE	Area of Potential Effect
Basin Plan	Water Quality Control Plan for the North Coast Region
BFE	base flood elevation
BLM	U.S. Bureau of Land Management
BMI	Benthic Macroinvertebrate
BMP	best management practice
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH_4	methane
CHP	California Highway Patrol
CLJ	Constructed Log Jam
CNDDB	California Natural Diversity Database
CO	carbon monoxide
CO_2	carbon dioxide
CRHR	California Register of Historic Resources
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
CY	cubic yard
dB	logarithmic decibel
dBA	"A-weighted" decibel scale
dbh	diameter at breast height
DWR	Department of Water Resources
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
ELJ	Engineered Log Jam
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESL	Environmental Study Limit
ESU	Evolutionarily Significant Unit
FAC	Facultative Plants

FACU	Facultative Upland Plants
FACW	Facultative Wetland Plants
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
fps	feet per second
GHG	greenhouse gas
GIS	geographic information system
HAP	Hazardous Air Pollutant
HEC-RAS	Hydraulic Engineering Center River Analysis System
HVT	Hoopa Valley Tribe
IAP	Integrated Assessment Plan
IS	Initial Study
KMP	Klamath Mountains Province
KOP	key observation point
LCSD	Lewiston Community Services District
L_{dn}	day-night average sound level
LRMP	Land and Resource Management Plan
LWD	large woody debris
MBTA	Migratory Bird Treaty Act
MDB&M	Mount Diablo Base and Meridian
MFF	maximum fishery flow
mm	millimeter
MMRP	Mitigation Monitoring and Reporting Program
MoA	Memorandum of Agreement
MSA	Magnuson-Stevens Fishery Conservation and Management Act
msl	mean sea level
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCAB	North Coast Air Basin
NCUAQMD	North Coast Unified Air Quality Management District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NI	No Indicator
NMFS	National Marine Fisheries Service
NOx	nitrogen oxide
NRHP	National Register of Historic Places
NTU	nephelometric turbidity unit
OBL	Obligate Wetland Plants
OHWM	ordinary high water mark
PA	Programmatic Agreement
PJD	preliminary jurisdiction determination
PM_{10}	particulate matter less than 10 microns in aerodynamic diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in aerodynamic diameter
PRC	Public Resources Code
Proposed Project	Bucktail and Lower Junction City Rehabilitation Sites

Q	flow rate (typically expressed in cfs)
$Q_{1.5}$	1.5-year return interval design flow
Q_{100}	100-year flood flow
Q_s	summer base flow
Reclamation	U.S. Bureau of Reclamation
Regional Water Board	North Coast Regional Water Quality Control Board
RM	River Mile
RMP	Resource Management Plan
ROD	Record of Decision
SAB	Scientific Advisory Board
SHPO	State Historic Preservation Office
SMARA	Surface Mining and Reclamation Act
SO_2	sulfur dioxide
SONCC	Southern Oregon/Northern California Coast
SR	State Route
SRA	shaded riverine aquatic
STNF	Shasta-Trinity National Forest
SWPPP	Storm Water Pollution Prevention Plan
TAC	Toxic Air Contaminant
TCRCD	Trinity County Resource Conservation District
TMC	Trinity Management Council
TRD	Trinity River Division
TRFEFR	Trinity River Flow Evaluation Final Report
TRGA	Trinity River Guides Association
TRRP	Trinity River Restoration Program
UPL	Obligate Upland Plants
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VAU	visual assessment unit
VFD	volunteer fire department
VRM	Visual Resource Management
WHR	Wildlife Habitat Relationships
WSE	water surface elevation
WSRA	Wild and Scenic Rivers Act
YT	Yurok Tribe

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Chapter 1

1 INTRODUCTION AND BACKGROUND

1.1 Overview

The United States Department of Interior (USDI) Bureau of Reclamation (Reclamation) proposes to conduct mechanical channel rehabilitation activities on the mainstem Trinity River downstream of Lewiston Dam at the Bucktail (River Mile [RM] 105.3-106.35) and Lower Junction City (RM 78.8-79.8.) Rehabilitation Sites (Figure 1). The proposed work at the Bucktail site includes some activities within the downstream end of the Dark Gulch Rehabilitation Site boundary (immediately adjacent to the Bucktail site) that was originally completed in 2008 (U.S. Bureau of Reclamation and Trinity County Resource Conservation District [TCRCD] 2008) and the upstream end of the Lowden Ranch Rehabilitation Site boundary that was originally completed in 2010 (North Coast Regional Water Board and Reclamation 2009). These work areas are now included in the Bucktail Rehabilitation Site boundary. The activities proposed at the Bucktail and Lower Junction City sites are hereafter referred to as the "Proposed Project" or "Project." Project work would be part of the ongoing Trinity River Restoration Program's (TRRP) work to restore the anadromous fishery of the Trinity River. The proposed river channel rehabilitation activities would recreate complex salmon and steelhead habitat, enhance natural river processes for the benefit of wildlife, and provide conditions suitable for reestablishing native riparian vegetation. Details of the Proposed Project are contained in Chapter 2 and mitigation measures associated with the Proposed Project are listed in Appendix A.

The fundamental purpose of the TRRP is to restore historic river processes to the river via implementation of the 2000 Record of Decision (ROD) for the Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement/Environmental Impact Report (Trinity River FEIS/EIR). It is the intent of the TRRP to recreate a properly functioning river, albeit on a smaller scale, in order to increase naturally spawning anadromous fish populations to levels that existed prior to construction of the Lewiston and Trinity Dams. The target reach for Trinity River restoration is the approximately 40-mile length of river downstream of Lewiston Dam to the confluence of the North Fork Trinity. In this reach, the ROD outlined six integral components for execution:

- Implementation of a variable annual flow regime according to recommendations provided in the Trinity River Flow Evaluation Report (USFWS and HVT 1999),
- Mechanical channel rehabilitation,
- Fine and coarse sediment management,
- Watershed restoration,
- Infrastructure improvement, and
- Adaptive environmental assessment and management.

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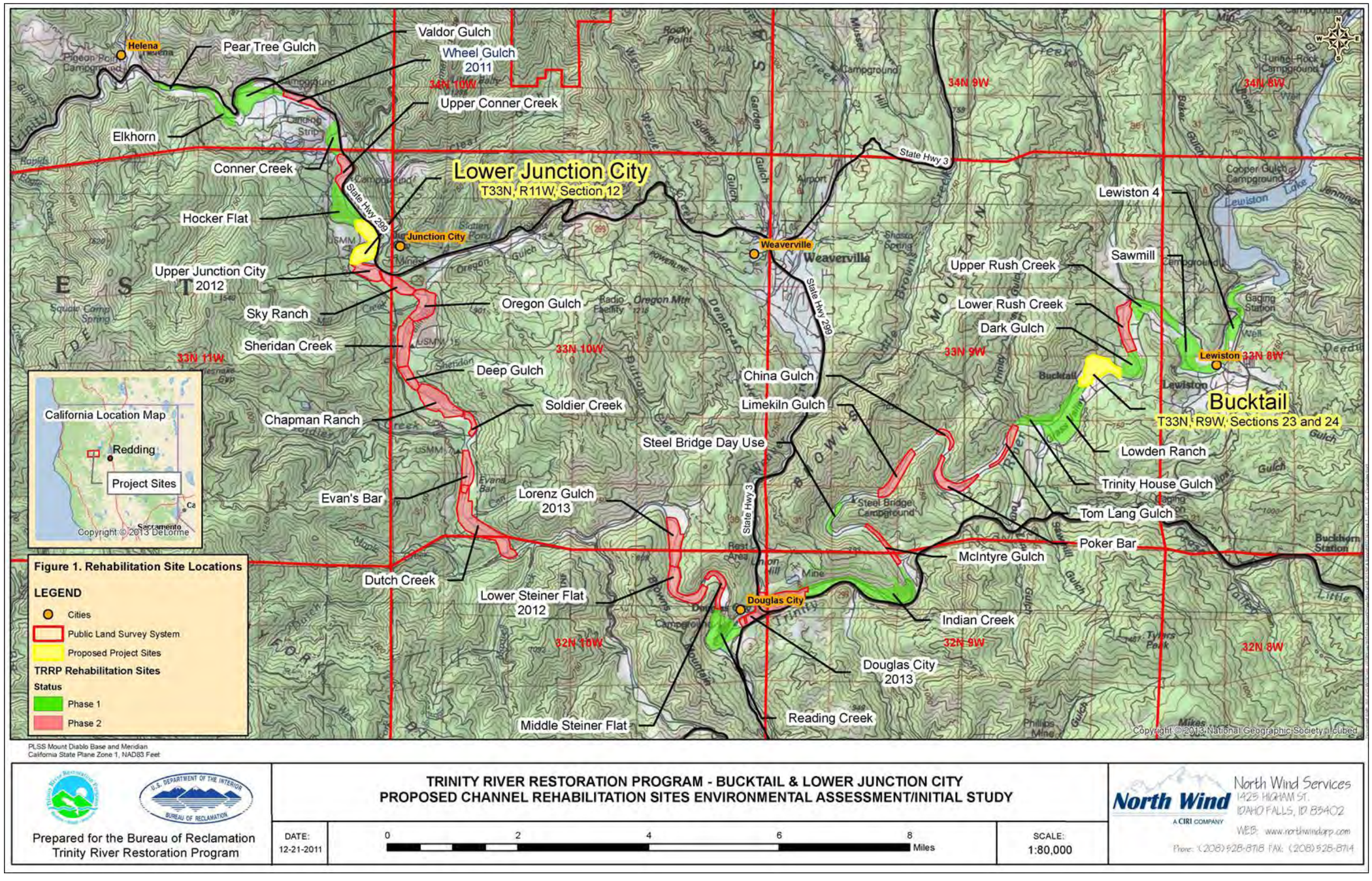

Figure 1. Proposed Project Location and Relationship to Other TRRP Sites.

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In general, the TRRP approach to channel rehabilitation is to reconnect the river with its floodplain. This reconnection requires selective removal of terraces and riparian berms (i.e., berms that are anchored with woody vegetation and consolidated sand deposits) that developed after the Lewiston and Trinity Dams were completed and historic peak scouring flows were lost. Along with berm removal, the approach involves physical alteration of floodplains to inundate more frequently, placement of large wood, and removal of riparian vegetation at strategic locations to promote the alluvial processes necessary for the restoration and maintenance of complex riverine habitats.

This environmental review document was prepared by Reclamation, in coordination with the USDI Bureau of Land Management (BLM), a federal land manager at the Proposed Project sites and federal co-lead for National Environmental Policy Act (NEPA) review. These federal agencies worked with the North Coast Regional Water Quality Control Board (Regional Water Board), as the California state lead agency, to analyze the potential impacts of the proposed activities according to NEPA and California Environmental Quality Act (CEQA) guidelines. The results of these analyses are recorded in this Project Environmental Assessment/Initial Study (EA/IS), which meets all NEPA requirements for environmental analyses and disclosure of potential impacts.

The EA portion of this document tiers from the 2000 Trinity River FEIS/EIR (USFWS et al. 2000a). However, Trinity County, the CEQA lead agency for the Trinity River FEIS/EIR chose not to "certify" the EIR portion of the 2000 document. Therefore, the EIR portion of the Trinity River FEIS/EIR was not available for the CEQA portion of this document, or other earlier TRRP CEQA documents, to "tier" from. Consequently, four joint EA/EIRs were completed to analyze TRRP channel rehabilitation projects between 2004 and 2008[1]. Based upon the similarity of these projects and their environmental impacts, and agreement that future TRRP projects would have similar impacts, a separate programmatic CEQA document, the Master Environmental Impact Report for Channel Rehabilitation and Sediment Management Activities for the Remaining Phase 1 and Phase 2 Sites or Trinity River Master EIR ([Master EIR]; North Coast Regional Water Board and Reclamation 2009) was developed. The Regional Water Board acted as lead agency for the Master EIR and site specific EA/EIR (State Clearinghouse number 2008032110). The Master EIR provides a discussion of the existing conditions, environmental impacts, and mitigation measures required to comply with CEQA (California Public Resources Code [PRC], Section 21000 et seq.). In addition to addressing direct and indirect impacts associated with the Proposed Project and alternatives, the Master EIR addresses cumulative and growth-inducing impacts that could be associated with activities at the remaining Phase 1 and Phase 2 sites. The Regional Water Board certified the Master EIR on August 25, 2009. Phase 2 sites, like the Lower Junction City site, are now eligible for enrollment and CEQA coverage following the completion of any subsequent project-specific environmental analysis required to supplement the programmatic level review contained in the Master EIR. Under California Code of Regulations, Title 14, Section 15177, after a Master EIR has been prepared and certified, subsequent projects, which the lead agency determines as being within the scope of the Master EIR, will be subject to only limited environmental review. As stated before, the Bucktail site contains portions of the Dark Gulch and Lowden Ranch sites. The Dark Gulch site was a Phase 1 site, the effects of which were analyzed in the Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4 to 111.7 EA/EIR (U.S. Bureau of Reclamation and TCRCD 2008). The Lowden Ranch site was also a Phase 1 site, which was analyzed in the Master EIR; North Coast Regional Water Board and Reclamation 2009). Information from those documents is incorporated by reference.

The preparation of a new environmental document and new written findings will not be required if, based on a review of the IS prepared for the subsequent project, the lead agency determines, on the basis of written findings, that no additional significant environmental effect will result from the proposal, no new additional mitigation measures or alternatives are required, and that the project is within the scope of the Master EIR. Whether a subsequent project is within the scope of the Master EIR is a question of fact to be determined by the lead agency based upon a review of the IS to determine whether there are additional significant effects or new additional mitigation measures or alternatives required for the subsequent project that are not already

[1] Hocker Flat (Reclamation and California DWR 2004), the Canyon Creek Suite (Reclamation and Regional Water Board 2006), Indian Creek (Reclamation and TCRCD 2007), and Lewiston-Dark Gulch (Reclamation and TCRCD 2008).

discussed in the Master EIR. If the Regional Water Board requires additional analysis, site-specific CEQA documentation is required. This Proposed Project EA/IS contains a site-specific Project description and other information required to apply for enrollment under General Permit R1-2010-0028 for Trinity River channel rehabilitation activities, which the Regional Water Board will consider in making its determination and approval decision.

This EA/IS for the Proposed Project provides site-specific details for environmental impact analyses and has been prepared to comply with NEPA (42 United States Code [USC], Section 4321 et seq.) and CEQA (California PRC, Section 21000 et seq.). The Master EIR meets the elements required for a Program EIR pursuant to California Code of Regulations, Title 14 (Natural Resources), Section 15168. The Master EIR provides programmatic CEQA level review, as the Trinity River FEIS/EIR serves under NEPA, from which site-specific projects may tier. Therefore, the Lower Junction City site is considered a subsequent site-specific project that is tiered to the Master EIR. Although the Bucktail site was not specifically covered in the Master EIR, portions of the present Bucktail site were described in other TRRP project environmental documents, and Master EIR permitting includes coverage for channel rehabilitation activities that may be conducted to improve habitat conditions at previously constructed TRRP sites. The Dark Gulch portion of the Bucktail site was covered in the Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4 to 111.7 EA/EIR (U.S. Bureau of Reclamation and TCRCD 2008), and the Lowden Ranch portion of the site was covered in the Master EIR. This combined NEPA/CEQA document evaluates the environmental impacts of the proposed channel rehabilitation and sediment management activities at the project-specific level for the Proposed Project. At both Project sites the designers are continuing to refine designs that are presented in this document. The analysis presented herein is based on these designs that represent the best available information at the time of this writing. Based on actual findings in the field, designs may change slightly. If substantial changes are made to the Proposed Project that would result in additional impacts above those analyzed in this document, then subsequent NEPA/CEQA analyses would be conducted.

1.2 Regional Setting

The Trinity River originates in the rugged Salmon-Trinity Mountains of northern California in the northeast corner of Trinity County. The Trinity River Basin encompasses the majority of Trinity County and the easternmost portion of Humboldt County. The mainstem Trinity River flows a total of 170 miles from its headwaters to its confluence with the Klamath River at Weitchpec, on the Yurok Indian Reservation. The Trinity River passes through Trinity County, Humboldt County, the Hoopa Valley Indian Reservation, and the Yurok Indian Reservation. Much of the basin is composed of federal lands managed by the United States Forest Service (USFS), BLM, and, to a lesser extent, Reclamation. Ownership along the Trinity River corridor is a mixture of public, tribal, and private lands.

The Trinity River flows generally southward until impounded by Trinity Dam and Lewiston Dam. The river drains a watershed of approximately 2,965 square miles; about one-quarter of this area is above Lewiston Dam. From Lewiston Dam, the river flows westward for 112 miles until it enters the Klamath River near the town of Weitchpec, 43.5 miles upstream from the Pacific Ocean. The Klamath River flows northwesterly for approximately 40 miles from its confluence with the Trinity River before entering the Pacific Ocean.

Topography of the Trinity River Basin is predominantly mountainous with a heavily forested basin. Elevations in the watershed range from 8,888 feet above mean sea level (msl) at Sawtooth Mountain in the Trinity Alps to 300 feet above msl at the confluence of the Trinity and Klamath rivers. Land use within the Trinity River Basin is greatly influenced by the large amount of public, tribal, and private lands, much of which is used for timber production and other natural resource-related uses. Two scenic byways, State Route 299 (SR-299) and SR-3, cross the county. SR-299 is the primary travel corridor through Trinity County, connecting the Central Valley with the coastal communities of Humboldt County. The area's numerous lakes and rivers provide many recreational opportunities, including fishing and boating. Private uses along the Trinity River are generally limited to scattered residential and commercial development.

1.3 Project Location

The general setting for the TRRP is within the 40-mile reach of the mainstem Trinity River between Lewiston Dam and the confluence of the North Fork Trinity. The entire stretch is designated under the National and California State Wild and Scenic River Systems to preserve its Outstandingly Remarkable Values, which include the river's free flowing condition, anadromous and resident fisheries, outstanding geologic resource values, scenic values, recreational values, cultural and historic values, and the values associated with water quality. The segment of the Trinity River encompassed by the Proposed Project is classified and managed as a "Recreational" reach by the BLM and the Shasta-Trinity National Forest (STNF). Lands under BLM administration are managed in accordance with BLM's Redding Resource Management Plan (RMP). See Section 3.2.1.3, Relevant Land Use Plan, of this EA for more details on the BLM's land use management plan.

The Bucktail Rehabilitation Site (RM 105.3-106.35) is a 96.01-acre site that begins approximately 0.15 miles downstream of the Bucktail Bridge extending upstream approximately 0.95 miles to RM 106.35. This site is found on Lewiston, California 7.5-minute U.S. Geological Survey (USGS) quadrangle, in Township 33 North, Range 9 West, Sections 23 and 24 and, Mount Diablo Base and Meridian (MDB&M). The majority of the land within this site is privately owned (51.17 acres). BLM manages the greatest portion of the public land in the site (43.65 acres), while Trinity County owns the bridge that traverses the site (1.14 acres).

The river elevation at this site is approximately 1,750 feet above msl. Access to the site is via Browns Mountain Road, off of Old Lewiston Road. Activity areas on the left side of the river would be accessed via Browns Mountain Road. Browns Mountain Road via Steelhead Circle or Salmon Drive provides access to Bucktail activity areas along the right side of the river. The current Bucktail rehabilitation project boundary includes a portion of the previously constructed Dark Gulch and Lowden Ranch rehabilitation sites. The Dark Gulch Rehabilitation Site was designed and constructed by TRRP in 2008, and the Lowden Ranch Rehabilitation Site was constructed in 2010. The Bucktail environmental study limit (ESL) and responsible land managers/owners are shown on Figure 2.

The Lower Junction City Rehabilitation Site is a 103.84-acre site located near Junction City, California. The general limits of the site extend from near the Dutch Creek Road Bridge to past the Canyon Creek confluence with the Trinity River, from approximately RM 78.8 to RM 79.8. The site extends downstream from the Dutch Creek Road Bridge in Junction City through the "Junction City Hole," a large scour hole induced by a bedrock outcrop that provides significant adult salmonid holding habitat. There is a high berm on part of the right bank at this site. The site is immediately below the Upper Junction City Rehabilitation Site, which was constructed in 2012. The Lower Junction City site is almost entirely held in private ownership (99.93 acres), with small portions of BLM- (1.37 acres), state- (1.29 acres), and county- (1.20 acres) owned land also occurring within the boundaries. The site is found on the *Junction City, California* 7.5-minute USGS quadrangle, Township 33 North, Range 11 West, Section 12, MDB&M (Figure 3). The river elevation at this site is approximately 1,450 feet above msl. The site can be reached from Dutch Creek Road via SR-299. Activity areas on the right side of the river would be accessed via Dutch Creek Road. Dutch Creek Road via Red Hill Road provides access to Lower Junction City activity areas along the left side of the river. The Lower Junction City ESL and responsible land managers are shown on Figure 3.

The current Project site boundaries are shown on Figures 2 and 3. TRRP staff, with interdisciplinary review from the Trinity Management Council (TMC) technical staff, developed the site boundaries to incorporate the rehabilitation activities that were considered. For the Proposed Project, these activities include removal of encroaching riparian vegetation, rehabilitation of floodplain and in-channel alluvial features (e.g., side-channels and large wood and mixed wood-boulder habitat and hydraulic structures) and construction of off-channel habitat for aquatic- and riparian-dependent species.

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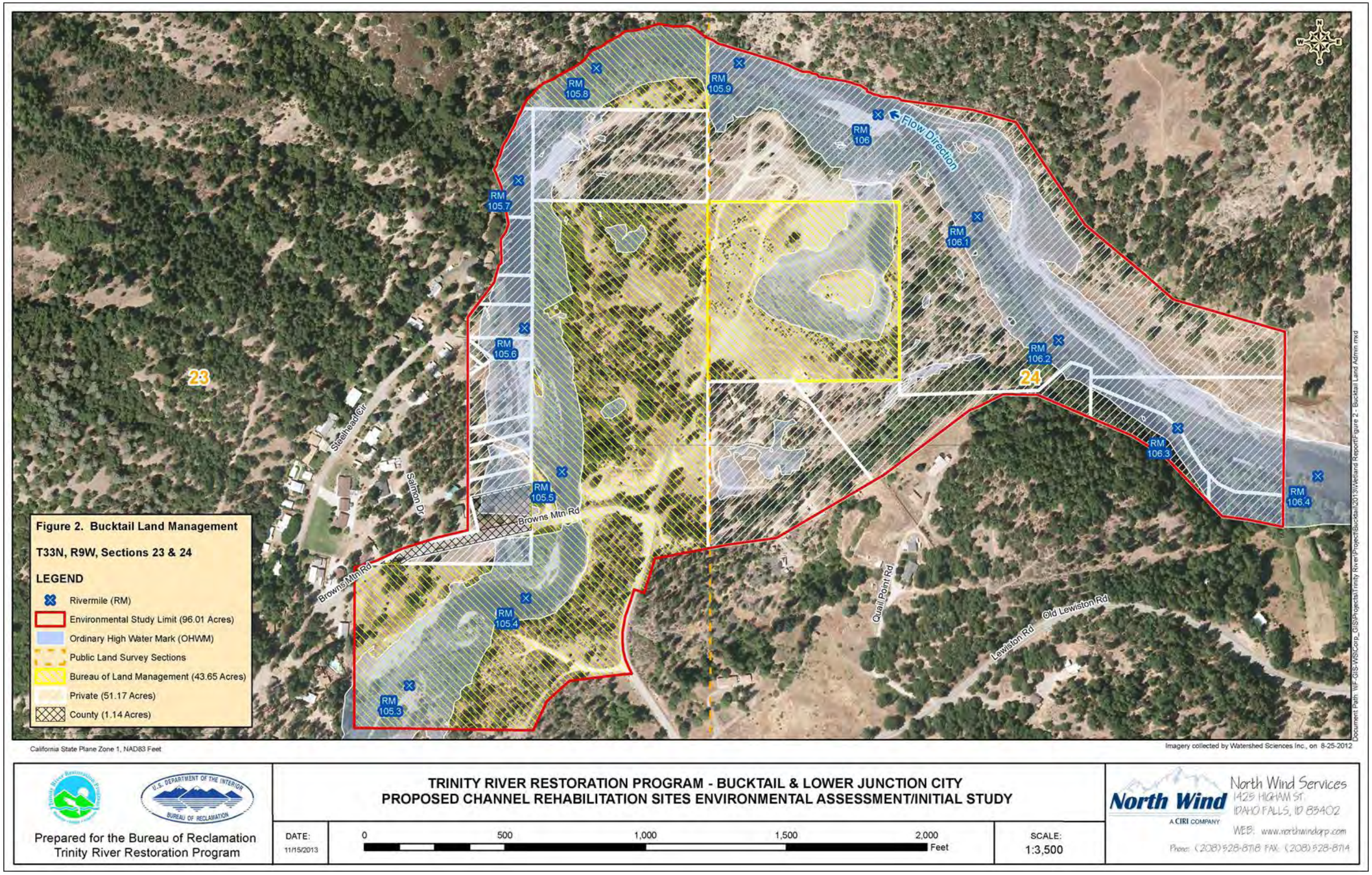

Figure 2. Land Management and Boundaries of the Bucktail Rehabilitation Site.

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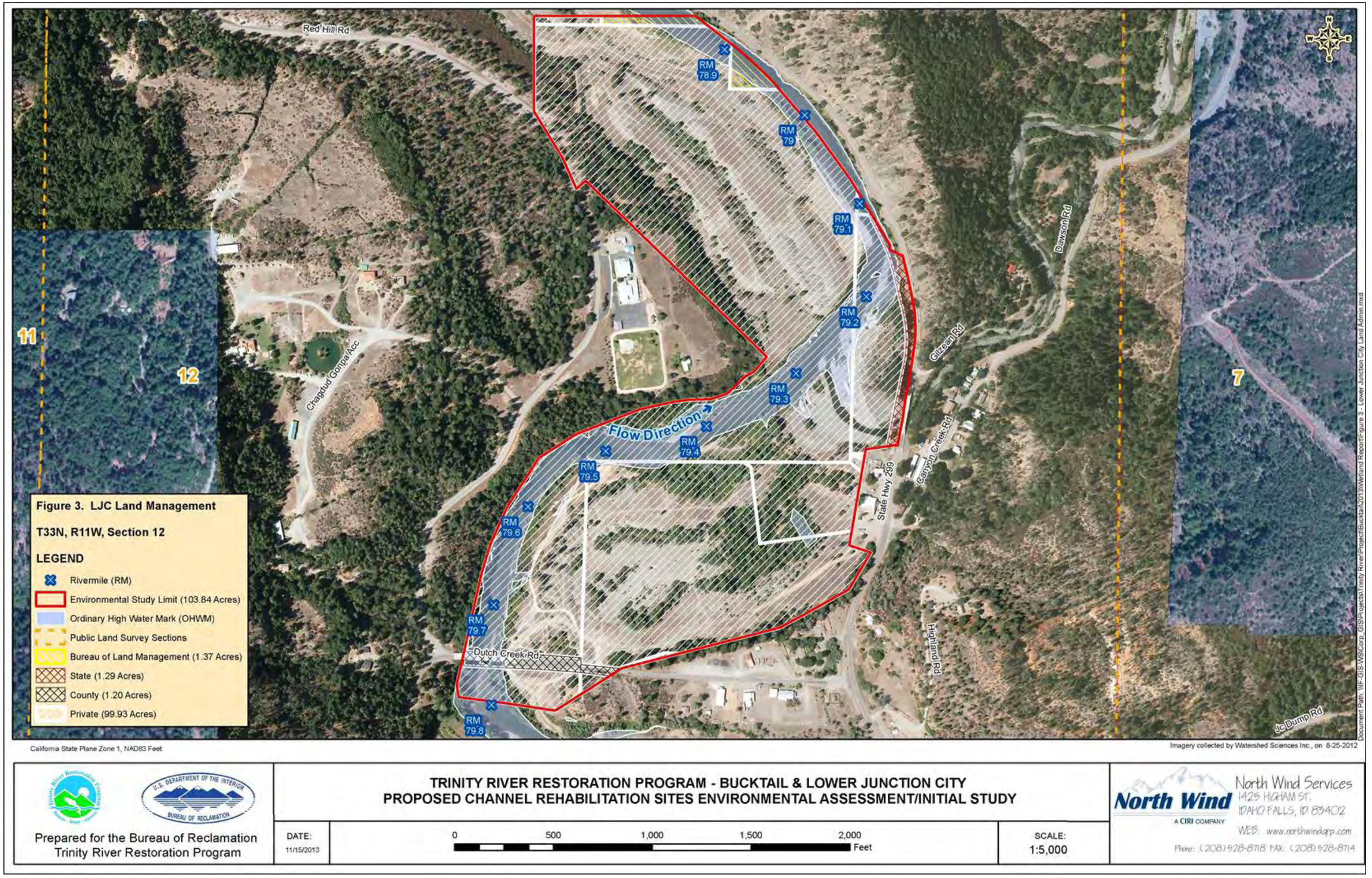

Figure 3. Land Management and Boundaries of the Lower Junction City Rehabilitation Site.

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1.4 Project History and Background

Completion of Trinity Dam and Lewiston Dam in 1964 blocked anadromous fish access to habitat upstream of Lewiston Dam restricting them to habitat below the dam. The location of the Trinity River relative to other components of the Central Valley Project (CVP) is shown on Figure 1-1 in the Master EIR. Trans-basin diversions from Lewiston Lake to the Sacramento River Basin altered the hydrologic regime of the Trinity River, diminishing annual flows by up to 90 percent. Consequences of diminished flows included encroachment of riparian vegetation, establishment of riparian berms, and fossilization of point bars at various locations along the river, as far downstream as the North Fork Trinity River. These geomorphic changes reduced the diversity of riparian age classes and riparian vegetation species, impaired floodplain access, and adversely affected fish habitat.

In 1981, in response to declines in salmon and steelhead populations, the Secretary of the Interior directed the U.S. Fish and Wildlife Service (USFWS) to initiate a 12-year flow study to determine the effectiveness of flow restoration and other mitigation measures for impacts of the Trinity River Division (TRD) of the CVP. Then, in 1984, Congress enacted the Trinity River Fish and Wildlife Program to further promote and support management and fishery restoration actions in the Trinity River Basin. Under this program, nine pilot bank rehabilitation projects between Lewiston Dam and the North Fork Trinity River were implemented between 1991 and 1993, in addition to other actions. In 1992, Congress enacted the Central Valley Project Improvement Act (CVPIA). One purpose of the CVPIA (Section 3406(b)(23)) was to protect, restore, and enhance fish, wildlife, and associated habitats in the Trinity River Basin. The act also directed the Secretary of the Interior to finish the 12-year Trinity River Flow Evaluation Report and to develop recommendations "regarding permanent instream fishery flow requirements, TRD operating criteria, and procedures for the restoration and maintenance of the Trinity River fishery." The Trinity River Flow Evaluation Final Report (TRFEFR) was ultimately published in 1999 by the USFWS and the Hoopa Valley Tribe (HVT), providing a framework for restoration activities below Lewiston Dam as well as the basis for the preferred alternative in the concurrent programmatic environmental analysis.

In 1994, the USFWS as the NEPA lead agency and Trinity County as the CEQA lead agency began the public process for developing the Trinity River Mainstem Fishery Restoration Environmental Impact Statement (EIS)/EIR. The ROD for the Trinity River FEIS/EIR (December 19, 2000; USDI 2000) directed USDI agencies to implement the Flow Evaluation Alternative, which was identified as the Preferred Alternative in the Trinity River FEIS/EIR (USFWS et al. 2000a). However, the EIR portion of the FEIS/EIR was not certified by Trinity County. The ROD set forth prescribed Trinity River flows for five water-year types: extremely wet (815,200 acre-feet annually [afa]), wet (701,000 afa), normal (646,900 afa), dry (452,600 afa), and critically dry (368,600 afa). The flows prescribed by the 2000 ROD are deemed to constitute the "existing [hydrological] environment" for CEQA purposes, and are considered the basis for the environmental analysis under both NEPA and CEQA.

The Master EIR (North Coast Regional Water Board and Reclamation 2009) includes a brief chronology summarizing the most pertinent management actions that have occurred relevant to the Trinity River Basin between 1938 and 2008 (Section 1.4.4., page 1-8). Additional details concerning the legislative and management history can be found in the Trinity River FEIS/EIR (USFWS et al. 2000a) and the EA/Final EIRs for TRRP projects constructed between 2005 and 20082. These documents are on file at the TRRP office in Weaverville, California, available on the TRRP website (www.trrp.net), and at the Weaverville public library. The Master EIR (Section 1.4.5, pages 1-10 through 1-15) also contains a summary of the various restoration activities that have been undertaken since the signing of the ROD, as well as brief discussions of other watershed restoration programs and activities occurring within the basin; additional information is available on the TRRP website3.

[2] Hocker Flat (Reclamation and California DWR 2004), the Canyon Creek Suite (Reclamation and the Regional Water Board 2006), Indian Creek (Reclamation and TCRCD 2007), and Lewiston-Dark Gulch (Reclamation and TCRCD 2008).

[3] On the TRRP website go to http://www.trrp.net/?page_id=409

The TRRP acts under guidance of the TMC, a collaborative board of natural resource managing agencies, tribes, and local government. TMC member agencies include Reclamation, USFWS, National Marine Fisheries Service (NMFS), USFS, HVT, Yurok Tribe (YT), the California Natural Resources Agency represented by the California Department of Fish and Wildlife (CDFW) and the California Department of Water Resources (DWR), and Trinity County. Technical experts associated with each of these entities participate in the design and review of the rehabilitation sites.

An integral part of the TRRP is the implementation of an Adaptive Environmental Assessment and Management (AEAM) Program. As described in the Trinity River FEIS/EIR, an AEAM process is important for management of complex physical and biological systems like the Trinity River.

The ROD for the Trinity River FEIS/EIR specified that mechanical channel rehabilitation activities would be implemented on the mainstem Trinity River between Lewiston Dam and the North Fork Trinity River. Conceptually, the overall intent of these activities was to selectively remove fossilized berms (berms that have been anchored by extensive woody vegetation root systems and consolidated sand deposits); revegetate and provide conditions for regrowth/sustenance of native riparian vegetation; and reestablish alternate point bars and complex fish habitat similar in form to those that existed prior to the construction of the TRD. Since development of the ROD, the TRRP has included large-scale use of wood (large woody debris [LWD]) and skeletal bar features to restore habitat and geomorphic form and function within the Trinity River.

The Trinity River FEIS/EIR identified 44 potential channel rehabilitation sites and three potential side-channel sites for consideration by the TRRP (USFWS et al. 2000a). These sites were originally prescribed for rehabilitation in the Trinity River Flow Evaluation Report (USFWS and HVT 1999) and included in the preferred alternative identified in the ROD. Site selection was based on identifying locations where the maximum amount of habitat for native anadromous fishes could be initiated through construction projects, and then enhanced or maintained by a combination of river flows plus coarse sediment augmentation. Consequently, the original sites were chosen based largely on the existence of riparian berms and where channel morphology, sediment supply, and high-flow hydraulics would encourage a dynamic alluvial channel. The ROD prescribed rehabilitation efforts at these sites to be implemented in phases. Early TRRP planning efforts resulted in the identification of two phases, Phase 1 and Phase 2. Subsequently, during ROD implementation by the TRRP, the originally identified sites were revisited and redefined. The Master EIR (Tables 1-1, 1-2, and 1-3) describes the relationship between sites identified in the ROD and sites defined subsequent to the ROD. The Lower Junction City site is a Phase 2 site. The Bucktail site encompasses portions of the Dark Gulch and Lowden Ranch sites, both of which were Phase 1 sites. Ultimately, sites at which rehabilitation activities could be implemented were selected using criteria that identified physical features and processes such as channel morphology, sediment supply, and high-flow hydraulics that would encourage a dynamic alluvial channel. Factors such as property ownership, access to the sites, and engineering and economic feasibility were also considered in the site selection process.

In 2002, the TRRP office was opened in Weaverville specifically to implement the components of the ROD. The first accomplishment of the TRRP was to upgrade infrastructure and bridges so that recommended ROD flows of up to 11,000 cubic feet per second (cfs) could be safely passed. Over 100 potable water wells that were impacted by increased river flows were enhanced, four river crossings (bridges) were improved, one house was moved, and many pieces of infrastructure were upgraded (e.g., decks and outbuildings moved, roads and drives raised) to eliminate impacts of high flows. This work was done through negotiation with landowners to protect physical structures and maintain human safety. Eminent domain was not used. The first of the post-ROD channel rehabilitation projects were implemented at sites downstream of Canyon Creek (e.g., Hocker Flat and the Canyon Creek suite), where natural high flows would maintain constructed alluvial features while ROD flows were contested in court. After the ROD was upheld in November 2004 by the United States Court of Appeals for the Ninth Circuit, channel rehabilitation designs focused on modifying alluvial features (e.g., berm removal), at locations where pronounced fossilized riparian berms had developed in response to changes in the flow regime and sediment flux that resulted from construction and operation of the TRD.

In 2006, Hocker Flat, the first channel rehabilitation project was completed. Although berm removal and reforming alluvial features continue to be emphasized in channel rehabilitation efforts, the restoration of alluvial processes, coupled with the creation of high-value juvenile fish margin and side-channel habitat (low velocity, shallow, and in close proximity to cover; Alvarez et al. 2010), are now emphasized by the TRRP in order to increase habitat for anadromous fish. This approach is consistent with the recognition in the Trinity River FEIS/EIR that the rehabilitation sites exhibit a variety of conditions that require site-specific designs. The Trinity River FEIS/EIR also acknowledged that, in many instances, an entire site would not require treatment to facilitate rehabilitation. This is because strategically treating certain areas is expected to result in fluvial processes that will promote the formation and maintenance of complex fish habitat (e.g., alternating channel bars) in both treated and untreated sections of the river. Phase I of the channel rehabilitation component of the ROD (24 sites of the 47 enumerated in the FEIS) was completed in 2010.

Under the Implementation Plan for the Preferred Alternative of the Trinity River EIS/EIR (contained in Appendix C of the FEIS/EIR), an evaluation of the Phase I channel rehabilitation projects was described. The Implementation Plan states that:

> *"Twenty-four sites are proposed during the first three years of construction if adequate funding is available. Additional projects will be constructed after evaluation of the first series of projects under Adaptive Environmental Assessment and Management. This evaluation will be ongoing beginning with construction of the first projects, but an interim period without construction activities may be necessary to fully evaluate the effectiveness of project designs and the effect of the new flow regime before beginning construction on the remaining sites."*

Based on this, several non-profit organizations have requested that the TRRP stop implementation of their channel rehabilitation and gravel augmentation projects until a "Phase I review" is completed. However, the ROD emphasizes the need for rapid implementation of the program so that synergistic benefits of the work may quickly restore river conditions for fish and allow for expansion of depleted populations. The TRRP's Scientific Advisory Board (SAB) and an external board of experts have conducted the Phase 1 review and are developing a programmatic report of findings. Preliminary reporting by the SAB on TRRP activities from 2001 through 2010 has found that many of the TRRP channel rehabilitation projects are performing well to increase river complexity and fish habitat, and that more recent projects are generally performing better than earlier channel rehabilitation projects. In order to realize the rapid systemic change in river form and function required to create juvenile rearing habitat, and ultimately to increase returning adults of all native salmonids, the members of the TMC have directed the TRRP to continue with implementation of rehabilitation projects that are believed to be non-controversial, while simultaneously completing Phase 1 analyses and reporting. This schedule would allow the TRRP to continue mainstem restoration as efficiently as possible, while maintaining project momentum and funding.

To date, the TRRP has utilized adaptive management in its project implementation and project design process; however, local fishing guides (e.g., the Trinity River Guides Association [TRGA]) have noted that TRRP construction and gravel augmentation has been filling adult holding areas. Consequently the SAB has been reviewing the Proposed Project, and will continue to provide input so that the benefits of the Phase I review may inform and benefit implementation of the planned 2014 and future projects. The Proposed Project has considered the need to maintain adult holding habitat in their designs and is expected to minimally impact these areas. Scouring and deepening are expected in areas near log jams (unless they are completely underlain by bedrock), which should result in development of additional holding habitat. Use of small diameter material (e.g., fines and gravel < 4 inches) is planned for use in establishing vegetated islands and not for scour as mobile gravel, and in-river work and crossings have been minimized.

Based on scientific need and requests from local fishermen, the TRRP initiated a monitoring program in 2010 to evaluate river bathymetry (including adult holding locations) within the 40-mile reach between Lewiston and the North Fork Trinity River. Boat based sonar and global positioning software allowed quantification of pool volume and depths pre- and post-construction (at some sites) and pre- and post-flow release (e.g., pre- and post-2011 spring 11,000 cfs flow). Results from this monitoring have been incorporated into decision-

making processes, and have assisted the project designers in integrating activities to help maintain pools and adult holding habitat at the Bucktail and Lower Junction City sites.

1.5 Purpose and Need

NEPA regulations require that an EA briefly specify the need that the agency is responding to in proposing the various alternatives, including the Proposed Project (40 Code of Federal Regulations [CFR], Section 1508.9(a)). Similarly, CEQA requires that the IS include a statement of the objectives to be achieved by a Proposed Project (CEQA Guidelines, Section 15124(b)). Specific Project objectives are discussed in Chapter 2 of this document.

Overall, the purpose of the TRRP is to implement the 2000 ROD. The TRRP is working to provide increases in habitat for all life stages of naturally produced anadromous fish native to the Trinity River in the amounts necessary to reach congressionally mandated goals. The strategy is to create habitat for native anadromous fish, while also ensuring that habitat complexity and quantity increases as the alluvial processes of the Trinity River are enhanced or restored in a manner that would perpetually maintain fish and wildlife resources (including threatened and endangered species) and the river ecosystem. The Proposed Project would continue to advance the implementation efforts of the TRRP and provides the opportunity to:

- Increase the diversity and amount of habitat for salmonids, particularly habitat suitable for rearing;
- Increase rearing habitat for juvenile salmonids, including coho and Chinook salmon and steelhead;
- Ensure that the flows prescribed in the ROD would not increase the likelihood of flood-related impacts to public resources and private property within the Project boundaries
- Increase the structural and biological complexity of habitat for various species of wildlife associated with riparian habitats;
- Increase hydraulic and fluvial geomorphic diversity and complexity; and
- Measure/demonstrate the ecological response to changes in flow regimes, morphological features, and aquatic, riparian, and upland habitats.

The underlying need for the Proposed Project is to restore fish populations to pre-dam levels and restore dependent fisheries, including those held in trust by the federal government for the HVT and YT. This need results from:

- Requirements in the ROD (USDI 2000) to restore the Trinity River fishery through a combination of higher releases from Lewiston Dam (up to 11,000 cfs), floodplain infrastructure improvements, channel rehabilitation projects, fine and coarse sediment management, watershed restoration, and an AEAM Program; and
- The expectation that the AEAM Program would continue to incorporate the experience provided through the planning, design, and implementation of the Proposed Action into future restoration and rehabilitation efforts proposed by the TRRP.

1.6 Purpose of This Document

Similar to the Master EIR (North Coast Regional Water Board and Reclamation 2009), this site-specific EA/IS for the Proposed Project at the Bucktail and Lower Junction City Rehabilitation Sites has been prepared to comply with NEPA (42 USC 4321 et seq.) and CEQA (California PRC, Section 21000 et seq.). Both statutes generally require that governmental agencies disclose information about proposed activities that may affect the environment, evaluate the potential environmental impacts of their proposed actions before making formal commitments to implement them, and involve the public in the environmental review process. This combined NEPA/CEQA document evaluates the environmental impacts of the Proposed Project, recommends mitigation measures to minimize impacts, and is designed to facilitate lawful implementation under all applicable laws.

CEQA allows for preparation of a Master EIR that analyzes a series of related actions that are characterized as one large project or program, such as the channel rehabilitation and sediment management activities proposed by the TRRP. The Master EIR meets the elements required for a Program EIR pursuant to California Code of Regulations, Title 14, Section 15168. A Master EIR evaluates at a programmatic level the direct and indirect environmental impacts, cumulative impacts, growth-inducing impacts, and irreversible significant effects on the environment of subsequent specific projects. A project-level EIR evaluates the environmental impacts of a specific project (CEQA Guidelines, Section 15161), focusing primarily on the changes in the environment that would occur because of project implementation and evaluates all phases of a particular project (i.e., planning, construction, and operation). A Master EIR forms the basis for analyzing the effects of subsequent projects (CEQA Guidelines, Section 15175, et. seq.), a process known as "tiering." Tiering, which is recognized under both NEPA and CEQA, refers to the practice of covering general matters in broader scope environmental documents and focusing subsequent documents on the issues germane to the site-specific actions (40 CFR 1508.28). Tiering is appropriate when a sequence of analyses progresses from a broad, conceptual, or planning-level review over a wide area or program to a project-specific and site-specific analysis. Tiering helps the lead agencies focus on issues that are "ripe" for decision, while excluding from consideration issues already decided or not yet ripe (CEQA Guidelines, Section 15385). The general analysis in the broader document is incorporated by reference into the subsequent documents, meaning that the information in the broader document does not need to be repeated in subsequent documents.

Because the Master EIR provides programmatic level review from which site-specific projects may tier, the Proposed Project analysis in this EA/IS is tiered from that document. (Both the Lower Junction City site and the Lowden Ranch portion of the Bucktail site were addressed in the Master EIR.) Because work at the Bucktail site includes a portion of the Dark Gulch Rehabilitation Site, this analysis is also tiered to the Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4 to 111.7 EA/EIR (U.S. Bureau of Reclamation and TCRCD 2008). In addition, the EIS portion of the Trinity River FEIS/EIR functions as a project-level NEPA document for policy decisions associated with managing Trinity River flows and as a programmatic NEPA document providing "first-tier" review of other potential actions, including the Proposed Project. This EA/IS focuses only on Proposed Project site-specific activities and serves as a joint NEPA/CEQA document for Project authorization by both federal and California state regulatory agencies.

1.7 Federal and California Lead Agencies

This document is tiered to and incorporates the information contained in the Master EIR (North Coast Regional Water Board and Reclamation 2009) by reference in its entirety, as well as the information pertinent to the Bucktail site in the Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4 to 111.7 EA/EIR (U.S. Bureau of Reclamation and TCRCD 2008). As an integrated, multi-purpose document, the Master EIR is responsive to the efforts of the lead, responsible, and cooperating agencies to ensure that it addresses applicable laws, policies, and regulations. At the same time, it incorporates the input provided during the scoping process in conjunction with the extensive level of consultation and coordination between the agencies.

Reclamation is responsible for the funding and implementation of the Proposed Project and is the federal lead agency under NEPA. The BLM, which manages land within the Bucktail site boundaries, serves as a co-lead for the Project. The Regional Water Board is the California state lead agency under CEQA. The TCRCD, in its role as an experienced implementer of restoration actions, collaborator on TRRP revegetation, and past CEQA lead for the Lewiston-Dark Gulch and Lowden Ranch projects, which encompass a portion of the Bucktail site, is working with the TRRP to ensure that CEQA guidelines are fulfilled.

Master EIR Phase 2 sites, like the Lower Junction City site, are now eligible for enrollment and CEQA coverage following completion of any subsequent project-specific environmental analysis required to supplement the programmatic level review contained in the Master EIR as necessary. Under California Code of Regulations, Title 14, Section 15177, after a Master EIR has been prepared and certified, subsequent projects, which the lead agency determines as being within the scope of the Master EIR, will be subject to only limited environmental review.

The preparation of a new environmental document and new written findings will not be required if, based on a review of the IS prepared for the subsequent project, the lead agency determines, on the basis of written findings, that no additional significant environmental effect will result from the proposal, no new additional mitigation measures or alternatives may be required, and that the project is within the scope of the Master EIR. Whether a subsequent project is within the scope of the Master EIR is a question of fact to be determined by the lead agency based upon a review of the IS to determine whether there are additional significant effects or new additional mitigation measures or alternatives required for the subsequent project that are not already discussed in the Master EIR. This Bucktail and Lower Junction City EA/IS contains a site-specific Project description and other information required to apply for enrollment under General Permit R1-2010-0028 for Trinity River channel rehabilitation activities that the Regional Water Board will consider in making its determination and approval decision.

1.8 Regulatory Framework

In addition to CEQA and NEPA, the Proposed Project is subject to a variety of federal, state, and local statutes, regulations, policies, and other authorities. The decision to facilitate mechanical channel rehabilitation projects requires various permits from state agencies. The primary responsible and trustee agencies are U.S. Army Corps of Engineers (USACE), USFWS, NMFS, California DWR, CDFW, the Regional Water Board, California Department of Transportation (Caltrans), and Trinity County. Chapter 3 of the Master EIR, Regulatory Framework, includes descriptions of the actions required of these agencies and of permits required for the TRRP work on the Trinity River as well as an overview of the principal environmental statutes that establish the regulatory setting that would be used to assess the impacts of rehabilitation activities. As necessary, the lead, cooperating, and responsible agencies will use the Master EIR document for their permitting and approval process. Implementation of the Proposed Project, as described in Chapter 2, would generally require compliance with the federal, state, and local permit and approval processes and regulations described in Chapter 3 of the Master EIR. For example, federal protection of the Trinity River, which is part of the Wild and Scenic Rivers System, is required under Section 7 of the federal Wild and Scenic Rivers Act (WSRA). The Trinity River is designated specifically for its outstandingly remarkable anadromous fishery value. The federal WSRA requires the preservation of its free-flowing condition; anadromous and resident fisheries; and outstanding geologic, wildlife, flora and fauna, historic and cultural, visual, recreational, and water quality values.

1.9 Scoping and Public Involvement

Since the signing of the ROD and efforts to begin its implementation, numerous public meetings and open houses have been held by TRRP and various lead agencies to gain public input and information for each channel rehabilitation site as well as programmatically under the Master EIR. The Master EIR includes a complete description of scoping and public involvement activities that occurred as part of that process (Master EIR, section 1.6). The same agencies and organizations that were consulted during the preparation of the Master EIR are again in consultation for the Proposed Project.

The Master EIR was developed specifically to identify and mitigate potential significant impacts as defined by CEQA. Accordingly, the same issues that were addressed programmatically in the Master EIR are considered germane to the Proposed Project. These issues were used to develop the descriptions of the resource areas and the associated impact analysis presented in Chapter 3 of this document.

A public outreach meeting was held on June 4, 2013 to solicit stakeholder input and values, and to relate values to the measured metrics of each design alternative. As part of the public involvement process for the Bucktail and Lower Junction City sites, Reclamation used a stream restoration decision analysis and design guidance tool (Stream Project Tool) that was created to define and implement a rational, objectives-driven approach to evaluating and designing stream restoration projects. Using the Stream Project Tool, stakeholders were given the opportunity to participate in the scoring of proposed alternative designs for these two sites. Participants ranked their opinions of three Program objectives--increasing/enhancing habitat, restoring physical processes, and supporting more proper riparian function--using two different measures for

each objective. Participants then presented scores to the designers based on their support for specific goals and the means by which to achieve them. The results helped the design team characterize stakeholder concerns and showed what design objectives caused a particular design alternative to rank higher. This allowed certain features to be added, modified, or eliminated earlier than had been possible on past rehabilitation site designs.

In addition to the meetings listed above, TRRP staff members continue to meet with local groups (e.g., fishing guides and mining groups) and landowners from the Lewiston and Junction City areas, where the sites are located, as needed, in order to obtain stakeholder input and advice as well as to address concerns. The TRRP held meetings to discuss further work on the river on November 5 and 6, 2013, for the Bucktail and Lower Junction City sites, respectively. Notice of all public meetings, and other pertinent Project information, is announced in the local Trinity Journal newspaper and posted on the TRRP's website: http://www.trrp.net/. The TCRCD will continue to assist the TRRP with public notification and meetings so interested parties can learn about the Project and provide input. The official public review period for this EA/IS began when the document was submitted to the California State Clearinghouse on December 13, 2013. The document was circulated to local, state, and federal agencies and to interested organizations and individuals for review and comment on the analysis.

The public scoping period ran for 30 days from acceptance at the State Clearinghouse, through January 13, 2014. Concurrent with this review period, public notice was provided to solicit additional comments from the public and interested parties. Public notice included: posting on the TRRP website; advertisement(s) in the local Trinity Journal newspaper; letters mailed to local landowners; email notices to interest groups; and signage posted at the Project sites informing the public of the availability of the EA/IS for review. An open house was held on December 17th, 2013 at the Trinity County Library to describe the Proposed Project and receive public input.

A total of 23 comment letters were received on the Draft EA/IS during the public comment period between December 13, 2013 and January 14, 2014. The federal and state lead agencies have responded to the comments received. The comment letters and responses from the TRRP are included in Appendix B. In addition to updating this section based on public involvement activities that have occurred since the Draft EA/IS was released for public comment, adding the public comments and responses in Appendix B, and making minor edits and updates, information was added to the Draft EA/IS (Section 2.4.2 Proposed Project) to clarify that the Bucktail channel rehabilitation design would be reevaluated when the project is funded and planned for construction. Portions of the channel rehabilitation project would be re-designed, as required, at that time to ensure that the implemented project would meet proposed objectives for the bridge that will be in place post-construction. If the Bucktail Project is implemented in the future, it would not include relocation of the boat launch to downstream of the bridge at BAF-2.

Copies of this EA/IS are available for review on the TRRP website http://www.trrp.net/ and on Reclamation's website:

http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=15761,

as well as at the following locations:

Trinity River Restoration Program
United States Department of the Interior
Bureau of Reclamation
1313 South Main Street
Weaverville, California 96093

United States Department of Interior
Bureau of Land Management
Redding Field Office
355 Hemsted Drive
Redding, CA 96002

Trinity County Resource Conservation District
#1 Horseshoe Square
Weaverville, California 96093

Trinity County Library, Weaverville Branch
211 Main Street
Weaverville, California 96093

Written comments and questions regarding this document should be sent to:

Michele Gallagher, Project Coordinator
Trinity River Restoration Program
P.O. Box 1300
Weaverville, California 96093
magallagher@usbr.gov
Phone: (530) 623-1800
Fax: (530) 623-5944

Copies of the Master EIR, the December 19, 2000, ROD and Trinity River FEIS/EIR are also available for public review on the TRRP website: http://www.trrp.net or at:

Trinity River Restoration Program Office
U.S. Department of the Interior – Bureau of Reclamation
1313 South Main Street
Weaverville, California 96093
(530) 623-1800

Chapter 2

2 PROJECT DESCRIPTION AND ALTERNATIVE DEVELOPMENT

This chapter describes the Project's objectives and discusses the process used to develop the Proposed Project as analyzed in this document. It also describes the design criteria, design concepts, and site locations associated with the Bucktail and Lower Junction City sites. Two alternatives are considered in this document: the No-Project alternative and the Proposed Project alternative. Alternatives considered but not selected for evaluation are also discussed. The term Proposed Project is used rather than Proposed Action, however, the terms are synonymous.

2.1 Background

To meet the Project objectives the TRRP has identified 15 discrete activities (see Chapter 2 of the Master EIR), most of which have been incorporated into the Proposed Project as described later in this chapter. In addition to these activities, several earthwork and habitat construction activities, which were identified in the Master EIR, have grown in scope in recent projects. The addition of wood (i.e., LWD) is elaborated on in this document as an important rehabilitation tool, and construction of split flow channels is now added as well. In the Master EIR, LWD placement was included within sediment management activities and activities common at each site. However, in the Wheel Gulch EA/IS (Regional Water Board, Reclamation, and BLM 2011) LWD installation, including construction of both large wood habitat structures (which are designed during construction in the field), and larger Engineered Log Jams (ELJs), which are designed in the office, was identified as a stand-alone construction activity. The increasing use of wood to create aquatic habitat and hydraulic complexity (scour) at channel rehabilitation sites, and recommendations for additional wood use at future sites (Cardno Entrix and CH2MHill 2011), require that this important rehabilitation activity be highlighted as a common activity planned in the Proposed Project and other Phase 2 sites. Similarly, construction of a split flow channel, which divides Trinity River flow into two branches of similar volume, is proposed and identified as an individual activity in Table 1; a similar split flow channel was constructed at the Lowden Ranch project in 2010 and Wheel Gulch in 2011. The impacts associated with implementation of these activities do not rise above those identified and analyzed in the Master EIR, but their increasing use and visibility requires that these activities be clearly identified for the reader.

2.2 Goals and Objectives

The TRRP has developed a number of restoration objectives for the channel rehabilitation sites that help frame the alternative development process. These objectives are intended to be used to identify specific activities that could be implemented at Trinity River locations. Ultimately, the goal of the activities described in Master EIR is to increase the quantity and quality of suitable rearing habitat for native anadromous salmonids and other native fish species, while reestablishing geomorphic processes required to enhance alluvial features, such as alternate point bars and meander sequences, in the Trinity River. These objectives were used by the design team to identify specific activities that could be applied within the Proposed Project. This document focuses on these activities that are intended to restore fluvial processes through the rescaling of the river channel and floodplain for the purpose of creating, restoring, and enhancing habitats for all life stages of native anadromous fishes, including salmon and steelhead. Designs at Bucktail and Lower Junction City have considered effects to salmonid adult holding habitat. In areas near log jams, scouring and deepening are expected (unless they are completely underlain by bedrock), which should result in development of additional holding habitat.

With input from stakeholders, the lead agencies considered a number of objectives in the alternative development process (see Master EIR, Section 2.2 for these objectives). For the Proposed Project, the specific in-channel (within the active low water channel) and riverine (within the ordinary high water mark

[OHWM], but not contiguous with the active channel) activities proposed are intended to assist in reestablishing fluvial processes and interactions. Conceptually, the objective is to increase connectivity between the Project sites, the Trinity River, and their shared floodplain. The proposed rehabilitation activities could result in the development of a larger and more complex expanse of river and floodplain habitat. Based on successful TRRP rehabilitation projects constructed over the past eight years, it is anticipated that fluvial processes will affect a larger area than the defined limits of activity within the Proposed Project site boundaries. This habitat expansion is expected to increase habitat suitability and availability for salmonids and other native fish and wildlife species at various river flows.

2.3 Alternative Development

The President's Council on Environmental Quality (CEQ) guidelines (Section 1502.14) and CEQA guidelines (Section 15126.6(a)) state that an EIS or EIR shall describe a range of reasonable alternatives to the Proposed Project that would feasibly attain most of the basic objectives of each project, but would avoid or substantially lessen significant effects in comparison to the Proposed Project (Section 2.5 later in this chapter provides brief descriptions of alternatives considered but eliminated from further evaluation). Section 15126.6(c) of the CEQA guidelines states that among the factors which may be taken into account when addressing the feasibility of alternatives is site availability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site.

The alternative development process for the TRRP considered input from stakeholders, particularly local residents and resource agency personnel; existing engineering data; and social, physical, and biological factors. Consistent with the AEAM Program, the Proposed Project designs reflect the collective experience of the TRRP and the TMC from the implementation of previous mechanical channel rehabilitation projects (e.g., Upper Junction City, Lorenz Gulch, and Douglas City, among others). Information derived from the implementation of these projects, coupled with information on the biological and physical responses to these projects, was considered in the alternative development process.

The following criteria were applied to evaluate the ability of the Proposed Project to meet the objectives outlined in Section 2.2 of this document. Pursuant to NEPA, the purpose and need (presented in Chapter 1) were also considered in this evaluation.

- Effectiveness – The methods, materials, and performance of previous Trinity River restoration projects (including the original pilot projects constructed in the 1990s and the recent TRRP channel rehabilitation projects) in similar environments.
- Implementation – Practical execution, including potential public acceptance issues, permitting issues, and land use issues, was considered. Constructability and the complexity of maintaining the rehabilitation sites over time were also considered.
- Environmental – Benefits and impacts to environmental resources with emphasis on special status species, including native anadromous salmonids, and humans were considered. The impacts considered included both short-term construction-related impacts and long-term maintenance impacts associated with post-ROD flows. Aquatic habitat, jurisdictional wetlands, accessibility, and consistency with land use planning were considered in the type and location of proposed activities.
- Cost – The relative cost of each alternative, including construction and revegetation costs, was considered. Cost was used to identify alternatives that were significantly out of proportion with other alternatives.

A number of alternatives were initially evaluated in the Master EIR using the criteria outlined above; as a result three alternatives were included in that analysis –No-Proposed Projects alternative, Proposed Projects alternative, and Alternative 1. The Proposed Projects alternative was determined to most efficiently meet Project objectives and was selected as the preferred alternative in the Master EIR. Alternative 1 was analyzed in the Master EIR in response to input provided by stakeholders, including landowners along the river corridor, and represented a reduction in the size, intensity, and magnitude of rehabilitation activities,

particularly those in close proximity to residential or recreational developments. Alternative 1 was expected to reduce significant impacts to various resources, especially to the human environment (e.g., traffic, noise near residential areas, etc.); however, it was not expected to expand Trinity River aquatic habitat complexity and quantity or to enhance natural river processes to the same extent as the Proposed Projects alternative. Consequently, benefits to fish and wildlife populations would be reduced compared to the Proposed Projects alternative. As a result Alternative 1 was not selected as the preferred alternative in the Master EIR and is not carried forward for analysis in this EA/IS.

2.4 Description of Alternatives

A description of the two alternatives that are carried forward in this analysis is presented in this section. Both the Proposed Project and No-Project alternatives are described. The No-Project alternative is presented first to provide comparison of impacts to the Proposed Project.

2.4.1 No Project Alternative

The No-Project alternative represents ongoing activities and operations of the TRRP and other entities involved in restoring the Trinity River with the exception of the Proposed Project. Consistent with CEQA Guidelines, Section 15126.6, subdivision (e)(2), existing conditions are defined as those that "would be reasonably expected to occur in the foreseeable future if the project were not approved" (Association of Environmental Professionals 2009). This is consistent with the NEPA definition of the No Action alternative involving federal decisions (42 USC 4321–4347). Collectively, actions and activities authorized in the ROD and incorporated into the No-Project alternative include:

- Implementation of the annual flow release schedule based on recommendations of the TMC to Reclamation; and
- Implementation of watershed restoration and rehabilitation projects within the Trinity River Basin, including those funded by the TRRP and members of the TMC, BLM, and TCRCD.

2.4.2 Proposed Project

The Proposed Project includes specific activities within the Bucktail and Lower Junction City site boundaries. The activities proposed are similar to those implemented at previous channel rehabilitation sites and include: reducing riparian encroachment; LWD placement; physical alteration of alluvial features (e.g., floodplains and side channels); construction of large wood hydraulic and habitat structures; and removal/replacement of riparian and upland vegetation at strategic locations. Extensive revegetation of native riparian vegetation (woody and wetland species) and management of upland mixed conifer habitats, to mimic historic conditions, is also planned. The specific activities that would occur within the Proposed Project site boundaries are described below and shown on Figure 4 for Bucktail and Figure 5 for Lower Junction City. Consistent with the CEQA Guidelines (Section 15176 (a) and (c)), the information contained in this section describes the timing, type, size, intensity, and location of the activities associated with the sites as currently planned. At both Project sites the designers are continuing to refine designs that are presented in this document. In particular, designs at the IC-4 feature at the Bucktail site are under revision to address both internal design group and public concerns (refer to response to comment 19.B in Appendix B). Conditions in the field at the actual time of construction may result in slight changes to designs, as presented here. Assumptions were made in the analysis that would accommodate minor design changes. If changes to the design are made that would result in effects beyond those estimated, additional NEPA/CEQA documentation may be required.

For those portions of the sites that are managed by BLM, a BLM Right-of-Grant (a.k.a., Right-of Way), would be issued to Reclamation, pursuant to Title V or the Federal Land Policy and Management Act (43 U.S.C. 1761, et. seq.). Dependent on the potential for processing of on-site river alluvium to obtain coarse sediment (gravel, cobbles, and boulders) for use in the Project, BLM would also provide Reclamation with a Free Use Permit for use of river alluvium and tailings at the Bucktail site. Mitigation measures and best management practices (BMPs) developed through this EA/IS would be considered for incorporation into all BLM Project authorizations for the Project.

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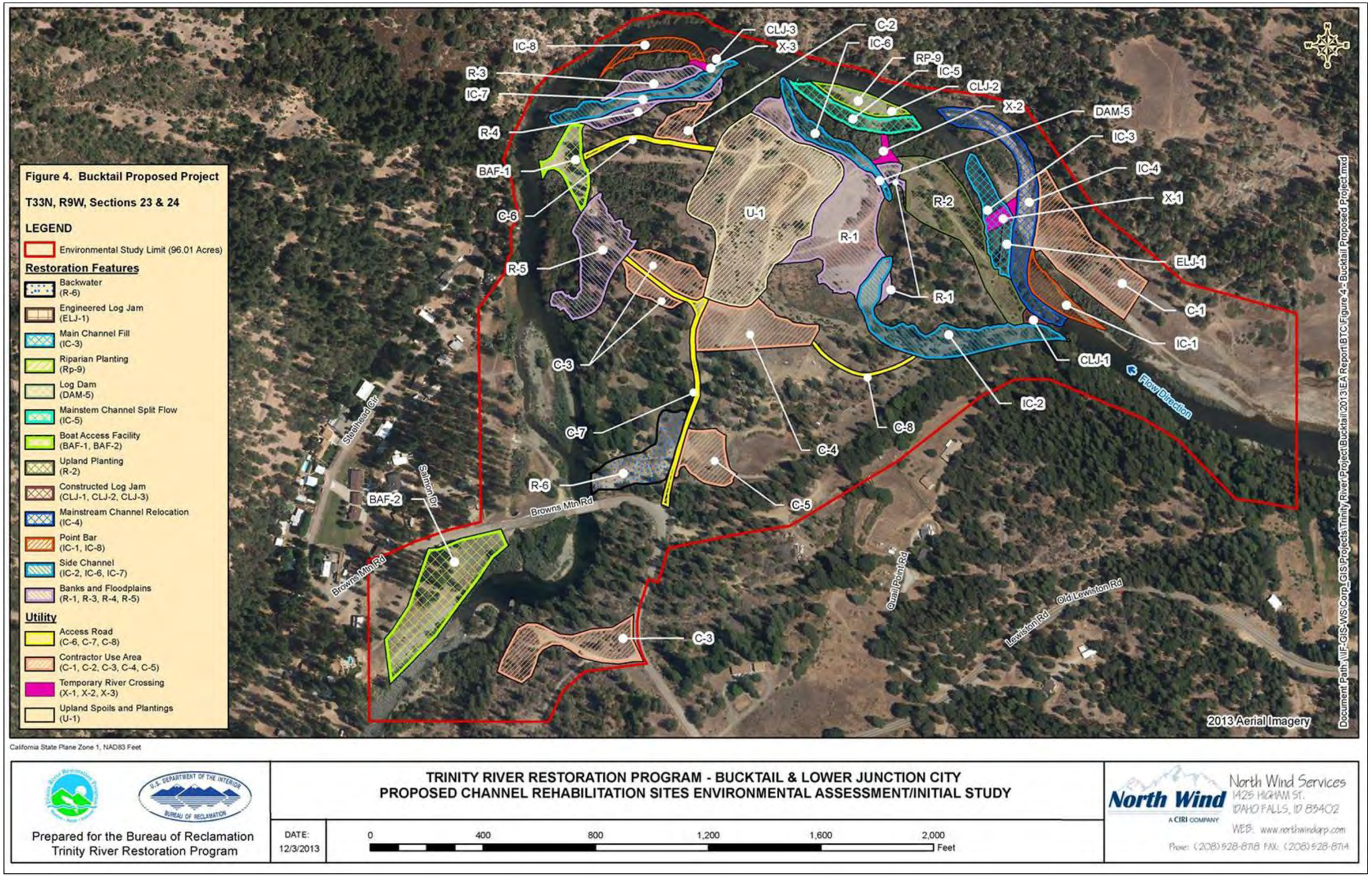

Figure 4. Bucktail Rehabilitation Site – Proposed Project.

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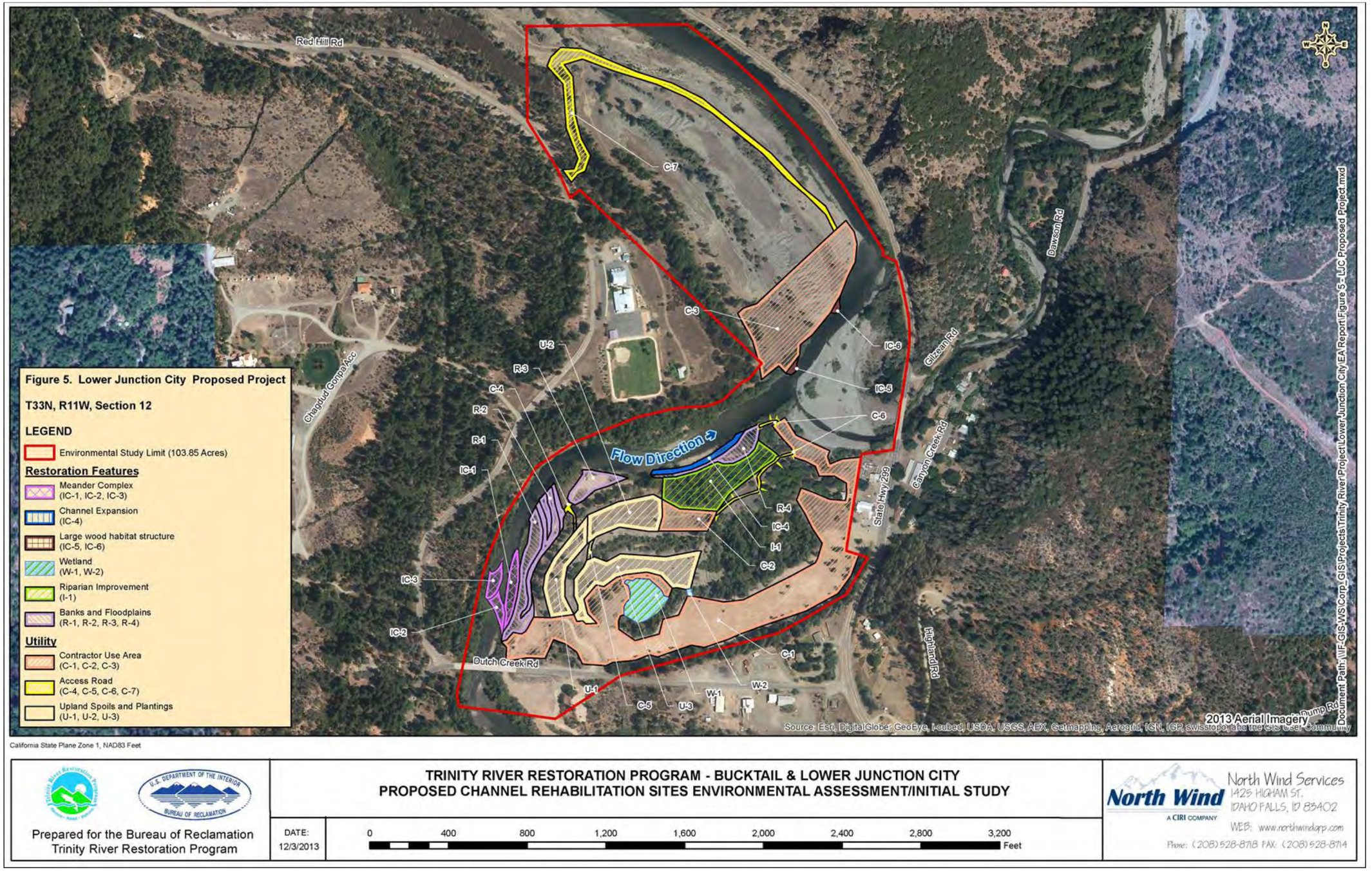

Figure 5. Lower Junction City Rehabilitation Site – Proposed Project.

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2.4.2.1 Mechanical Channel Rehabilitation Activities

The TRRP has developed objectives for the Project sites as well as specific activities that would occur at defined locations in support of Project goals. The rehabilitation objectives for the Bucktail and Lower Junction City Rehabilitation Sites are linked with the overall river restoration strategy of the TRRP and detailed in the TRFEFR and the Channel Design Guide (HVT et al. 2011).

The overall objectives of the proposed designs are to:

- Increase fry and juvenile salmonid rearing habitat;
- Increase or maintain adult salmonid holding habitat;
- Increase adult salmonid spawning habitat;
- Increase and enhance wildlife habitat;
- Increase and enhance riparian and wetland habitat, and enhance upland habitats;
- Increase channel complexity;
- Promote fluvial processes;
- Minimize adverse impacts to existing infrastructure; and
- Minimize uncertainty related to project performance.

Table 1 contains general descriptions of the types of activities included within the Proposed Project. Refer to Section 2.3.2 of the Master EIR for more information about each of these activity types. Several additional activity types have been added since the Master EIR was completed to clarify the intent of the activity for the reader.

Table 1. Rehabilitation Activities at the Proposed Project Sites. [4]

Label	Activity Type
A	Recontouring and vegetation removal (banks and floodplains)
B	Construction of inundated surfaces (450 cfs)
C	Construction of inundated surfaces (1,000 – 4,500 cfs)
D	Construction of inundated surfaces (6,000 cfs)
E	Low-flow side channel (300 cfs)
F	High-flow side channel and gravel infiltration areas
G	Alcove
J	Placement of excavated materials
K	Staging/contractor use areas (includes gravel/rock processing and stockpiling)
L	Roads, existing
M	Roads, new
N	Temporary channel crossings
O	Revegetation
P	In-river installation: construction of engineered log jams/hydraulic structures (wood and/or rock), habitat wood structures, skeletal bar or boulder habitat placement
Q	Split flow channel (30 to 60% of river flow)
W	Wetland complex – rearing pond

[4] Several activity labels are omitted (e.g., H for grade control removal) as these activity types were enumerated in the Master EIR but not utilized at the Proposed Project sites.

Activities A through G are intended to increase the potential for the river to meander (migrate) within the floodplain in which it has been confined by historic dredging activities and, more recently impacts related to the construction and operation of the TRD. In addition to the immediate changes to the channel (e.g., side channel construction and berm removal), the Proposed Project would increase the likelihood that the Trinity River would reflect more of the "healthy river" attributes of an alluvial river, as described in Section 4.3 of the Master EIR. Activities E, F, G, P, and Q are intended to create aquatic habitat that would provide refuge for salmonids and other aquatic wildlife during inundation and that would evolve over time. The side channels, alcoves, and floodplain enhancements would also provide additional complexity to the riverine environment and areas of riparian habitat diversity. All of these activities are consistent with the "healthy river" attributes. Activities J through M are associated with the transfer, placement, and stabilization of material excavated from the riverine areas. In conjunction with Activity J, various grading techniques would be used to develop seasonal, off-channel riparian habitat available for riparian-dependent species. Activity K includes the processing and storage of coarse sediment or boulder material for use in construction of in-river installations (Activity P). Activity N crossings provide a reasonable method to access activity areas on the opposite side of the river. Activity P uses wood and rock structures to increase fluvial and channel complexity, which will in turn build and maintain aquatic habitats. Activity P is intended to increase woody material which is a natural part of healthy rivers and provides important habitat for aquatic species, including cover from high flows and predators, collection of suitable spawning materials, and a food source for aquatic insects. It can also create and maintain beneficial habitat features such as pools, side channels, islands, and gravel bars. Activity O includes revegetation of disturbed surfaces. Activity Q would create a split flow channel off the mainstem Trinity River that would flow at all times including during low flow conditions. Activity W would create pond habitat for western pond turtle and yellow-legged frog and provide greater diversity of fish habitat.

Activity A (Recontouring and Vegetation Removal)

The ground surface would be modified to reduce riparian encroachment and minimize the risk of stranding of juvenile salmonids. Vegetation would be cleared at some locations, but would be maintained where possible. Activity A, sometimes referred to as the grading of banks and floodplains, or simply as "banks and floodplains," includes grading to construct or enhance topographic features that could develop into functional riparian habitat; excavation and fill would be balanced such that there is no net change in the volume of earthen material within the activity area. Vegetation removal would enhance historic patchy forest wildlife habitat. Trees would be marked for selective removal in order to enhance safety and forest health as well as for use in LWD habitat structures. Removed vegetation would be used for in-river placement as LWD, chipped/masticated, or spread/buried in revegetation areas in order to increase nutrients and water holding capability of the soils. Excavated alluvium may be processed to obtain clean gravel, boulders and fines for use in terrestrial and in-river construction and vegetation efforts. Excavated alluvium on private parcels would primarily be utilized on the lands under ownership from which they were removed. Activities would be accomplished using a variety of methods, including hand tools and heavy equipment, such as excavators, bulldozers, scrapers, and dump trucks.

Activities B, C, and D (Construction of Inundated Surfaces)

Activities associated with the construction of inundated surfaces would enhance the connection of these surfaces to the river at various flows. As a reference point, the OHWM correlates to a 1.5-year recurrence flow. (On figures the OHWM is estimated by hydraulic modeling). These activities are intended to expand the surface area of the channel that could be inundated by reoccurring flows below the OHWM. Vegetation would be cleared as necessary, and earth would be excavated to meet design elevations for periodic inundation.

Newly inundated surfaces would provide important rearing and slow-water habitat for juvenile salmonids and other native anadromous fish. They would also provide low points that could enhance sinuosity and thereby provide the habitat variability that was historically present and is required to support rapid growth of native fishes.

These treatment areas would rely on a combination of natural recruitment of native riparian vegetation and riparian planting to enhance the establishment of a diverse assemblage of native vegetation. If initial revegetation establishment is less successful than anticipated, additional efforts would be made to establish riparian vegetation consistent with the CDFW policy of no net loss in riparian vegetation from pre-project levels.

Activity E and F (Side Channels)

Modifications to create or change side channels would reconnect the Trinity River with its floodplain at targeted flows. Side channels constructed for 300 cfs flows would provide off-channel, low-velocity habitat for a variety of aquatic organisms, including juvenile salmonids at base flow conditions. Side channels constructed for 1,000 cfs flows would provide habitat for salmonid rearing when water is flowing through the channels. As flows recede during the year, these side channels would drain naturally, reducing the likelihood of stranding aquatic organisms. It is important to note that side channels do not necessarily flow year round. Side channels would evolve over time and partially vegetate. While the duration of side channel flow would be dependent upon their evolution over time and the river's water surface elevation (WSE), even when water is not flowing, riparian and wildlife habitat diversity would be increased.

Side channels would be constructed to leave earthen berms near the upstream and downstream ends to protect water quality during construction. These berms would be removed at the end of construction if the water in the side channel is of appropriate quality for discharge to the river or the water in the side channel would be left in place for removal by subsequent high flows. Side channels may be pumped to uplands and dewatered during construction, or slowly metered into the mainstem post-construction. These techniques reduce the amount of turbid water that ultimately reaches the Trinity River during side channel connection.

Activity G (Alcoves)

Alcoves would be excavated to design elevations at the downstream end of side channels or other appropriate locations. They would be continuously inundated (approximately 1-2 feet deep during low flows), scoured/maintained during high flows, and would provide year-round juvenile fish habitat.

Activity J (Placement of Excavated Materials)

Excavated materials would be placed in spoil areas so that there would be no increase in the elevation of the 100-year flood to comply with the requirements of Trinity County's Floodplain Ordinance. Spoiled materials would be spread in uniform layers that blend with the natural terrain. In general, revegetation of upland areas, including efforts required for erosion control, would be consistent with agency requirements and with authorization from land managers and owners. Refer to Activity O (Revegetation) for more information. Placement of excavated and cleaned coarse sediment or cobbles may alternatively be used to create an infiltration gallery to allow sub-surface water flow.

Activity K (Staging/Contractor Use Areas)

Excavated materials would be transported across the staging area to stockpile areas. Water would be applied for construction purposes, including dust abatement, as directed by the Contracting Officer. Activity in these areas would include maintaining existing water wells and other infrastructure. The staging area may also be used for processing and storage of coarse sediment required for long-term sediment management activities or to obtain and store boulders for use in constructing hydraulic structures and boulder habitat placements. Thinning may occur in forested areas, under BLM guidance, in order to enhance forest habitat conditions. Thinned forest material could be used in wood installations.

Activity L and M (Roads, Existing and New)

Access to the Proposed Project sites would primarily be via SR-299, Dutch Creek Road, Old Lewiston Road, and Browns Mountain Road. On-site roads would be used for one or more activities (e.g., access for equipment and personnel, removal of material, revegetation efforts, and monitoring activities). The location of the activity areas within the sites would require construction of new access roads for specific Project purposes. Site-specific design would consider factors like topography, soils, existing vegetation, and the need

for future vehicle access. BMPs would be used to reduce the impacts of road-related sediment on the riparian and aquatic environments.

Activity N (Temporary Channel Crossings)

Temporary crossings would provide access across the river at the Bucktail site. These temporary crossings occur in "X" activity areas on the figures, and may include constructed fords, temporary bridges, or other site improvements to facilitate access for construction-related traffic. If required, temporary bridges would be used when crossings are needed outside of the summer (July 15-September 15) in-channel work window. All temporary crossings would be designed and constructed to meet the requirements for heavy equipment such as trucks, excavators, and scrapers. Fords would be constructed using native alluvial materials excavated from the bed and bank of the Trinity River or adjacent sources. With the exception of rip-rap or other stabilizing materials, material would be primarily extracted from activity areas within identified TRRP sites. Use of fords to cross the river would be minimized.

Due to requirements to retain passage for fish and boats, at least 1/3 of a ford crossing would be submerged to a minimum depth of 1 foot under low-flow conditions. The construction of the temporary crossings would likely require some vegetation removal at entrances and exits to the channel. If temporary bridges or other constructed crossings are used, abutment material may be extracted from activity areas. All temporary crossings would be constructed in a manner that does not impede navigability at the specific site.

Activity O (Revegetation)

Impacts to vegetation are anticipated at most of the activity areas. Revegetation of riparian areas would rely on a combination of planting and natural recruitment of native species. Revegetation would occur to address landowner requests and fish and wildlife requirements. Native willows from the impact areas would be replanted as clumps during construction to speed recovery of vegetation. Replanting of impacted native vegetation (e.g., willows and cottonwoods) after construction is also planned. In general, the TRRP objective is to ensure that riparian vegetation is minimally impacted by TRRP activities and is replaced at a 1:1 ratio (no net loss of riparian area habitat) within the Trinity River corridor. Revegetation is designed to provide aquatic refugia at high flows, improve terrestrial habitat for birds and other wildlife, provide future wood recruitment, and to provide future terrestrial nutrient input to the river. Additional planting, seeding and mulching is also planned to control or inhibit the reestablishment of noxious and invasive plant species. This activity potentially includes post-planting irrigation furnished by the Contractor.

Activity P (In-River Installation of LWD [Hydraulic and Habitat Structures], Skeletal Bars, and Boulder Habitat)

The TRRP would use appropriate materials to cause and enhance geomorphic action that would also enhance aquatic and wildlife habitat. Addition of large rock (> 6 inch as in the ROD's skeletal bars) or rock/wood structures would remain in place and confine the river, thereby increasing stream power to scour and maintain adult salmonid holding habitat.

As appropriate, salvaged LWD would be retained and incorporated into riverine/in-channel activities to provide additional hydraulic and habitat complexity. This could include LWD placement as individual pieces, small accumulations, and large habitat structures. The addition of large wood would develop topographical and hydraulic complexity and increase bank length to provide additional rearing habitat over a wide range of flows. Incorporation of woody material would improve anadromous fish spawning and rearing habitat.

Woody material is a natural part of healthy rivers. It provides important habitat for aquatic species by providing cover from high flows and predators. Its low velocity areas collect suitable spawning materials and its organic materials are a food source for aquatic insects. It can help create and maintain beneficial habitat features such as pools, islands, and gravel bars. Activity P may also include the construction of ELJs to further engage the flow and act as a catalyst for natural processes of scour and channel migration. Construction of larger habitat structures or ELJs may incorporate the use of rock and boulders as ballast to ensure that the structures do not migrate with high flows. Furthermore, these ELJs may specifically be built

with downstream "skeletal bars," thus forming habitat complexes that would grow in depositional areas. Alluvial construction material would be obtained from on-site gravel processing of excavated material or purchased for local vendors for delivery.

All LWD installations would be designed so that local velocities would be safe for navigation during relatively low river flows (less than approximately 2,000 cfs). Natural wood material would be placed in a manner to reduce the chances of hazardous contact with swimmers and boaters. Over time, woody material would collect on the structures to create areas of slower flow, which would direct water flow and, consequently, boaters away from the LWD. This would minimize the hazard of these structures to people.

The Proposed Project would place wood in alcoves to improve the quality of habitat in this design element by providing cover for juvenile fish, enhancing roughness and complexity, and increasing shading. Because of uncertainties in the availability, types, shapes, and sizes of the wood and the planned construction methods, the exact amounts and locations of wood placement are not known at this time. Trees and slash for use in constructing LWD structures would be obtained on-site (see Activity A) and/or opportunistically from other lawful sources (e.g., public or private construction areas where clearing has occurred) and delivered to the project site.

The final locations and dimensions of wood and large rock (skeletal bar) placement would be determined in the field based on direction from Reclamation's field engineer.

Activity Q (Construction of Split Flow Channels)

A new channel would be excavated to accept between 30 and 60 percent of the mainstem Trinity River flow during low flow conditions. The constructed split flow channel would be excavated through the existing floodplain, generally behind the existing riparian berm and vegetation. Similar construction methods to those noted for low flow side channels (Activity E) would be employed.

Activity W (Wetland Complexes – Rearing Ponds)

Ponds would be created off the mainstem Trinity River. The ponds would provide slow backwater refugia and year round rearing habitat for juvenile salmonid species. Groundwater infiltration and surface water in-flow from side channels would supply the ponds with a cold water environment. Existing tree/shrub canopy would be saved during construction to provide food sources, shade, and protection from predation. The ponds would contain deeper pools that have a connection to groundwater to supply needed cold water. Existing vegetative cover and re-vegetation planting would be incorporated into the ponds for food productivity.

2.4.2.2 Activity Areas

Tables 2 and 3 list the activity areas associated with the Proposed Project and Figures 4 and 5 illustrate these activities and construction areas. As the tables show, each activity area has been assigned a unique alphabetic label that corresponds to the type of activity area. For example, U-1 is the identifier for upland activity area 1. These labels are used throughout this document. For the Project, discrete activity areas were defined by the design team to include riverine areas, upland areas, and construction support areas. While these areas are intended to encompass the full range of activities, typically the actual area that would be treated will be smaller. For each site, riverine areas are labeled with an R preceding the site number (e.g., R-1, R-2); upland areas are labeled with a U (e.g., U-1, U-2); in-channel work areas are labeled with an IC; construction staging/contractor use areas are labeled with a C; wetland/pond areas are labeled with a W; boat access facilities are labeled with a BAF; engineered log jams are labeled with an ELJ; constructed log jams are labeled with a CLJ; riparian plantings are labeled RP; and temporary crossings are labeled with an X. Roads are identified as existing or new. The tables also show the size of the activity areas, the estimated volume of material that would be excavated or filled, and the primary use anticipated for each area. Details are provided in Table 2 for the Bucktail site and Table 3 for the Lower Junction City site.

Table 2. Activity Areas at the Bucktail Rehabilitation Site.				
Activity Area[a]	**Primary Activity**	**Activity/ Treatment Area (acres)[b]**	**Earthwork (cubic yards)[c]**	**Fill (cubic yards)[c]**
IC-1	Point Bar	0.49	0	3,880
IC-2	Side Channel	1.65	13,175	0
IC-3	Mainstem Channel Fill	0.79	0	5,150
IC-4	Mainstem Channel Relocation	1.46	7,575	0
IC-5	Mainstem Channel Split Flow	0.66	5,000	0
IC-6	Side Channel	0.61	2,500	0
IC-7	Side Channel	0.79	8,175	0
IC-8	Point Bar	0.42	0	1,275
	IC Subtotal =	***6.87***	***36.425***	***10,305***
R-1	Floodplain	2.68	0	11,250
R-2	Upland Planting	1.88	0	0
R-3	Floodplain	0.46	3,350	0
R-4	Floodplain	0.39	1,925	0
R-5	Floodplain	1.42	13,300	0
R-6	Backwater	0.97	12,700	0
	R Subtotal =	***7.8***	***31,275***	***11,250***
BAF-1	Boat Access Facility	0.64	0	0
BAF-2	Boat Access Facility	2.10	0	0
	BAF Subtotal =	***2.74***	***0***	***0***
ELJ-1	Engineered Log Jam	0.20	0	0
	ELJ Subtotal =	***0.20***	***0***	***0***
CLJ-1	Constructed Log Jam	0.04	0	0
CLJ-2	Constructed Log Jam	0.06	0	0
CLJ-3	Constructed Log Jam	0.09	0	0
	CLJ Subtotal =	***0.19***	***0***	***0***
DAM-5	Log Dam/ Beaver Dam	0.04	0	0
	DAM Subtotal =	***0.04***	***0***	***0***
RP-9	Riparian Planting	0.43	0	0
	RP Subtotal =	***0.43***	***0***	***0***
C-1	Access Road	1.25	0	0
C-2	Contractor Use Area	1.25	0	0
C-3	Contractor Use Area	1.30	0	0
	C Subtotal =	***3.8***	***0***	***0***
U-1	Upland Spoils and Planting	4.78	0	78,900
	U Subtotal =	***4.78***	***0***	***78,900***
X-1	Temporary River Crossing	0.17	0	0
X-2	Temporary River Crossing	0.10	0	0
X-3	Temporary River Crossing	0.04	0	0
	X Subtotal =	***0.31***	***0***	***0***

[a] IC = in-channel work area; R = riverine work area; U = upland activity area; C = construction staging/contractor use areas; X = temporary river crossing; RP = riparian planting; DAM = dam structure; CLJ = constructed log jam; ELJ = engineered log jam; BAF = boat access facility.
[b] Area calculated from project GIS
[c] Provided by TRRP.

Table 3. Activity Areas at the Lower Junction City Rehabilitation Site.

Activity Area[a]	Type of Activity	Activity/ Treatment Area (acres)[b]	Earthwork (cubic yards)[c]	Fill (cubic yards)[c]
IC-1	Meander Complex, Bank Excavation	0.43	3,840	0
IC-2	Meander Complex, Constructed Riffle	0.20	0	980
IC-3	Meander Complex, Point Bar with Apex Wood	0.23	0	2,500
IC-4	Bar and Channel Expansion	0.31	3,000	0
IC-5	Large Wood Habitat Structure	0.05	0	750
IC-6	Large Wood Habitat Structure	0.04	0	750
	IC Subtotal =	***1.26***	***6,840***	***4,980***
R-1	Floodplain	1.29	8,000	0
R-2	Floodplain Swales and Alcoves	0.59	6,000	0
R-3	Floodplain	0.56	1,500	0
R-4	Floodplain	0.60	4,200	0
R-5	Clearing and Grading, Slope Reduction	0.14	0	0
	R Subtotal =	***3.79***	***19,700***	***0***
I-1	Riparian Improvement	2.11	0	0
	I Subtotal =	***2.11***	***0***	***0***
W-1	Riparian Surface, Wetland	0.70	5,000	0
W-2	Wetland Connections	0.02	250	0
	W Subtotal =	***0.72***	***5,250***	***0***
U-1	Upland Spoils Area	1.69	0	8,300
U-2	Upland Spoils Area	1.30	0	8,300
U-3	Upland Spoils Area	2.01	0	8,300
	U Subtotal =	***5.0***	***0***	***24,900***
C-1	Contractor Use Area	6.89	0	0
C-2	Contractor Use Area	0.71	0	0
C-3	Contractor Use Area, Potential Revegetation Area	2.56	0	0
C-4	Temporary Access Road	0.03	0	0
C-5	Temporary Access Road	0.07	0	0
C-6	Access Road	0.04	0	0
C-7	Temporary Access Road	0.25	0	0
C-8	Temporary Access Road	2.40	0	0
	C Subtotal =	***12.95***	***0***	***0***

[a] IC = in-channel work area; R = riverine work area; I = riparian improvement; U = upland activity area; C = construction staging/contractor use areas; W = wetland.
[b] Area calculated from project GIS.
[c] Provided by TRRP.

Activity Area Details

Bucktail Rehabilitation Site

The following section provides information about the activities proposed at the Bucktail Rehabilitation Site. Channel rehabilitation details are provided in Table 2 and revegetation details for this site are included at the end of this section. Actions at this site are proposed for construction in 2014, as funding is available. In addition to channel rehabilitation activities at the Bucktail site, the Proposed Project also proposes to replace the existing boat launch in a new location downstream of the Bucktail Bridge. It is anticipated that approximately 40 additional trees (generally 6 to 24 inch diameter at breast height [dbh] with none exceeding 30 inch dbh) would be marked by BLM staff throughout the site boundary for selective removal in order to enhance safety and forest health within the Bucktail site.

Plans for replacing the Bucktail Bridge are currently being considered by the Trinity County Department of Transportation and funding sources are being sought. It is the intent of the Program to construct the Bucktail channel rehabilitation project in coordination with the building of a new Bucktail Bridge. The Proposed Project would integrate the new bridge design at the Bucktail Channel Rehabilitation Site, if built. A new Bucktail Bridge would reduce constriction, increase conveyance, and eliminate the backwater effect that exists currently. For instance, the new bridge would allow relatively more gravel addition upstream without affecting downstream water surface elevations. However, the decision to construct a new bridge is one that is outside the jurisdiction of the TRRP and implementation of the proposed Bucktail channel rehabilitation project is not dependent upon construction of a new bridge. If a new bridge is not constructed, TRRP would be obligated to redesign some areas of the channel rehabilitation site (primarily downstream areas closest to the bridge), as site conditions would exhibit different hydrologic and geomorphic constraints. In that event, a supplemental environmental document would be prepared and circulated for public review of a revised Bucktail channel rehabilitation project.

IC-1, Point Bar

Area IC-1 is a constructed point bar designed to inundate at 4,500 cfs, narrow the low flow channel width, increase channel sinuosity, and help steer mainstem flows into the excavated left bank at the upstream end of Area IC-4, thereby improving overall channel complexity. Area IC-1 would initiate redirection of flows into the upstream end of IC-4. Area IC-5 also steers flows towards the side channel entrance (IC-2) and constructed log jam (CLJ)-1. The point bar and scaled mainstem channel increases channel complexity and shallow low velocity refugia at a variety of flows. The effects should cause deposition that promotes vertical scour and left bank migration.

IC-2, Side Channel

Area IC-2 is a low flow side channel approximately 600 feet in length and is designed to deliver approximately 5-10 percent of the mainstem flow into Area R-1, R-2, and IC-6. Area IC-2 starts as a high flow scour channel entrance at RM 106.2. The proposed alignment intersects a terrace that contains sparse mixed conifers and nonnative grassland. The proposed side channel enters into the upstream end of an existing wetland. A large wood structure (CLJ-1) is proposed to maintain entrance conditions and meter flow into the side channel. CLJ-1 would be woven into existing trees between IC-2 and IC-4. IC-2 would increase low water bank length and sinuosity; provide connectivity between existing floodplain surfaces and a seasonal pond; and maintain fine sediment transport through the entrance, increasing the expected longevity of the low flow side channel. Coarse sediment between ¼ inch and 5 inches would be added within the constructed side channel riffles to improve off-channel spawning opportunities. Constructed channel IC-2 in combination with CLJ-1 is designed to capture 5-10 percent of summer/winter baseflows (30-45 cfs) maintaining lower streamflow velocity's and shallower depths over a wider range of flows. Area IC-2 combined with IC-6 and an internal wetland provides up to 60,000 square feet of fry and juvenile rearing habitat that meets depth, velocity, and with the placement of habitat structures, cover.

Constructed riffles within Area IC-2 would provide adult salmonid spawning areas and productive Benthic Macroinvertebrate (BMI) habitat that increases food resources for fry and juvenile salmonids during critical winter and spring rearing periods.

IC-3, Mainstem Channel Fill

Area IC-3 is the existing mainstem channel between RM106.1 and 106.2, which is steep with large cobble substrate. The left bank has wood placed as part of the 2008 Dark Gulch rehabilitation project. Area IC-3 includes a combination of coarse sediment, revegetation, and large wood (ELJ-1) filling the existing channel such that 100 percent of flows up to 6,000 cfs are directed into the downstream portion of Area IC-4. Flows in excess of 6,000 cfs would overtop IC-3. The existing channel would be filled with coarse sediment to increase storage and provide the potential for future supply should channel migration occur. Coarse sediment would be placed at IC-3 in a way that provides a hyporheic connection between upstream sources to unaltered areas downstream of IC-3. The low water bank length would be increased by leaving a portion of the mainstem channel downstream of IC-3 unaltered and provides a hyporheic connection from upstream sources. Construction of IC-3 would leave areas of open water within the cut-off portion of the mainstem channel connected by hyporheic flow that provide fry and juvenile habitat at flows ranging between 300 cfs and 6,000 cfs. Riparian hardwood plantings on the upper portion of the bar would help to stabilize Area IC-3, increasing roughness that promotes fine sediment deposition increasing suitable riparian establishment areas.

IC-4, Mainstem Channel Relocation

Area IC-4 proposes construction of a new mainstem channel that increases channel length, complexity, and sinuosity and reduces slope and radius of curvature. Area IC-4 extends from RM 106.05 to 106.2, beginning in the mainstem channel and along the left bank and then crossing into an existing right bank low flow side channel constructed in 2008. The upstream portion of Area IC-4 excavates the left bank, removing riparian vegetation currently maintaining a straight uniform channel. The downstream portion of IC-4 occupies a constructed 2008 side channel. Construction of IC-4 would increase low water bank length, sinuosity, expansion and contraction zones, and decrease slope that creates a physical template for future channel migration and adjustment. This feature is intended to capture 100 percent of flows less than 6,000 cfs. As flows increase surrounding areas are inundated at flows ranging between 4,500 cfs and 8,000 cfs. Area IC-4 and surrounding areas would provide shallow depths and slow velocities across a wider range of streamflows than the existing mainstem channel configuration. This feature would improve adult spawning opportunities, provide fry and juvenile rearing opportunities at a wide range of flows over existing conditions, and should provide suitable BMI habitat for food production for increased local drift availability.

IC-5, Mainstem Channel Splitflow

Area IC-5 is a split flow side channel designed to capture 50 percent of the mainstem streamflow along the left bank. Area IC-5 is located along the back side of the original feathered edge site constructed in 1993. As part of the 2008 Dark Gulch rehabilitation project, coarse sediment was placed atop the bar as a high flow gravel recruitment pile. A bar apex wood jam (CLJ-2) would be incorporated into the head of the existing bar to help maintain the flow split. Sedges would be planted along the toe of the bar, providing cover for rearing salmonids. This feature would increase low water bank length, sinuosity, and expansion and contraction zones; decrease slope to create the physical template for future channel migration and adjustment; and potentially develop a long term gravel augmentation site at this location to increase in-channel coarse sediment available for transport. The existing medial bar and proposed bar apex jam (CLJ-2) are intended to create a 50/50 flow split between the existing channel and IC-5. The medial bar is designed to inundate at 4,500 cfs and would have shallow depths and slow velocities across a wider range of streamflows than the current mainstem channel. This feature would increase mainstem channel complexity and reduce slope improving adult spawning opportunities, and double the mainstem channel length providing additional fry and juvenile rearing opportunities.

IC-6, Side Channel

Area IC-6 extends from the existing wetland and gravel spoils pile in Area R-2 to the mainstem channel, intersecting both the terrace and riparian berm at RM 105.94. This feature is a 300 cfs side channel designed to drain Area R-1, the seasonal wetland. At the inflow to IC-6, a beaver dam (DAM-5) would be designed to provide variable backwater elevations into the seasonal wetland Area-R-1. The proposed constructed side channel increases low water bank length and provides an outlet to seasonal wetlands fed by IC-2. If needed, coarse sediment between ¼ inch and 5 inches would be added to the constructed side channel to increase

coarse sediment storage and provide a suitable medium for macro invertebrate production. The constructed channel would have 5-10 percent of summer/winter baseflows (30-45 cfs) providing lower streamflow velocities and shallower depths over a wider range of flows. IC-2 combined with IC-6 provides approximately 3,500 feet of new edge fry and juvenile rearing habitat and constructed riffles for BMI habitat increasing food production and fish growth for all ROD flow releases. IC-6 is designed to drain seasonal wetlands to avoid juvenile fish stranding. It would increase the inundated area for groundwater recharge providing more suitable areas for wetland and riparian establishment.

IC-7, Side Channel

Area IC-7 extends from RM 105.76 to 105.9 passing along the backside of a historic right bank bar and current riparian berm. This feature proposes a side channel designed to capture approximately 5-10 percent of the mainstem flow at 300 cfs. IC-7 also connects isolated floodplain surfaces and the former settling pond during high flow events. A large wood structure (CLJ-4) is proposed to maintain entrance conditions and meter flow into the side channel. CLJ-4 would be woven into the existing trees between the upstream end of the IC-8 point bar and entrance to the IC-7 side channel. This feature would increase low water bank length, and provide improved surface and ground water connectivity between constructed floodplains R-3 and R-4. The constructed channel would have 5-10 percent of summer/winter baseflows (30-45 cfs) and would have lower streamflow velocity and shallower depths over a wider range of flows. This would provide fry and juvenile rearing habitat from 300-4,500 cfs that meets cover, depth, and velocity criteria. Area IC-7 increases inundated area along the backside of IC-8 increasing groundwater recharge potential and providing more suitable areas for riparian establishment.

IC-8, Point Bar

Area IC-8 is a riparian berm located from RM 105.72 to 105.85 on the left bank. The area was previously treated with berm notching and a large wood habitat structure protruding from the bank into the mainstem and is vegetated with mixed willow. Area IC-8 would add approximately 1,300 cubic yards (CY) of coarse sediment to the right bank creating a self-sustaining point bar. The top of the IC-8 point bar is designed to be inundated at 4,500 cfs and would have shallow depths and slow velocities across a wider range of streamflows than the current left bank channel configuration. This feature would increase coarse sediment storage and supply available for transport; increase low water bank length, sinuosity, and expansion and contraction zones; and decrease the radius of curvature and create the physical template for future channel migration and bed scour along the right bank. Area IC-8 would provide slow shallow rearing habitat from 300-4,500 cfs and maintain a pool on the outside of the bend along the right bank bedrock to maintain adult holding opportunities.

R-1, Floodplain

Area R-1 contains a gravel spoils pile, low lying floodplain area, and a portion of a wetland pond. Area R-1 currently is inundated through a hyporheic connection with the mainstem channel and begins to backwater through a gravel berm at flows of 4,500 cfs. Area R-1 would be lowered to target inundation elevations ranging between 1,500 cfs and 4,500 cfs. This would provide slow shallow rearing habitat for streamflows in this range. At flows of 300 cfs, Area IC-2 would provide water into Area R-1. A beaver dam (DAM-5) located at the entrance to IC-6 would backwater into Area R-1 to help portions of R-1 function as a seasonal wetland. This feature would provide flow confinement that promotes coarse sediment transport through IC-2 and provides areas for overbank deposition and riparian plantings and regeneration.

R-2, Upland Planting

Area R-2 is a relatively high surface inundated at flows ranging between 6,000 cfs and 8,500 cfs. No earthwork is proposed for Area R-2; however, this area would be planted with upland vegetation. Planting upland vegetation would create more complex upland woodland that overtime may be recruited by a migrating channel, increasing large wood supply to the Trinity River to increase vegetation complexity and provide a future source for large wood recruitment. Slow shallow rearing habitat is expected when flows exceed 6,000 cfs.

R-3, Floodplain

Area R-3 runs between the riparian berm on the backside of IC-8 and the IC-7 side channel. Area R-3 would be lowered to a functional floodplain elevation designed to be inundated at flows ranging between 1,500 cfs and 4,500 cfs, providing bank complexity and surfaces that would initiate floodplain deposition. This feature would provide areas with shallow depths and slow velocities across a wider range of streamflows than those currently adjacent to the mainstem channel. The floodplain would be revegetated with riparian hardwood species. Excavated material would be processed, and clean gravel would be stockpiled at U-1 for future augmentation/use.

R-4, Floodplain

Area R-4 is along the right bank of the IC-7 low flow side channel. Area R-4 lowers the existing left bank along IC-7 to elevations inundated at flows of 1,500 cfs to 4,500 cfs, providing bank complexity and surfaces that would initiate floodplain deposition. This feature would provide areas with shallow depths and slow velocities across a wider range of streamflows than those currently adjacent to the mainstem channel. The floodplain would be revegetated with riparian hardwood species. Excavated material would be processed, and clean gravel would be stockpiled at U-1 for future augmentation/use.

R-5, Floodplain

Area R-5 begins at RM 105.6 and connects an existing riparian hardwood stand consisting of mixed willows into a historic settling pond, primarily vegetated with narrow-leaf willow. Area R-5 would lower the terrace separating a historic settling pond and the mainstem channel. The lowered surface would backwater into the historic settling pond at a flow of 4,500 cfs, connecting a depression within the interior of the Bucktail site to the mainstem channel. This feature would provide areas with shallow depths and slow velocities across a wider range of streamflows (from 1,500 cfs to 4,500 cfs) than those currently adjacent to the mainstem channel. The surface would be planted with riparian hardwood species. Approximately 13,300 CY of material would be excavated and processed, and clean gravel would be stockpiled at Area U-1 for future augmentation/use.

R-6, Backwater

Area R-6 is at the downstream end of an existing high flow scour channel. Flows in excess of 7,000 cfs enter the high flow scour channel at RM 106.2 exiting through R-6 just upstream of the Browns Mountain Road Bridge. Area R-6 is intended to backwater at flows ranging between 450 cfs and 2,500 cfs. High flow events in excess of 7,000 cfs are expected to scour, and the area should be depositional at flows less than 7,000 cfs. Area R-6 proposes construction of surfaces that provide slow shallow rearing habitat for streamflows ranging from 450 cfs and 2,500 cfs. The floodplain would be revegetated with riparian hardwood species. Approximately 12,700 CY of material would be excavated and processed, and clean gravel would be stockpiled at Area U-1 for future augmentation/use.

Wood Structures

Construction of large wood habitat structures (which are designed during construction in the field) are named CLJs within the Bucktail site. These are similar to the large wood habitat structures at Lower Junction City. Larger ELJs are designed in the office by engineers to maintain integrity under higher flow conditions. One ELJ is proposed at the Bucktail site and none are proposed at the Lower Junction City site. Both types of wood structures provide habitat for fish and wildlife and a static structure to interact with flow.

CLJ-1, Constructed Log Jam

CLJ-1 proposes weaving large wood into existing vegetation between IC-2 and IC- 4, providing a stable hard-point at the head of the upstream terrace to create a split flow between the main channel (IC-4) and the low-flow side channel (IC-2). This structure increases the complexity of the stream bank and creates a scour pool upstream of the wood placement routing sediment away from the entrance to IC-2. CLJ-1 provides adequate summer rearing habitat for juvenile salmonids, enhances hydraulic and escape cover along the channel margin, and reduces the distance to cover from adjacent spawning areas (IC-2 and IC-4). During high flow events, CLJ-1 should accumulate racking logs over time through the linking of the hill slope and fluvial

recruitment processes for both upland and riparian woody material. CLJ-1 would be designed to meter flows into IC-2 such that at a flow of 300 cfs, 5-10 percent (15 cfs to 30 cfs) enters the side channel, and at a flow of 6,000 cfs approximately 200 cfs enters into the IC-2 side channel.

CLJ-2, Constructed Log Jam

CLJ-2 proposes construction of a bar apex jam at the head of an existing bar at RM 106.0 that creates a 50/50 flow split between the existing mainstem channel and Area IC-5. CLJ-2 would be constructed at the head of the 1993 feathered edge bar, intending to bury logs into the remaining coarse sediment placed atop the bar as part of the 2008 project. This structure increases the complexity of the mainstem channel with the intention of creating a scour pool upstream of the wood placement. This structure also captures woody material mobilized by high flows and accumulates racking logs over time through the linking of the hill slope and fluvial recruitment processes for both upland and riparian woody material. CLJ-2 also creates an eddy downstream promoting coarse sediment deposition and bar formation. CLJ-2 would increase the complexity of the stream bank and provide hydraulic and escape cover for juvenile salmonids and create holding habitat for adults through the creation of local scour and capture of woody material mobilized by high flows. This structure would clean and sort spawning gravels, scour sand out of pools, and provide adequate temperature and habitat conditions for salmonids.

CLJ-3, Constructed Log Jam

CLJ-3 proposes weaving large wood into existing vegetation between IC-7 and IC-8, providing a stable hard-point along the left bank of the channel at the head of an upstream riparian berm and a historic point bar to maintain a surface water connection to a low-flow side channel. CLJ-3 would be designed to meter flows into IC-7 such that at a flow of 300 cfs 5-10 percent (15 cfs to 30 cfs) enters the side channel, and at a flow of 6,000 cfs approximately 200 cfs enters the IC-7 side channel. This structure increases the complexity of the stream bank and creates a scour pool upstream of the wood placement routing sediment away from the entrance to IC-7. During high flow events, the linking of the hill slope and fluvial recruitment processes for both upland and riparian woody material, should accumulate racking logs on CLJ-3 over time. It would rack woody material mobilized by high flows and help to maintain the coarse sediment bar directly downstream (IC-8). The structure would provide adequate summer rearing habitat for juvenile salmonids and create holding habitat for adults through the creation of local scour pools. Hydraulic and escape cover would be enhanced along the channel margin and the distance to cover from adjacent wood structures would be reduced. The structure would clean and sort spawning gravels, scour sand out of pools, and provide adequate temperature and habitat conditions for fish.

ELJ-1, Engineered Log Jam

ELJ-1 is designed to direct 100 percent of mainstem flows less than 6,000 cfs into IC-4. Wood placement combined with coarse sediment, boulders, and vegetation would create a stable configuration within the channel directing 100 percent of flows up to 6,000 cfs into the newly constructed channel (IC-4) and increasing the physical complexity of the downstream substrate, enhancing BMI habitat. Some vertical wood posts with root wads would be buried to brace the structure, which would be designed to withstand forces exerted by the maximum fishery flow (MFF; approximately 11,800 cfs). The structure would be constructed with a matrix of wood and fill material to provide hydraulic cover allowing for riparian plantings and regeneration within Area IC-3. Area ELJ-1 in-channel substrate would inundate at 450 cfs and structural impoundment and floodplain overbanking would be maintained at flows between 1,500 cfs and 6,000 cfs. Smaller wood would be placed along the wetted perimeter of the larger wood placements to add hydraulic and escape cover for fish. The structure also creates physical complexity by creating refugia for juvenile residents and salmonids. The structure serves to clean and sort spawning gravels, scours sand out of pools, and provides adequate temperature and habitat conditions for fish. The scour pool and cover provided by the wood placed at the apex of the gravel bar would create summer rearing habitat in the form of feeding stations and holding features.

By reducing flow velocities and encouraging deposition of sediment and nutrients downstream from the impounding structure, a suitable site for riparian planting and natural regeneration would be created.

DAM-5, Log Dam

Area DAM-5 proposes construction of a beaver dam structure that is intended to allow an adaptive approach to raise water surface elevations at various flows into and out of the Area R-1 seasonal wetland. During summer and winter baseflows, the beaver dam structure would backwater into Area R-1, providing up to 2 acres of wetland habitat. As flows increase into the winter and spring, the beaver dam would be removed allowing higher velocities to pass coarse sediment through the channel. This would prevent fine material from depositing within the side channel. During periods of high flow, fine sediment would deposit on the floodplain and seasonal wetland surfaces. During winter and summer rearing periods, this feature could backwater up to 2 acres providing large areas that meet velocity, depth, and cover criteria for fry and juvenile salmonid rearing habitat. An adaptive approach would be necessary to successfully achieve riparian and wetland plant success as well as encouraging fine sediment deposition outside the low flow channel thalweg.

BAF-1, Boat Access Facility

BAF-1 is the current boat launch and public use area. Two options are being considered for this area. It would either be left as it currently is or converted to a riparian planting area.

BAF-2, Boat Access Facility

BAF-2 is a proposed new boat launch and public use area. If this area was developed it would include parking, boat access to the river, and a restroom.

X-1, X-2, and X-3, River Crossings

Temporary crossings would provide access across the river. These temporary crossings may include constructed fords, temporary bridges, or other site improvements to facilitate access for construction-related traffic. If required, temporary bridges would be used when crossings are needed outside of the summer (July 15-September 15) in-channel work window. All temporary crossings would be designed and constructed to meet the requirements for heavy equipment such as trucks, excavators, and scrapers. All temporary crossings would be constructed in a manner that does not impede navigability at the specific site.

U-1, Upland Planting

Area U-1 incorporates the majority of the high terrace area in the center of the Bucktail Rehabilitation Site. This area is primarily roads, non-native grassland, and sparse conifers. Area U-1 would serve as the primary contractor use area and coarse sediment stockpile area. This area is intended to be used as a long-term coarse sediment source and would provide a location above the 100-year floodplain to stockpile coarse sediment for future local coarse sediment augmentation. Upland plantings and wood habitat piles are proposed to increase stand complexity, providing a variety of avian, reptilian, and mammalian habitat.

C-1, Access Road

Construction access roads are required to complete the Project. Within the Project site, existing access roads would predominantly be utilized. Because scrapers would likely be utilized for excavation of channels and floodplains, these roads would be essential for safety and efficiency. Post-Project, access roads would be returned to pre-construction condition, decommissioned, or left as improved, according to landowner approval.

C-2 and C-3, Contractor Use Area

Contractor use areas would be used for construction access, staging, stockpiling, mobilization, gravel processing, and other necessary construction activities during implementation. Depending on landowner goals and objectives, each contractor use area may be improved back to pre-construction condition or decommissioned.

Lower Junction City Rehabilitation Site

The following section provides information about the activities proposed at the Lower Junction City Rehabilitation Site. Details are provided in Table 3. Activities at this site are proposed for construction beginning in 2014, as funding is available. As at the Bucktail site, LWD used for construction would be a

combination of that obtained on-site during vegetation removal and that obtained from other lawful sources and delivered to the site. Revegetation details for this site are included at the end of this section.

IC-1, IC-2, and IC-3, Meander Complex

This feature is a constructed meander composed of three distinct elements: an excavated bend along the right bank (IC-1), a constructed diagonal riffle (IC-2), and a constructed point bar (IC-3). IC-1 is to be excavated to thalweg elevation with a steep bank slope along its downstream half and a more gently sloping bank along its upstream half. The IC-2 riffle would be constructed of mobile gravel and cobble to an elevation roughly 2 feet higher than the existing bed. The IC-3 bar would be built to an elevation roughly equivalent to the 8,500 cfs stage at its upstream end, and slope downward in the downstream direction to grade into the existing bed about 150 feet downstream. The upstream end of the bar would feature an apex log jam and would be ballasted with gravel with a significant proportion of large cobble for durability. The remainder of the bar downstream from the apex jam would be composed of mobile gravel and cobble and would be stocked with woody debris. The meander complex would create hydraulic diversity which would directly provide a suite of diverse physical habitats in an area that presently offers a narrow range of habitat conditions. The steep slope in the downstream half of the bend is intended to promote post-construction bank erosion, whereas the gentle bank slope in the upstream half of the bend is intended to provide greater channel width, creating hydraulic conditions favorable for maintaining the diagonal riffle.

IC-4, Bar and Channel Expansion

The IC-4 bar expansion consists of terrace lowering to approximately the baseflow water surface elevation. The result of this excavation would be to widen an existing bar along the low-flow channel, as well as the channel itself, by about 30 feet. The outer edge of the feature would be excavated to 1-2 feet below the baseflow water surface to create a chute channel that disconnects the emergent bar from the outer bank. A small apex wood jam would be placed at the head of the bar and several smaller woody debris placements would be scattered over its surface. Creation of the IC-4 bar expansion and chute would create additional habitat immediately by increasing low-flow edge length, woody cover, and reducing average flow velocities in the channel. The feature is also intended to reduce terrace confinement to increase the potential for more complex bar morphology to develop in the future.

IC-5 and IC-6, Large Wood Habitat Structures

Two large wood placements consisting of about 25 pieces each would be placed along the left bank opposite the Canyon Creek delta. The IC-5 and IC-6 wood structures would provide highly complex cover habitat and encourage scour that would diversify the local bed topography and hydraulic conditions. The channel adjacent to the Canyon Creek delta is currently characterized by monotonous plain bed topography that lacks cover and habitat complexity. These wood structures are expected to generate scour holes near their bases and potentially lead to localized erosion along the edge of the Canyon Creek delta. As they would not be engineered to withstand large floods, they are likely to release wood for redistribution over time. These large wood habitat structures would be similar to the ELJs and CLJs proposed at Bucktail.

R-1 and R2, Floodplain

A terrace surface adjacent to the IC-1, IC-2, and IC-3 meander would be lowered to create a new floodplain area that progressively inundates over a flow range from near baseflow to about 8,000 cfs. The floodplain would have complex topography designed to limit overbank flow conveyance so as to provide slow-water habitat and maintain sediment transport continuity at all flows. It would be highest near its upstream end and along the edge nearest the channel, with an elevation target near the 8,500 cfs stage. The surface would slope downward from that crest elevation toward the north and toward the east, creating a northward sloping swale along its eastern margin that branches into two swales at the far downstream end of the feature. The floodplain and swales would grade to near the existing bed elevation at its downstream end, creating a pair of small baseflow alcoves. The floodplain would be stocked with woody debris, especially in the downstream portions of the swales. The R-1, R-2 floodplain would provide an increasingly large area of slow water habitat with increasing discharge. The area of inundated habitat would cover nearly the entire floodplain area as discharge approaches bankfull stage. However, limited flow conveyance would ensure that area inundates

primarily from its downstream end, keeping overbank flow velocities relatively low. Limited overbank conveyance would also ensure that sediment transport capacity in the main channel would be maintained. Overtopping of the crest at the upstream end of the floodplain at flood stage would permit periodic flushing of fines from the floodplain swales so as to maintain the downstream connectivity. The area would eventually provide wood and allochthonous trophic production to the aquatic ecosystem, as well serve as a high-flow refugia with abundant cover.

R-3, Floodplain

The R-3 floodplain feature involves lowering of an existing floodplain and low terrace area adjacent to the Junction City Hole. The surface would be lowered to the 2,000 cfs stage at its northern end adjacent to the main channel and grade upward to the 4,500 cfs stage toward the southwest. The area would be stocked with woody debris. The R-3 area has been used in recent decades as a parking area and so is compacted and devoid of vegetation. Modest lowering would put the entire area at an elevation suitable for natural recruitment of riparian vegetation. In addition, the area would provide fry and juvenile salmonid rearing habitat at discharges of 2,000 cfs and up. The area would eventually provide wood and allochthonous trophic production to the aquatic ecosystem, as well serve as a high-flow refugia with abundant cover.

R-4, Floodplain

The main lobe of the R-4 floodplain area represents a floodplain surface with an elevation equal to the 4,000 cfs stage that has been excavated out of the existing terrace. The surface is essentially flat with a small downstream slope. The thin finger of the R-4 area that extends upstream along the upstream half of the IC-4 bar expansion area is too narrow to contain a level surface, and so represent the slope from IC-4 to the existing terrace level. The R-4 floodplain creates an additional connected floodplain surface that would eventually provide allochthonous trophic production to the aquatic ecosystem and slow-water habitat with cover during periods of moderately high flow.

R-5, Clearing and Grading

The R-5 area would be cleared of invasive blackberry vines. The area currently contains little or no desirable native vegetation. Clearing and limited grading to remove blackberry would give alternative vegetation an opportunity to colonize the area, potentially resulting in a more diverse stand of riparian vegetation.

I-1, Riparian Improvement

A variety of tree species (e.g., cottonwood, red willow, shiny willow) would be interplanted within the existing habitat to increase structural diversity for wildlife habitat.

W-1, Riparian Surface/Wetland Area

W-1 consists of excavation to lower a relatively low upland area by 2 to 3 feet. The W-1 area is currently slightly too high to allow for natural riparian colonization. Modest lowering of the area would make it suitable for riparian recruitment and provide an area in which natural recruitment can help meet riparian compliance objectives. It is anticipated that native riparian vegetation would develop in this area.

W-2, Wetland Connections

Excavation in the W-2 area would remove road prisms between 10 and 20 feet thick that currently separate wetland swales to the west from a large wetland area to the east. Removal of the road prisms would improve habitat connectivity for terrestrial wildlife.

U-1, U-2, and U-3, Upland Spoils Areas

These are areas for disposing of spoils from excavation. It is anticipated that there would be about 25,000 CY of excavated material to spoil.

C-1, C-2, and C-3, Contractor Use Areas

Contractor use areas would be used for construction access, staging, stockpiling, mobilization, gravel processing, and other necessary construction activities during implementation. Depending on landowner

goals and objectives, each contractor use area may be improved back to pre-construction condition or decommissioned.

C-4, C-5, C-6, C-7, and C-8, Access Roads

Construction access roads would be required to complete the Project. Because scrapers would likely be utilized for excavation of channels and floodplains, these roads would be essential for safety and efficiency. Post-Project, access roads would be returned to pre-construction condition, decommissioned, or left as improved, according to landowner approval.

Revegetation

Revegetation details for both sites are presented in Table 4.

Table 4. Revegetation Types and Species Proposed for the Bucktail and Lower Junction City Sites.

Planting Type	Species	
Wetland Zonal	torrent sedge *Carex nudata* common rush *Juncus effuses* small fruited bulrush *Scirpus microcarpus*	scouring rush *Equisetum hyemale* spreading rush *Juncus patens* hard stemmed bulrush *Schoenoplectus acutus*
Emergent Wetland Zonal	mugwort *Artmesia douglasiana* scouring rush *Equisetum hyemale* spreading rush *Juncus patens*	torrent sedge *Carex nudata* common rush *Juncus effusus* small fruited bulrush *Scirpus microcarpus*
Toe Zonal[a]	torrent sedge *Carex nudata*	common rush *Juncus effusus*
Slope Zonal[b]	mugwort *Artmesia douglasiana* cottonwood *Populus trichocarpa* red willow *Salix laevigata* shiny willow *Salix lasiandra*	scouring rush *Equisetum hyemale* California rose *Rosa californica* arroyo willow *Salix lasiolepis*
Riparian Cluster	Cottonwood Cluster cottonwood *Populus trichocarpa* red willow *Salix laevigata* shiny willow *Salix lasiandra* snowberry *Symphoricarpos albus* California grape *Vitus californica* Mixed Willow Cluster mugwort *Artmesia douglasiana* American dogwood *Cornus sericea ssp. occidentalis* scouring rush *Equisetum hyemale* cottonwood *Populus trichocarpa* red willow *Salix laevigata* shiny willow *Salix lasiandra* arroyo willow *Salix lasiolepis* Mixed Alder Cluster white alder *Alnus rhombifolia* mugwort *Artmesia douglasiana* American dogwood *Cornus sericea ssp. occidentalis* scouring rush *Equisetum hyemale* Oregon ash *Fraxinus latifolia* Arroyo Willow Cluster mugwort *Artmesia douglasiana* cottonwood *Populus trichocarpa* arroyo willow *Salix lasiolepis* California rose *Rosa californica* snowberry *Symphoricarpos albus*	
Upland Cluster and Upland Infill	ponderosa pine *Pinus ponderosa* canyon live oak *Quercus chrysolepis* interior live oak *Quercus wislizeni* greenleaf manzanita *Manzanita patula*	ghost pine *Pinus sabiana* redbud *Cercis occidentalis* whiteleaf manzanita *Manzanita viscida* honeysuckle *Lonicera hispidula*

[a] Toe zonal plantings would occur within 24 inches of the water surface along the excavated side channels.
[b] Slope zonal plantings would occur on side channel slopes.

Revegetation design objectives include:

- Increase the plant species richness used in revegetation,
- Increase the potential future large wood supply,
- Increase riparian vegetation quality and quantity along the side channel and constructed benches,
- Increase upland vegetation quality and quantity between side channels, constructed benches, and the existing upland,
- Provide structural complexity, plant species diversity, and cover to enhance and increase wildlife and fish habitat, and
- Maintain continuous corridors of riparian vegetation with a more variable upland vegetation ecotone.

Revegetation consists of site layout, preparing planting areas, planting a mixture of upland and riparian plant species, and potentially post-planting irrigation furnished by the Contractor. Plant species are assigned to different riparian or upland patches. The grading plan avoids removing patches of existing riparian vegetation within the site that currently provide cover and a readily available seed source immediately after construction. Constructed side channel slopes would be planted to provide cover for wildlife and fish, shade the channel, speed riparian vegetation recovery, and increase woody plant and age class diversity. Constructed benches and bars are specifically targeted for woody riparian revegetation. Wetland species would be planted in areas appropriate for an individual species' tolerance to varying lengths of inundation. Planted material may be nursery grown and sizes vary by plant species.

Irrigation systems would potentially be installed as needed in all revegetated areas. Irrigation systems would be installed with portions of the system to be in place all year long. Seasonally, some portions might be removed to protect them from weather and flows (e.g., solar panels and above ground irrigation lines) and other portions would be installed and removed at the end of the final growing season. The system (including infiltration well – to withdraw water from a subsurface location, pump and solar panels for power, potentially holding water holding tanks, plumbing and filters) and sprinkler system (drip or micro emitters for watering) would generally be installed to stay on-site for up to three years post project to ensure long-term survival of plants. Some of the system may be protected from theft and vandalism by fencing.

2.4.2.3 Common Activities and Construction Criteria and Methods Associated with the Proposed Project

In addition to the activities included in Tables 2 and 3, several other activities are common to all activity areas to varying degrees. These common activities (vegetation removal, watering, and monitoring) are briefly discussed in Appendix A. Appendix A also provides a general overview of the construction process for the Proposed Project. Earthmoving equipment that may be used at the sites to complete the construction activities includes off-road articulated dump trucks, wheel loaders, tracked excavators, dozers, push-pull scrapers, water tenders, and graders. Monitoring would occur as a required element of the Proposed Project and responds to the TRRP program management objectives, as well as the elements of the Mitigation Monitoring and Reporting Program (MMRP) required pursuant to CEQA. The MMRP, included as Appendix E of the Master EIR, is incorporated in its entirety by reference. Specific mitigation measures proposed as part of the MMRP for the Proposed Project are included as Appendix A of this EA/IS.

2.4.2.4 Tentative Schedule

Development of preliminary designs for these sites began in 2011 and the Proposed Project, which incorporates landowner and TRRP design input, was completed in late 2013. The Lower Junction City project would be constructed in 2014; however funding is not available for the Bucktail project in 2014. Consequently, the project would be implemented at a later date when the potential that the Bucktail Bridge will be replaced is better clarified. At that time, the Bucktail Project would be redesigned and supplementary environmental review documents developed and circulated for review as needed.

Construction associated with the Proposed Project would not begin until the environmental process is completed. In addition, the following must have been completed: the final designs, plans, contract specifications, and cost estimates; award of contract(s) for work; hazardous materials site assessments; acquisition of rights-of-way; acquisition of permits; and design approvals from local, state, and federal agencies.

To minimize impacts to breeding birds, construction would typically begin after nesting (August 1), but could begin sooner if pre-August bird surveys determine that nesting birds are not, and will not be, present in the construction areas, and thus would not be impacted by construction. Surface disturbance activities may be limited during the late spring (May and June), depending on the flow release schedule established for the particular water year. Although the majority of excavation and grading activities would typically occur between July 15 and November 1, excavation may continue later as long as surface water runoff does not increase the mainstem Trinity River turbidity by > 20 percent (Trinity River summer turbidity is typically very low; < 2 nephelometric turbidity units [NTU]).

Revegetation work (e.g., planting of willow pole cuttings and/or container plants, and seeding with native grasses) would generally take place in the wet season (fall/winter) following work or a year after construction.

2.5 Alternatives Considered but Eliminated from Further Evaluation

At both Project sites the designers are continuing to refine designs that are presented in this document. Within the general confines of the defined activity areas and ESLs, the designers are using models to inform themselves as to the potential effects that changes in constructed topography (how the features are built – using various grades, side slope angles, and elevation on the ground) might have on how constructed features function under various flow conditions. At both sites, the designers have been evaluating how these relatively minor changes in design affect modeled water depths, velocities, and sheer stresses under post construction conditions and how these results might affect long-term maintenance/evolution of features. The models may suggest that a feature will maintain itself or fill in under high flow conditions. Results of modeling are being used to select optimal configurations for maximum aquatic habitat quality for juvenile salmonids (e.g., depth, velocity, and substrate) in as-built conditions and as conditions evolve (e.g., erode, aggrade, or vegetate) under envisioned ROD flow conditions. In addition to the alternatives described above, the following alternatives were also considered but dismissed for the reasons provided.

2.5.1 At Bucktail

Prior to the preparation of the 50 percent Bucktail site designs, the HVT Design Group prepared and presented four 10 percent conceptual design alternatives (HVT et al. 2013a). These four alternatives were reviewed by the TRRP Design Team, program partners, and stakeholder groups from which two alternatives were chosen. The two chosen alternatives were developed into 30 percent conceptual designs that included preparation of digital terrain models and 2-dimensional hydrodynamic modeling (HVT et al., 2013b). The 30 percent design alternatives were reviewed by program partners and a Value Engineering study was done. Upon completion of these reviews one design alternative was chosen with modifications as presented in this EA/IS. As part of the 50 percent design assessment, a dam was placed within Area IC-7 to mimic a proposed beaver dam (HVT et al., 2013c). The top of ELJ-5 was set to an elevation of approximately 1,750 feet, the lowest topographic elevation at which water would begin to fill the proposed pond area. The results show that this proposed dam height would not inundate the proposed pond area; however it would backwater the proposed side channel into the mainstem Trinity River. This would result in deposition of sediment upstream of the proposed dam, likely filling the proposed side channel. As a result several options were discussed including: 1) lowering the ground surface within the proposed pond area along with lowering the top of dam elevation; 2) seasonally removing the proposed dam; 3) removing the proposed dam altogether; and 4) relocating the low flow side channel IC-7 to the backside of Area IC-8. The Hoopa Valley Design Group made the decision to move ahead with Option 4: Relocating the low flow side channel IC-7 to the backside of the IC-8 point. The reduction in overall project footprint area and subsequent habitat losses was determined to be relatively small compared to the cost savings associated with the 50 percent reduction in excavation.

2.5.2 At Lower Junction City

At Lower Junction City the designers dismissed three preliminary alternatives based on public input. Upland features, including removing tailings piles on private land, were removed from all alternatives for various reasons. One reason for excluding uplands work is that any work on the uplands is inconsistent with the intentions of the landowner. The second reason for exclusion of the uplands work is because of cost to benefit ratio, where the tailings piles removal is very expensive but, even with extensive lowering of 16-20 vertical feet, creates a surface that rarely interacts with the river.

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Chapter 3

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction to the Analysis

This chapter describes the existing resources at the Bucktail and Lower Junction City Rehabilitation sites 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 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 Bucktail and Lower Junction City 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 PRC 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 (PRC, § 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, 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 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

The land within the Bucktail Rehabilitation Site boundary (96.01 acres) is a mixture of public and private land. The BLM manages a large portion of the lands within the ESL (43.65 acres); the majority of the land is held in private ownership (51.17 acres); and a small percentage is owned by Trinity County (1.14 acres). The majority of the land within the Lower Junction City Rehabilitation Site ESL (103.84 acres) is privately owned (99.93 acres). The BLM manages 1.37 acres and the county and state manage the remaining acres (1.20 acres and 1.29 acres, respectively). The Bucktail site is located along Browns Mountain Road west of Lewiston. At the Bucktail site there are homes located on river right, in a residential development off of Steelhead Circle. On river left, there are homes and other structures located just outside the project area boundary, accessed off Lewiston Road. The Lower Junction City site is located adjacent to SR-299 and Dutch Creek Road. At the Lower Junction City site there are structures adjacent to the project area on both river right and river left, but there are no homes within the project area boundary.

Public land in and/or 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 RMP, and USFS lands are managed in accordance with the 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 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. Junction City is located on SR 299 approximately 9 west of Weaverville, and has an estimated population of 700. Lewiston is 35 miles west of Redding, California, and 15 miles east of Weaverville. Lewiston has a population of approximately 1,300 people (U.S. Census Bureau 2000). The Bucktail site is located in the Lewiston Community planning area (Trinity County 1986) and the Lower Junction City site is located in the Junction Community planning area (Trinity County 1987).

The small communities of Lewiston and Junction City, which are near the Proposed Project sites, are situated adjacent to the Trinity River in areas where terrain is relatively gentle. Existing land uses typical of the area are primarily residential, timber and other resource production, recreation, and open space. Development in these rural communities is primarily residential, typified by scattered single-family residences and mobile homes. Future development is restricted by the proximity of parcels to the Trinity River, because many of these parcels are zoned Flood Hazard and Open Space. 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.

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

Lewiston Community Plan

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

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

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, the Community Core, and Red Hill Road. Land uses along the river in Junction City vary by neighborhood and include resource, agricultural, residential, commercial, village, and open space. These land uses occur at varying densities, which range from 2.5 to 160 acres.

The Lower Junction City site is within the Junction City Community Plan area and would be located between the Community Core and the Red Hill Road neighborhoods. These neighborhoods typically include Rural

Residential, Open Space, and Resource land use designations, with a small area in the Community Core neighborhood designated as Village. These land uses occur at varying densities that generally reflect available public services and environmental constraints. The majority of parcels in the Red Hill neighborhood fall in the Rural Residential designation. There are several commercial establishments in the Community Core neighborhood. Public and private fishing and river access areas occur throughout the plan area.

Trinity County Zoning

The Trinity County Zoning Ordinance is discussed in Section 4.2 of the Master EIR, including details about Trinity County zoning districts that apply to lands in the area. Significant portions of the Project sites are located in the 100-year floodplain of the Trinity River as determined by the Federal Emergency Management Agency (FEMA). Areas in the 100-year floodplain have been designated as Zone A, Zone AE, Zone X, and Zone X500 Flood Hazard Areas[5] and all sites within the 100-year floodplain are designated by Trinity County as Scenic Conservation Zones.

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 (USDI BLM 1993) which in turn requires compliance with the Aquatic Conservation Strategy for Management of Habitat for Late-Successional and Old-Growth Related Species within the Range of the Northern Spotted Owl. 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 Master EIR for more information about the RMP and Appendix A of the Master EIR for the Project's Aquatic Conservation Strategy Consistency Evaluation. Appendix C contains the Pechman exemptions.

The Proposed Project applies a 2006 Exemption from a stipulation entered by the court in litigation regarding Survey and Manage species and the 2004 ROD related to Survey and Manage Mitigation Measure in *Northwest Ecosystem Alliance v. Rey*, No. 04-844-MJP (W.D. Wash., Oct. 10, 2006). Previously, in 2006, the District Court (Judge Pechman) invalidated the agencies' 2004 RODs eliminating Survey and Manage due to NEPA violations. Following the District Court's 2006 ruling, parties to the litigation entered into a stipulation exempting certain categories of activities from the Survey and Manage standards and guidelines, including both pre-disturbance surveys and known site management. The Proposed Project meets Exemption C because it is a river restoration project that incorporates the placement of large wood and channel and floodplain reconstruction. See Appendix C.

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

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

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, the Lewiston and Lower Junction City Community Plans, applicable land use plans, and zoning in relation to surrounding land uses and site features. The analysis was conducted through a literature review and site visits.

3.2.2.2 Significance Criteria

The following significance criteria were developed in the Master EIR and are based on guidance provided by CEQA guidelines. Impacts to land uses would be significant 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 5 summarizes land use impacts that could result from implementation of the No-Project and Proposed Project alternatives.

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

No-Project Alternative	Proposed Project	Proposed Project With Mitigation
Impact 3.2-1. Implementation of the project could disrupt existing land uses adjacent to the rehabilitation 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 Proposed 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 community of Lewiston and Junction 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. A portion of the activities at the Bucktail Rehabilitation Site would be located on public lands (BLM-managed) but some would also be located on private lands (refer to Figure 2). Most of the activities at the Lower Junction City Rehabilitation Site would be located on private lands (refer to Figure 3). Staging, construction, and access on private lands in and adjacent to the site boundaries would require landowner approval. Work within adjacent road easements would require Trinity County encroachment permits and traffic control for ingress and egress. Residential development located within or near the rehabilitation sites would be outside the areas of direct impact associated with the Proposed Project. There are no residential developments within either of the ESL boundaries, but residences are located nearby at both sites. Although these sites have private residences near their boundaries, Project activities would not interfere with, preclude, or conflict with adjacent land uses.

Based on the analysis above, potential conflicts with or disruptions to adjacent land uses resulting from activities associated with the Proposed Project would be temporary and less than significant. As discussed in Section 3.16, Transportation and Traffic, no road closures would result from implementation of the Proposed Project. Access to adjacent residences would be maintained during Project construction and post-construction monitoring activities (refer to Appendix 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, visual resources, and noise) at some nearby residences; however, such impacts would be temporary and would not significantly affect the ability to use adjacent lands. Project impacts associated with air quality, visual resources, and noise are discussed 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 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 Proposed Project may affect the availability of a locally important mineral resource recovery site.

No-Project Alternative

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

Proposed Project

There are no active mining claims within the Proposed Project sites, and there are no locally important mineral recovery sites identified by the state within the boundaries of the 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 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 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 Master EIR (Section 4.10, Cultural Resources). Table 6 provides a summary of the geomorphic features for the sites. These features are shown on Figure 6 for Bucktail and Figure 7 for Lower Junction City.

Table 6. Geomorphic Features within the Proposed Project Boundaries.

Geomorphic Feature	Bucktail (Acres)	Lower Junction City (Acres)
Vegetated Riparian Berm*	2.79	3.19
Floodplain	11.94	2.48
Bedrock	0.06	0.22
Bar	1.96	1.02
Modified Terrace*	60.60	44.18
Upland Hillslope	4.27	3.91
Delta	0	5.63
Levee	0.39	0
Coarse Fill	0.37	0.79
Tailings	1.81	28.69
* = Human induced geomorphic feature.		

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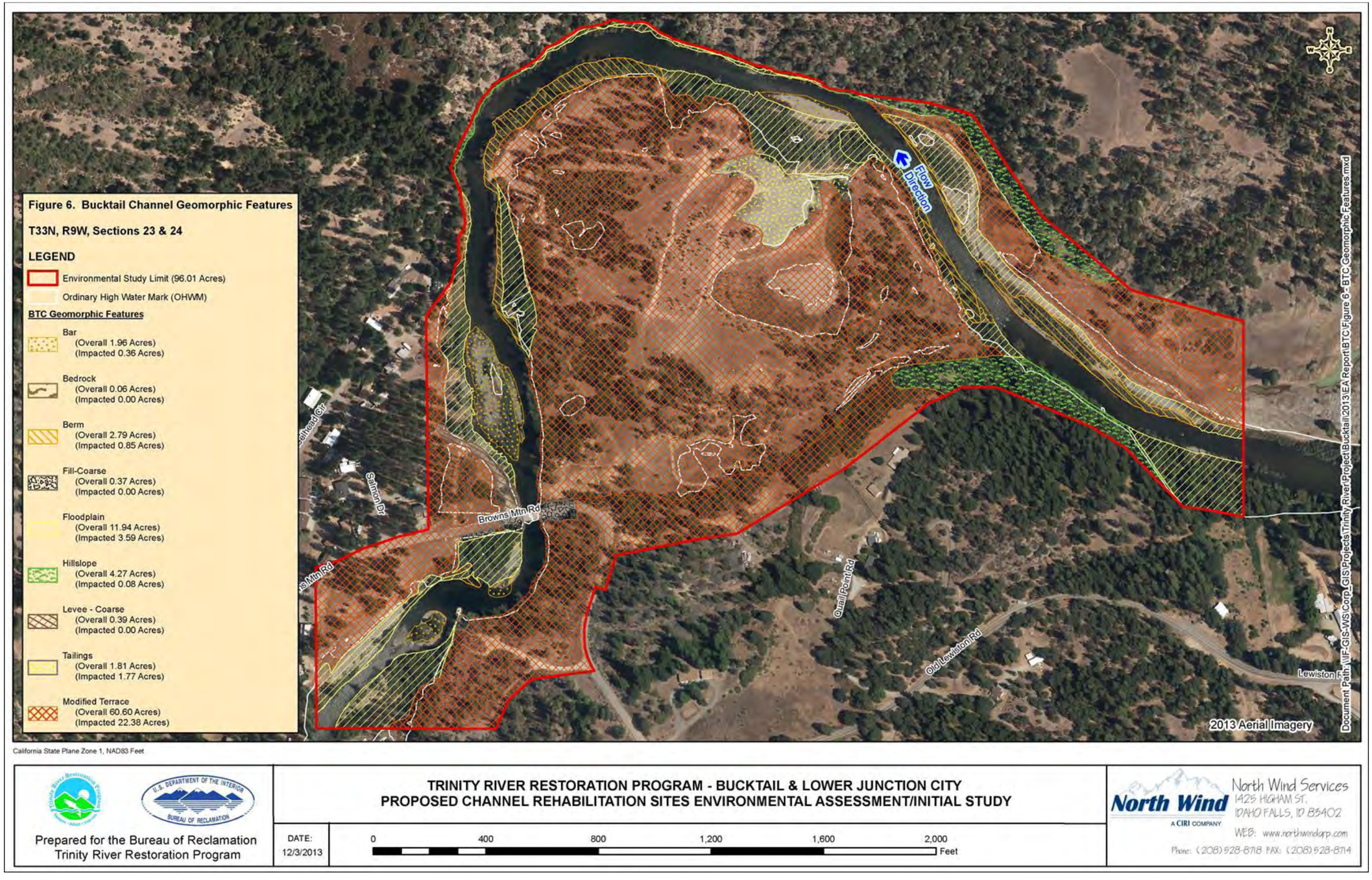

Figure 6. Geomorphic Features at the Bucktail Rehabilitation Site.

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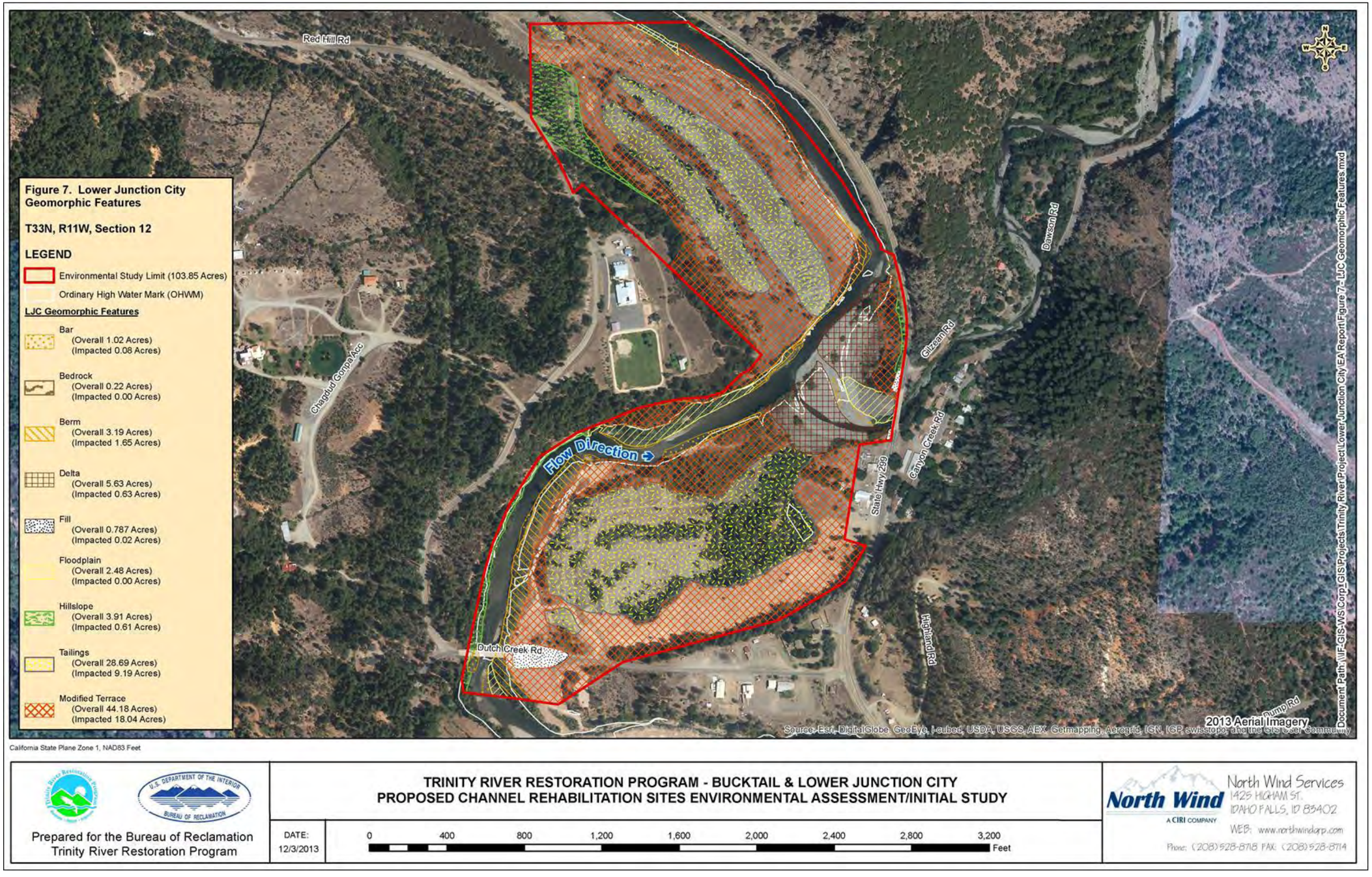

Figure 7. Geomorphic Features at the Lower Junction City Rehabilitation Site.

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

The Bucktail site is located on the Trinity River between RM 105.3 and 106.35. The Bucktail site begins approximately 0.15 miles downstream of the Bucktail Bridge extending upstream approximately 1 mile to RM 106.35. The site is intersected by Browns Mountain Road and the Bucktail Bridge and occupies the floodplain and alluvial terrace features on both sides of the Trinity River. The hydrology of the site is influenced almost exclusively by the mainstem Trinity River and associated operation of the TRD (i.e., Lewiston Dam and Trinity Dam). To a lesser extent, development and runoff from adjacent roads and hillsides following precipitation also affect the site. A review of historic aerial photographs between 1944 and 2012 provides insight into channel changes over time at this site (HVT et al. 2013c). These photographs show a dramatic decrease in bankfull channel width between 1944 and 2012. Reduced flows from Trinity Dam operations narrowed the existing bankfull channel width of 200-250 feet down to its current bankfull width of between 100 and 120 feet. Safety of Dam releases, tributary floods, and ROD high flow releases have exacerbated the problem, depositing additional fine sediment along the left bank and scouring the channel into its current rectangular form with near vertical banks. The channel upstream of RM 105 is primarily comprised of gravel and cobble (HVT et al. 2013c).

Several constraints at the Bucktail rehabilitation site may limit potential designs to the mainstem channel and left bank. Infrastructure constraints at the site include: 1) Bucktail Bridge (Browns Mountain Road Bridge) is located at RM 105.45 at the downstream end of the project reach; and 2) Private property inholdings and houses. In addition to the infrastructural constraints listed above, four geological/physical constraints exist at the site: 1) Valley wall and bedrock confinement along the entire right bank channel through the project reach (RM 105.65 – 106.0); 2) Need to maintain seasonal fishing access to the Bucktail boat launch; 3) Buried burn debris; and 4) Federal Emergency Management Agency requires that the 100-year flood water surface elevation at the site not be raised or lowered by more than one foot. An existing bridge (Browns Mountain Road Bridge or the Bucktail Bridge) at the downstream end of the project is proposed to be replaced with a new bridge. The existing bridge constricts the channel and backs water up throughout the Bucktail site. The proposed bridge would have a longer span and would reduce the constriction through the bridge section.

The Lower Junction City Rehabilitation Site is a 103.84-acre site whose general limits extend from near the Dutch Creek Road Bridge in Junction City past the Canyon Creek confluence with the Trinity River, from approximately RM 78.8 to RM 79.8. The site extends downstream from the Dutch Creek Road Bridge through the "Junction City Hole," a large scour hole induced by a bedrock outcrop. For the purposes of this discussion, the Lower Junction City site is divided into areas with different physical features and geomorphic processes: the relatively straight channel reach between Dutch Creek Bridge and Junction City pool, the Junction City pool complex, the Canyon Creek confluence area, and the dredger tailings and wetlands.

The river channel from just upstream of the Dutch Creek Bridge to upstream of the Junction City pool is relatively straight with a slight thalweg meander and low-profile alternate bar topography. Steep consolidated alluvium or placer mining deposits and bedrock border the river along the left bank side, and a pre-dam scale bar with a riparian and fine sediment berm border the right bank. Behind the riparian berm, the dredger tailings parallel the river channel. There is a small sediment wedge upstream of the Dutch Creek Bridge which restricts high flows. A small creek enters the river below the bridge along the left bank. The thalweg and river channel has been slowly migrating into the right bank approximately half way down the straight reach where the thalweg crosses back to the right bank. The majority of the thalweg alteration occurred since the mid-1990s and further development is likely hampered by the right bank riparian berm, the left bank bedrock, and the bridge constriction.

At the end of the straight reach, the channel gradually bends to the right before being forced into a sharp right elbow by a streamside bedrock obstruction and cliff. The Junction City pool forms between the end of the right bank riparian berm and a bedrock knob jutting out from the left bank. The pool gradually shoals into a wide pool tail-riffle. On the left bank edge of the pool, a relatively large bar formed in the lee of the bedrock

obstruction. This pool, riffle, and bar complex has changed rather significantly following the historic dredging efforts, the 1955 flood, and the elimination of large high flows post dam. Following closure of the dam, riparian vegetation progressively grew along the right bank upstream and downstream of the pool narrowing the channel. Several floods in the 1990s (e.g., Jan. 1, 1997) removed a large portion of the downstream vegetation, increased the pool depth, and formed the left bank bar downstream of the pool.

The Canyon Creek watershed has a drainage area of 63.7 square miles. The mainstem length is 20.1 miles and the delta extends from approximately the Highway 299 Bridge to the mainstem Trinity River. Floods have significantly changed the delta and Lower Junction City site. For example, the Highway 299 Bridge over Canyon Creek was washed away during the December 1964 flood and the Canyon Creek delta and mainstem Trinity River channel were significantly altered during the flood. The delta contains a wide range of sediment sizes and provides important gravels for spawning at the confluence with the Trinity River and downstream. The delta is a steep plane-bedded section with very little vegetation. Past cross section surveys that cross the mainstem Trinity River document large scour and fill adjustments from 1961 to 1965. The two cross sections across the Trinity River at the delta show the delta expanding and forcing the Trinity River to migrate northwestward from 1961 to 1965. The 1964 and early 1970s tributary floods continued to expand the delta because the entire upper basin December 1964 and subsequent mainstem floods were captured following completion of the Trinity and Lewiston Dams. The delta continued to grow during the late 1970s through early 1990s because there were few mainstem floods to transport additional delta sediments. However, riparian growth along the Trinity River left bank in the 1980s and 1990s appears to have slowed the Trinity River migration across from the delta. The 1997 and 2005 floods and the recent ROD dam releases removed some of the delta sediments but have also increased the mainstem channel migration. Currently, the interplay between the Canyon Creek delta and the mainstem Trinity River appears to be near equilibrium, with periodic growth and periodic excavation and northwestward migration by the Trinity River. This may change with a large winter tributary flood that transports large quantities of sediment to the delta.

3.3.1.2 Mineral Resources

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

Trinity County was historically a gold mining region, and many unpatented mining claims exist along the Trinity River. Both lode (hardrock) mines and placer (alluvial gravel) mines were present in the watershed with activity from 1848 to the present. A map of 2009 active mining claims is provided in the Master EIR (North Coast Regional Water Board and Reclamation 2009). 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. Presently there is a moratorium on suction dredging (Fish & Wildlife Code, § 5653 subd. (d)), although some gold mining activity continues in the form of panning and other non-motorized techniques. Placer mining has left tailing deposits that are apparent at the rehabilitation sites and that continue to influence the form and function of the Trinity River. Over time, aggregate mining of alluvial deposits and reworking of hydraulic tailings have resulted in additional channel modifications and changes in sediment supply.

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. However, the Assistant Secretary of the Interior for Policy, Management and Budget is proposing to withdraw, subject to valid existing rights, on behalf of the BLM, public lands located in Trinity County, California, from location and entry under the United States mining laws, but not from mineral material sales or mineral or geothermal leasing, to protect the cultural, recreational, and biological resources within and along the recreational segments of the Wild and Scenic River segment of the Trinity River (Federal Register,

Vol. 78, No. 162, Wednesday, August 21, 2013, 51741-51743). The Notices of Proposed Withdrawal have temporarily segregated the lands for up to two years from location and entry under the United States mining laws. TRRP will continue to work with the BLM to ensure that construction efforts are consistent with BLM's long-term management goals for sites that contain BLM-managed lands.

There are 36 named active mining claims (USDI 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). The closest placer mining claim to the Bucktail rehabilitation site occurs in Lewiston. There has been no mining activity associated with this claim for several years (Reclamation and TCRCD 2008). Currently, there is no authorized Plan of Operations for placer mining activities within or in close proximity to any TRRP rehabilitation sites, and there are no mining claims at the Bucktail or Lower Junction City sites. While suction dredging has been the principal mining method used on the Trinity River, there is currently a moratorium on suction dredging throughout California. The CDFW is currently prohibited by statute from issuing suction dredge permits (Fish & Wildlife Code, § 5653.1, subd. (a)), and the CDFW cannot currently predict when, or if, suction dredging will be lawful in California in the future or when permits may be available to interested miners.

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

The Proposed Project sites have been heavily disturbed by previous mining activities. The Bucktail site has large volumes of dredge tailings that are artifacts of this mining era. Evidence of this activity can be seen from the banks of the Trinity River within the site boundaries. These remaining tailing deposits continue to influence the form and function of the Trinity River. Extensive erosion from the La Grange placer mine (approximately 1 mile upstream of the Lower Junction City site) and other legacy mining helped lead to channel aggradation from upstream of Sheridan Creek to downstream of Conner Creek. Subsequent dredger mining completely over turned the entire lower valley floor and created extensive dredger tailing deposits within the Lower Junction City site. During the mining process, the majority of the riparian corridor was removed and the historic river channel, floodplain, and terraces were significantly altered. The topography and stratigraphy (fine surfaces and coarser subsurface deposits) of the floodplain and terrace deposits were reconfigured leaving tall, coarse deposits with little moisture and nearly devoid of vegetation (Reclamation et al. 2013).

3.3.1.3 Geologic Hazards

A discussion of the regional seismicity and seismic hazards is provided in the Master EIR (Section 4.3). No local active Quaternary faults have been identified, although little detailed mapping of Quaternary geologic features has been conducted in the area. The soils bordering the Trinity River are predominantly alluvial in nature and have the potential to experience liquefaction – a process whereby water-saturated granular soils are transformed to a liquid state during ground shaking; however, the type of activities described in Chapter 2 would not affect the potential for liquefaction or be affected by liquefaction were it to occur.

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 six main soil types in the Bucktail Project area. They are 102 – Atter-Dumps, Dredge Tailings-Xerofluvents Complex, 2 to 9 percent slopes; 179 – Musserhill Gravelly Loam, 15 to 30 percent slopes; 182 – Musserhill-Weaverville Complex, 30 to 50 percent slopes; 198 – Tallowbox-Minersville Complex, 50 to 75 percent slopes; 213 – Xeralfs-Xerorthents Complex, 5 to 50

percent slopes; and 217 – Xerofluvents-Riverwash Complex, 0 to 5 percent slopes. There are three main soil types at the Lower Junction City Rehabilitation Site. They are 102 – Atter-Dumps, Dredge Tailings-Xerofluvents Complex, 2 to 9 percent slopes; 217 – Xerofluvents-Riverwash Complex, 0 to 5 percent slopes; and 218 – Xerorthents-Rock Outcrop Complex, 2 to 15 percent slopes. Brief descriptions of these main soil types are included below.

102 – Atter-Dumps, Dredge Tailings-Xerofluvents Complex, 2 to 9 percent slopes. This map unit is on alluvial fans, stream terraces, and floodplains that have been altered by dredging operations. This unit is about 50 percent Atter extremely gravelly loamy sand, 20 percent Dumps, dredge tailings, and 15 percent Xerofluvents. The Atter soil is very deep and is somewhat excessively drained. Permeability is rapid in the Atter soil. Available water capacity is very low.

Runoff is slow, and the hazard of water erosion is slight. Dumps and dredge tailings consist of nearly barren mounds deposited along stream channels by dredge mining activities. Permeability is rapid in areas of the dumps. Runoff is medium, and the hazard of water erosion is slight. Xerofluvents consist of well-drained soils that formed in alluvium derived from mixed rock sources. Permeability is moderate or rapid in the Xerofluvents. Available water capacity is very low or low. Runoff is slow or medium, and the hazard of water erosion is slight or moderate. These soils are subject to flooding during prolonged, high-intensity storms. The frequency of the flooding ranges from rare to frequent; channeling and deposition are common along streambanks (USDA 1998).

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

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

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

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

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

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 2013); 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 10 Trinity River healthy alluvial river attributes.

3.3.2.3 Impacts and Mitigation Measures

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

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

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

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

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

No-Project Alternative

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

Proposed Project

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

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

No-Project Alternative

Under the No-Project alternative, the 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.

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

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

3.4 Water Resources

This section presents a discussion of the water resources known to occur in the Trinity River Basin in proximity to the Proposed Project 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 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 use6. 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

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

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 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.

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

The best available hydraulic analysis for the Trinity River is the Trinity River Hydraulic Flow Study: North Fork Trinity to Lewiston Dam developed by the California DWR for the TRRP using flow data from the 2005 Reclamation study (California DWR 2007). The California DWR study summarizes flow modeling of the mainstem Trinity River from Lewiston Dam to its confluence with the North Fork Trinity River, 40 miles downstream. The model estimates WSE based on a controlled flow release of 11,000 cfs from Lewiston Reservoir with 10-year and 100-year spring tributary flows. The TRRP has defined the 11,000 cfs release plus 100-year spring tributary flow event as the 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 base flood elevation (BFE) estimated by FEMA for the 100-year flood. One of the design criteria for the Proposed Project was developed to ensure that none of the proposed activities would result in an obstruction to flow or an increase in the BFE of more than 12 inches.

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

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

Table 8. Summary of Potential Water Resource Impacts for the No-Project and Proposed Project Alternatives.		
No-Project Alternative	**Proposed Project**	**Proposed Project With Mitigation**
Impact 3.4-1. Implementation of the project could result in a temporary or permanent increase in the BFE.		
No impact	Less than significant	Not applicable[1]
Impact 3.4-2. Implementation of the project could result in a permanent decline in groundwater elevations or a permanent change in groundwater quality.		
No impact	Less than significant	Not applicable[1]
Impact 3.4-3. Implementation of the project would expose people or structures to a significant risk of injury, death, or loss involving flooding or erosional processes.		
No impact	Less than significant	Not applicable[1]
[1] Because this potential impact is less than significant, no mitigation is required.		

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

No-Project Alternative

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

Proposed Project

The elevation and extent of the floodplain of the Trinity River would be modified through the activities associated with the Proposed Project, as described in Chapter 2. The Proposed Project would be consistent with the overall Project objectives and design criteria established by the TRRP and the Regional Water Board and the 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 of 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 Master EIR, Section 4.5, Water Quality. Information related to this topic is also provided in the Master EIR in Section 4.4, Water Resources, and Section 4.6, Fisheries.

3.5.1 Affected Environment/Environmental Setting

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

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

Temperature

The influence of Trinity Lake and Lewiston Reservoir on downstream conditions diminishes with distance. In general, the greater the release volumes from Lewiston Dam, the less susceptible the river's temperature is to other factors. Releases from the TRD are generally cold (42° to 47° 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 Ranch locations, holes have decreased in depth. Furthermore, due to high fishery flows released in spring 2011 (11,000 cfs from Lewiston Dam), riverbed and floodplain gravel have also moved more than in earlier years. While increased erosion and gravel movement during high flow years is to be expected, the TRRP has examined data, collected pre- and post-high flows, to determine the extent and type of change that has occurred on the river's bottom, and a draft summary is being developed. 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.

Turbidity

The Basin Plan (North Coast Regional Water Board 2011) contains water quality objectives to protect present and probable future beneficial uses of water and to protect existing high quality waters of the state. Water quality objectives form the basis for establishment of waste discharge permits. The Basin Plan contains a water quality objective for turbidity that applies to the Trinity River, including the Proposed Project 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 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 effects to aquatic organisms unless concentrations are extremely high (Lloyd 1985). Noggle (1978) estimated an acute lethal concentration causing 50 percent mortality of juvenile coho salmon at 1,200 mg 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 Board and Reclamation 2009). In the laboratory, 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, as long as the larger sediment particles are only mobilized into the water column from completed restoration activity areas and off-site sources during high flows, the larger sediment particles will be transported far down-river or deposited on adjacent alluvial features (e.g., floodplains) where these particles contribute to riparian form and function (e.g., plant growth).

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

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

3.5.2 Environmental Consequences/Impacts and Mitigation Measures

3.5.2.1 Methodology

For the past eight 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 (Regional Water Board 2011).

3.5.2.3 Impacts and Mitigation Measures

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

Table 9. Summary of Potential Water Quality Impacts for the No-Project and Proposed Project Alternatives.		
No-Project Alternative	**Proposed Project**	**Proposed Project With Mitigation**
Impact 3.5-1. Construction of the project could result in short-term, temporary increases in turbidity and total suspended solids levels during construction.		
No impact	Significant	Less than significant
Impact 3.5-2. Construction of the project could result in short-term, temporary increases in turbidity and total suspended solids levels following construction.		
No impact	Significant	Less than significant
Impact 3.5-3. Construction of the project could cause contamination of the Trinity River from hazardous materials spills.		
No Impact	Significant	Less than significant
Impact 3.5-4. Construction of the project could result in increased stormwater runoff and subsequent potential for erosion.		
No impact	Less than significant	Not applicable[1]
Impact 3.5-5. Construction and maintenance of the project could result in the degradation of Trinity River beneficial uses identified in the Basin Plan.		
No impact	Significant	Less than significant
[1] Because this potential impact is less than significant, no mitigation is required.		

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

No-Project Alternative

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

Proposed Project

The activities described in Chapter 2 for the Proposed Project would temporarily increase turbidity and total suspended solids in the Trinity River. The incorporation of design elements and construction criteria described in Appendix 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. Short-term increases in turbidity and suspended solids levels during construction would be a significant impact.

The temporary crossings at the Bucktail site would provide access for in-channel work areas. The low-flow channel crossings would be constructed of appropriately sized alluvial materials. Placement of alluvial fill materials could temporarily increase turbidity and suspended materials during and immediately following

crossing construction. Removal and distribution of alluvial materials upon deconstruction of the low-flow channel could also increase turbidity and suspended materials during and immediately following excavation.

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

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. These 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 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). Spills of hazardous materials into or adjacent to the Trinity River could degrade water quality and have deleterious effects on salmonids of any life stage that are in close proximity to construction activities. Section 3.13, Hazards and Hazardous Materials, evaluates potential effects associated with exposing the public to hazards associated with the transportation and use of hazardous materials at the rehabilitation sites. Additional requirements outlined in Appendix A would be incorporated into the Project 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, and
- Chemical constituents.

The impacts would be associated with in-channel work including the placement and deconstruction of the low-flow channel crossing at the Bucktail site. 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. These particular mitigation measures address potential impacts to multiple resources, but they are only listed once in an attempt to reduce the size of the document. Implementation of the specified mitigation measures would reduce the impacts to less than significant.

3.6 Fishery Resources

This section describes the fishery resources and aquatic habitats that are known to occur within the boundaries of the sites and evaluates the impacts of the Proposed Project on these resources. The TRFEFR (USFWS and HVT 1999) determined that lack of spawning and rearing habitat for juvenile salmonids is likely a primary factor 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 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 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*), 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.