Trinity River Channel Rehabilitation Site: Deep Gulch (River Mile 82.4–82.9) and Sheridan Creek (River Mile 81.6–82.4)

Environmental Assessment/Initial Study
DOI-BLM-CA-N060-2017-014-EA and TR-EA0117
State Clearinghouse #2008032110

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

Federal Co-lead Agency for NEPA
U. S. Department of Interior, Bureau of Land Management

Project Proponent's Consultant
North State Resources, Inc.

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Acronyms and Abbreviations

AEAM	Adaptive Environmental Assessment and Management
af	acre-feet
APE	Area of Potential Effect
Basin Plan	Water Quality Control Plan for the North Coast Region
BDA	beaver dam analog
BFE	base flood elevation
BLM	U.S. Bureau of Land Management
BMI	benthic macroinvertebrate
BMP	best management practice
BO	Biological Opinion
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
CO_2	carbon dioxide
CWA	Clean Water Act
CWHR	California Wildlife Habitat Relationships
CY	cubic yard
dB	logarithmic decibel
DPS	distinct population segment
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
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FIS	Flood Insurance Study
GHG	greenhouse gas
IS	Initial Study
L_{dn}	day-night average sound level
MMRP	Mitigation Monitoring and Reporting Program
msl	mean sea level

NAHC	Native American Heritage Commission
NCUAQMD	North Coast Unified Air Quality Management District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
NSR	North State Resources, Inc.
NTU	nephelometric turbidity unit
ORV	outstanding remarkable value
PA	Programmatic Agreement
PM10	particulate matter less than 10 microns in aerodynamic diameter
PM2.5	particulate matter less than 2.5 microns in aerodynamic diameter
PRC	Public Resources Code
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
SMARA	Surface Mining and Reclamation Act
SONCC	Southern Oregon/Northern California Coast
SR	State Route
SWPPP	Storm Water Pollutant Prevention Plan
TMC	Trinity Management Council
TRD	Trinity River Division
TRRP	Trinity River Restoration Program
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRM	visual resource management
WSE	water surface elevation
WSRA	Wild and Scenic Rivers Act
WUA	weighted usable area
YT	Yurok Tribe

Chapter 1. Introduction and Background

This Environmental Assessment/Initial Study (EA/IS) for the proposed Trinity River Channel Rehabilitation Sites – Deep Gulch (River Mile [RM] 82.4-82.9) and Sheridan Creek (RM 81.6-82.4) was prepared by the United States Department of the Interior (USDI), Bureau of Reclamation (Reclamation) and USDI Bureau of Land Management (BLM) to meet the requirements of the National Environmental Policy Act (NEPA) and by the North Coast Regional Water Quality Control Board (Regional Water Board) to meet the requirements of the California Environmental Quality Act (CEQA). Reclamation is the lead agency under NEPA, and BLM is a federal land manager at the sites and federal co-lead under NEPA. These federal agencies worked with the Regional Water Board to analyze the potential impacts of the proposed activities under NEPA (40 Code of Federal Regulations [CFR], Section 1508.9(a)) and CEQA (California Public Resources Code (PRC) Sections 21000 et seq.).

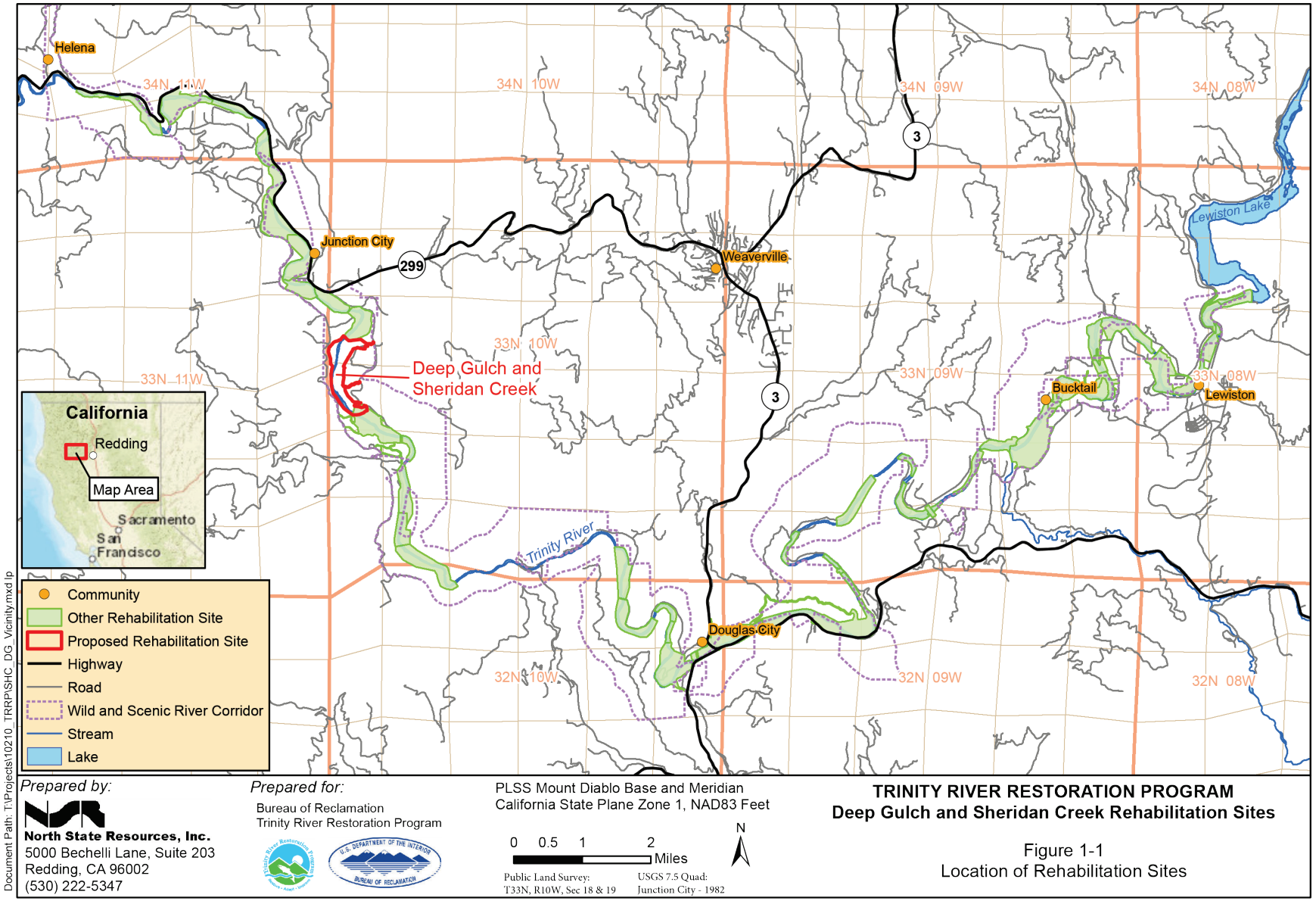
Appendix A1 to this EA/IS was prepared as an initial screening mechanism to identify the resource topics that were addressed in the *Channel Rehabilitation and Sediment Management Activities for Remaining Phase 1 and Phase 2 Sites, Part 1: Final Master Environmental Impact Report and Part 2: Environmental Assessment/Final Environmental Impact Report (Master EIR and EA/EIR, Regional Water Board and Reclamation 2009)* and considered in this document. Appendix A2 to this EA/IS is the CEQA environmental checklist prepared to partially satisfy CEQA requirements.

This EA/IS incorporates by reference, and is tiered from, two previous joint NEPA/CEQA documents, the *Trinity River Mainstem Fishery Restoration Environmental Impact Statement/Report* (Trinity River EIS/EIR; U.S. Fish and Wildlife Service et al. 2000) and the Master EIR and EA/EIR. The proposed Deep Gulch and Sheridan Creek Rehabilitation Sites (collectively referred to as the project area in this EA/IS) were identified in the Master EIR as Phase 2 sites and discussed at a programmatic level. The purpose of this EA/IS is to provide a site-specific analysis of the proposed rehabilitation activities at the two sites.

BLM is considering issuance of a Right of Way to Reclamation pursuant to Title V of the Federal Land Policy and Management Act (43 USC 1761 et seq.) for implementation of the rehabilitation activities on BLM-managed lands. BLM is also considering issuance of a Free Use Permit (FUP) pursuant to 43 CFR 3604 that would authorize Reclamation to use mineral materials for restoration activities at the Deep Gulch and Sheridan Creek rehabilitation sites. All environmental commitments, project design features, mitigation measures, and best management practices (BMPs) developed for this EA/IS would be considered for incorporation into the BLM authorization.

1.1 Location of Rehabilitation Sites

Reclamation proposes to conduct mechanical channel rehabilitation activities on the mainstem Trinity River downstream of Lewiston Dam in the project area, as illustrated on Figure 1-1. The Deep Gulch and Sheridan Creek rehabilitation sites share activity areas and have been combined into one project area for purposes of the analysis. The project area encompasses approximately 177 acres, which include 138 acres of BLM-managed land and 39 acres of private land.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California
Redding
Map Area
Sacramento
San
Francisco
Community
Other Rehabilitation Site
Proposed Rehabilitation Site
Highway
Road
Wild and Scenic River Corridor
Stream
Lake
Prepared by:
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5000 Bechelli Lane, Suite 203
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Prepared for:
Bureau of Reclamation
Trinity River Restoration Program
PLSS Mount Diablo Base and Meridian
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T33N, R10W, Sec 18 & 19
USGS 7.5 Quad:
Junction City - 1982
TRINITY RIVER RESTORATION PROGRAM
Deep Gulch and Sheridan Creek Rehabilitation Sites
Figure 1-1
Location of Rehabilitation Sites
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Throughout this document, the terms river left and river right are used to refer to the river banks when looking downstream. For this project, the left is the west side of the river and the right is the east side.

The Deep Gulch rehabilitation site is located about 1.6 miles south of Junction City, California. This site is in Section 19 of Township 33 North, Range 10 West on the *Junction City, California* 7.5-minute U.S. Geological Survey (USGS) quadrangle, Mount Diablo Base and Meridian. The 0.5-mile-long reach of the Trinity River at this site is characterized by a relatively wide alluvial valley bottom, relatively low water-surface slopes, low sinuosity, and simple channel geometry. The river elevation at the site is approximately 1,480 feet above mean sea level (msl). Access to the site is via dirt roads west of Sky Ranch Road, which intersects State Route 299 southeast of Junction City and north of the site and through the Sheridan Creek site to the north.

The Sheridan Creek rehabilitation site abuts the downstream (northern) boundary of the Deep Gulch rehabilitation site. This site is in Section 18 of Township 33 North, Range 10 West on the *Junction City, California* 7.5-minute USGS quadrangle, Mount Diablo Base and Meridian. The 0.8-mile-long reach of the Trinity River at this site is characterized by a relatively wide alluvial valley bottom, relatively low water surface slopes, low sinuosity, and simple channel geometry with a major riffle feature that supports salmonid spawning. Access to the site from Sky Ranch Road is via Dredger Place, a private, unpaved lane that also provides access through private land to private parcels as well as to BLM land at the northeast corner of the site. The road continues into the Deep Gulch site to the south.

1.2 Trinity River Restoration Program Background

The fundamental purpose of the Trinity River Restoration Program (TRRP) is to restore historic river processes to the Trinity River through implementation of the 2000 Record of Decision (ROD) for the Trinity River EIS/EIR. It is the intent of the TRRP to restore a properly functioning river through rehabilitation activities at multiple locations 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 River.

For 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 prepared by the U.S. Fish and Wildlife Service (USFWS) and Hoopa Valley Tribe in 1999,
- mechanical channel rehabilitation,
- fine and coarse sediment management,
- watershed restoration,
- infrastructure improvement, and
- adaptive environmental assessment and management.

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 peak scouring flows that occurred prior to completion of the

dams were lost. Along with berm removal, the approach involves physical alteration of floodplains so that they become inundated 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. The ROD for the Trinity River EIS/EIR specified that mechanical channel rehabilitation activities would be implemented at 47 sites on the mainstem Trinity River between Lewiston Dam and the North Fork Trinity River. Since issuance of the ROD, the TRRP has completed rehabilitation activities at 32 sites and is currently planning activities at several other sites, including the upstream Dutch Creek rehabilitation site.

The Master EIR 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., pages 1-8). Additional details concerning the legislative and management history can be found in the Trinity River EIS/EIR and the EA/Final EIRs for TRRP projects constructed between 2005 and 2008[1]. These documents are on file at the TRRP office in Weaverville, California, and 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 website[2].

1.3 Purpose and Need/Project Objectives

NEPA regulations require that an EA briefly specify the need that the agency is responding to in proposing an action (40 CFR 1508.9(a)). Similarly, a CEQA lead agency must describe the objectives to be achieved by a proposed project (California Code of Regulations (CCR), Title 14, Division 6, Chapter 3, Section 15124(b)).

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 increase 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 rehabilitation activities at Deep Gulch and Sheridan Creek are needed to support the TRRP's goals of restoring fish populations to pre-dam levels and restoring dependent fisheries, including those held in trust by the federal government for the Hoopa Valley and Yurok tribes, in compliance with the 2000 ROD.

Specifically, the primary rehabilitation objective for the Deep Gulch rehabilitation site is to re-establish a functioning, topographically complex floodplain, while also increasing in-channel habitat diversity. The existing pool-riffle features at the site provide opportunities to increase channel and hydraulic complexity by expanding the channel, excavating adjacent overbank areas, adding large woody material to support rearing habitat, and installing log jams to interact with river flows that can increase bed topography and create eddies. The rehabilitation activities are needed to increase optimal habitat over a wide range of flows for fry and presmolt fish above existing conditions. This

[1] Hocker Flat EA/EIR, the Canyon Creek Suite EA/EIR, Indian Creek EA/EIR, and Lewiston-Dark Gulch EA/EIR.
[2] On the TRRP website, go to http://www.trrp.net/?page_id=409.

site provides a source of alluvial materials necessary for improving aquatic habitat, increasing habitat complexity, and constructing submerged fords to access activity areas on river left.

For the Sheridan Creek rehabilitation site, the primary rehabilitation objective is also to increase habitat diversity, including riparian and aquatic habitat, while also promoting dynamic river processes. The existing riffles and multi-story riparian vegetation provide opportunities to enhance the existing habitat, increase the functional floodplain area, and protect existing high-use spawning riffles above Sheridan Hole. The rehabilitation activities are needed to increase rearing habitat for juvenile fish, reduce the wood storage deficit, and improve continuity between the existing riparian vegetation patches. This site also provides a source of alluvial materials necessary for improving aquatic habitat, increasing habitat complexity, and constructing submerged fords to access activity areas on river left.

1.4 Purpose of This Document

Both NEPA (42 USC 4321 et seq.) and CEQA (PRC, Section 21000 et seq.) 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 site-specific EA/IS for the proposed action at the Deep Gulch and Sheridan Creek sites has been prepared to comply with NEPA and CEQA. This combined NEPA/CEQA document evaluates the environmental impacts of the proposed action, recommends project design features or mitigation measures to minimize impacts, and is designed to facilitate lawful implementation under all applicable laws.

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 (CCR, Title 14, Division 6, Chapter 3, 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.

This site-specific EA/IS for the proposed action at the Deep Gulch and Sheridan Creek sites is tiered to the previous analysis in the *Trinity River Mainstem Fishery Restoration Final EIS/EIR* (FEIS/EIR; USFWS et al. 2000). It also incorporates by reference the analyses in the Master EIR and EA/EIR (Regional Water Board and Reclamation 2009).

The Trinity River FEIS/EIR serves as a NEPA analysis from which site-specific projects may tier. NEPA allows for tiering, as described in Sec. 1508.28 of the Council on Environmental Quality (CEQ) regulations. This section of the CEQ regulations states that tiering "refers to the coverage of general matters in broader environmental impact statements…with subsequent narrower statements or environmental analyses (i.e., regional or basinwide program statements or, ultimately, site-specific

statements), incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared."

In 1994, the USFWS as the NEPA lead agency and Trinity County as the CEQA lead agency began the public process for developing the EIS/EIR for the Trinity River Mainstem Fishery Restoration Program. The FEIS portion of the Trinity River FEIS/EIR (published in October 2000) functions as a project-level NEPA document for policy decisions associated with managing Trinity River flows and as a programmatic NEPA document providing "first-tier" review of other potential actions, including the proposed action. However, because the Trinity County Board of Supervisors—the CEQA lead agency for the Trinity River FEIS/EIR—never certified the EIR portion of the 2000 FEIS/EIR, the EIR portion was not available to tier from for the CEQA portion of this document or for other earlier TRRP CEQA documents. Consequently, four joint EA/EIRs were completed to analyze TRRP channel rehabilitation projects between 2004 and 2008[3]. Based on the similarity of these projects and their environmental impacts and agreement that future TRRP projects would have similar impacts, a separate programmatic document, the Master EIR, was developed. The EA portion of the Master EIR – EA/EIR tiers from the Trinity River Mainstem Fishery Restoration FEIS/EIR (USFWS et al. 2000a). The ROD, dated December 19, 2000, for the FEIS/EIR directed USDI agencies to implement the Flow Evaluation Alternative, which was identified as the Preferred Alternative in the FEIS/EIR.

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 TRRP. 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 site-specific projects. A Master EIR forms the basis for analyzing the effects of subsequent projects (CEQA Guidelines, Section 15175, et. seq.). The Master EIR meets the elements required for a Program EIR pursuant to CCR, Title 14, Division 6, Chapter 3, Section 15168. Therefore, the Master EIR provides programmatic CEQA level review, from which the Deep Gulch and Sheridan Creek project—a subsequent site-specific project—is tiered.

The Regional Water Board acted as the lead agency for the Master EIR (State Clearinghouse #2008032110) and for the initial study portions of subsequent site-specific EA/ISs. The Master EIR provides a discussion of the existing conditions, environmental impacts, and mitigation measures required to comply with CEQA (California 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.

Because the Master EIR provides programmatic level review from which site-specific projects may tier, the analysis of the proposed action required under CEQA is tiered from that document. 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 action. This EA/IS focuses only on site-specific activities for the proposed action and serves as a joint

[3] Hocker Flat EA/EIR, the Canyon Creek Suite EA/EIR, Indian Creek EA/EIR, and Lewiston-Dark Gulch EA/EIR.

NEPA/CEQA document for project authorization by both federal and California state regulatory agencies.

Under CCR, Title 14, Section 15177, after a Master EIR has been prepared and certified, subsequent projects that the lead agency determines as being within the scope of the Master EIR will be subject to only limited environmental review. Subpart (b)(2)) of this section of the CCR states that 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, that no new additional mitigation measures or alternatives are required, and that the project is within the scope of the Master EIR[4]. 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 on 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 EA/IS for the proposed action provides site-specific details for the environmental impact analyses and has been prepared to comply with NEPA (42 USC, Section 4321 et seq.) and CEQA (California PRC, Section 21000 et seq.). This EA/IS focuses only on site-specific activities for the proposed action and serves as a joint NEPA/CEQA document for project authorization by both federal and California state regulatory agencies. This EA/IS contains a site-specific project description and other information required to apply for enrollment under General Water Quality Certification R1-2015-0028 (or subsequent reissued Certification) for Trinity River channel rehabilitation activities, which the Regional Water Board will consider in making its determination and approval decision.

1.5 Other Regulatory Requirements

In addition to CEQA and NEPA, the proposed rehabilitation activities are subject to a variety of federal, state, and local statutes, regulations, policies, and other authorities, such as the Clean Water Act, Endangered Species Act, California Fish and Game Code, National Historic Preservation Act[5], Wild and Scenic Rivers Act, and BLM's 1993 Redding Resource Management Plan (RMP). The primary responsible and trustee agencies are the U.S. Army Corps of Engineers (USACE), USFWS, National Marine Fisheries Service (NMFS), California Department of Fish and Wildlife (CDFW), the Regional Water Board, and Trinity County. Chapter 3, Regulatory Framework, of the Master EIR includes descriptions of the actions required of these agencies and the applicable environmental statutes and identifies permits required for the TRRP work on the Trinity River.

The BLM's Redding Field Office manages public lands in the Trinity River Basin in accordance with its 1993 RMP and Record of Decision (RMP) (BLM 1993). The RMP discusses the general condition of natural resources in the plan area and prescribes appropriate land use management for lands within the plan jurisdiction, including BLM-managed lands at the Deep Gulch and Sheridan Creek rehabilitation sites. Section 4.2.2 of the Master EIR provides additional information about the

[4] Applicable for Master EIRs certified more than 5 years prior to the filing of a subsequent application.

[5] Section 3.1.1 of the Master EIR provides a comprehensive discussion of Reclamation's approach to compliance with the National Historic Preservation Act; specifically with respect to Section 106 consultation requirements. Appendix D to the Master EIR documents the programmatic agreement between USFWS, Reclamation, BLM, Hoopa Valley Tribe, the California State Historic Preservation Office and the Advisory Council on Historic Preservation.

RMP. As part of the BLM decision-making process, BLM must evaluate the consistency of the proposed action with the RMP, as amended.

1.6 Scoping and Public Involvement

Since the signing of the ROD and efforts to begin its implementation, TRRP and other agencies have held numerous public meetings and open houses to obtain public input and provide the public with information on the overall TRRP rehabilitation activities. As part of ongoing TRRP outreach activities, TRRP staff members have met with local groups (e.g., fishing guides and mining groups) and individual landowners from the Junction City area to obtain stakeholder input and advice and to address general concerns not specific to the Deep Gulch or Sheridan Creek rehabilitation activities. Notice of all public meetings and other pertinent project information are announced in local newspapers and posted on the TRRP's website: http://www.trrp.net/.

Assembly Bill 52 (AB52) was signed by the Governor of California in September 2014. The bill requires that California state lead agencies consult with California Native American tribes traditionally and culturally affiliated with the geographic area of a project when the Tribe requests to be informed of such projects and requests the consultation in order to ensure that impacts to tribal cultural resources are minimized. AB 52 requirements apply to projects with a notice of preparation or a notice of negative declaration or mitigated negative declaration filed on or after July 1, 2015. The consultation requirements of AB 52 did not apply to the preparation and adoption of the 2009 Master EIR prepared for the TRRP.

Under the auspices of Reclamation, the TRRP entered into a Programmatic Agreement (PA) with the California State Historic Preservation Officer to ensure compliance with Section 106 of the National Historic Preservation Act. The PA ensured that tribal cultural resources were addressed in the Master EIR. The mitigation, monitoring, and reporting plan adopted by the Regional Water Board includes measures for the protection of tribal cultural resources, including tribal consultation and coordination; site evaluations; and avoidance, minimization, and other specific mitigation as necessary at the site scale.

Starting in 2014, when the initial planning/design process for the Deep Gulch and Sheridan Creek sites began, TRRP staff met numerous times with individual landowners along Sky Ranch Road as well as with other interested parties (e.g., local fishing guides) to describe the proposed activities, exchange ideas on how to make the project more acceptable to the local community, adjust project boundaries to reduce impacts to landowners and other users, and discuss the advantages and disadvantages of combining the two sites in one environmental review.

At the request of the TRRP, an outside, independent team of scientists and engineers met for a week in July 2015 to conduct a detailed review of the proposed designs for, and recommend improvements to, the Deep Gulch and Sheridan Creek project using a process referred to as value engineering (VE). The VE study, which was completed in December 2015, provided recommendations related to the design and implementation of the proposed action. As a result of the VE study, the TRRP design teams revised the preliminary design reports and developed the proposed action described in Chapter 2 of this EA/IS. The Value Engineering Study report was completed in December 2015 and is available on the TRRP website at http://odp.trrp.net/Data/Documents/Details.aspx?document=2255.

Consistent with Reclamation and BLM's NEPA requirements, the public review of the Draft EA/IS began when the agencies posted the document to their official websites. The official public review period under CEQA began when the document was submitted to the California State Clearinghouse on March 8, 2017. The Draft EA/IS was circulated to local, state, and federal agencies and to interested organizations and individuals, stipulating a 31-day review period ending on April 7, 2017. After several requests to extend the review period, it was extended for a week to April 14, 2017. At the onset of the review period, public notices informing the public of the availability of the Draft EA/IS for review were posted on the TRRP website, at the rehabilitation sites, at the TRRP Weaverville and BLM Redding Field offices, and in the *Trinity Journal* and *Redding Record Searchlight* newspapers; the public notices were also mailed to local landowners and emailed to interest groups. An open house to describe the proposed action and receive public input was held on March 15, 2017, at 6:00 pm at the North Fork Grange Hall on Dutch Creek Road in Junction City, California, and was attended by representatives of agencies and Tribes, as well as local residents and other interested parties.

During the comment period, five individual comment submittals were received by the TRRP covering a wide array of topics, many of which were outside the scope of the EA/IS. Appendix B provides a complete record of these comments and the responses from the lead agencies.

Chapter 2. Description of Alternatives

This chapter describes the proposed action and the no action alternative as well as alternatives that were eliminated from detailed analysis in this EA/IS. The NEPA term "proposed action" is used throughout this document rather than the CEQA term "proposed project"; however, the terms should be considered synonymous.

2.1 Proposed Action

The proposed action consists of a number of rehabilitation activities at the Deep Gulch and Sheridan Creek rehabilitation sites, including reducing the encroachment of riparian vegetation; placement of large wood material; physical alteration of alluvial features (e.g., placement or excavation of alluvial material to construct floodplains and side channels); construction of large wood hydraulic and habitat structures; and removal or replacement of riparian and upland vegetation at strategic locations. These activities are based on those described and analyzed in the Master EIR; refer to Section 2.3.2 of the Master EIR for more information about each of these general activity types.

For the proposed action, specific activities that fall within the broader categories outlined in Table 2-1 of the Master EIR are described below. Activities P and W have the same level of impacts originally analyzed in the Master EIR, but are described separately in this analysis to clarify their intent. This section describes the general types of activities that occur in the TRRP's rehabilitation projects; Section 2.4.2.2 below describes the actual site-specific activities for the proposed action at the Deep Gulch and Sheridan sites.

2.1.1 Activity A (Recontouring and Vegetation Removal)

Under Activity A, the ground surface would be modified to reduce riparian encroachment and minimize the risk of stranding of juvenile salmonids. Vegetation would be cleared at most of the activity areas that would be subject to rehabilitation activities (e.g., constructed floodplains, disposal areas), but would be maintained where possible.

Activity A includes grading to construct or enhance topographic features that could develop into functional riparian habitat; excavation and the placement of fill would be balanced. In addition to the activity areas that would be cleared prior to grading, site-specific removal of trees (e.g., cottonwood, grey pine) may be required to enhance the safety of the work site and to improve local conditions for individual tree growth and wildlife; these trees would be used to construct large wood habitat structures. In these instances, consultation and authorization with BLM would be required before removal of site-specific trees.

Removed vegetation would be used for in-river placement as large wood, chipped/masticated, or spread/buried in revegetation areas to increase nutrients in and the water holding capability of the soils. Activities would be accomplished using a variety of methods, including hand tools and heavy equipment, such as excavators, bulldozers, scrapers, and dump trucks. Only the minimum amount of riparian vegetation that is necessary for project implementation would be removed.

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

Activities B, C, and D concern the construction of surfaces that would be inundated. Activities associated with the construction of these surfaces would enhance their connection to the river at various flows. These activities are intended to expand the surface area of the channel that could be inundated by reoccurring flows below the ordinary high water mark. 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 by Reclamation consistent with requirements and commitments outlined in the TRRP's 2016 Draft Riparian Mitigation and Monitoring Plan. This plan requires supplemental efforts (e.g., in-planting, weed control, irrigation) as necessary to establish riparian vegetation to meet the standard of no net loss in riparian vegetation from pre-project levels.

2.1.3 Activities E and F (Side Channels)

Under Activities E and F, modifications to create or change side channels would reconnect the Trinity River with its floodplain at targeted flows. Side channels constructed for flows of 300 cubic feet per second (cfs) 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.

Side channels would evolve and revegetate to varying degrees over time. While the duration of side channel flow would depend on their evolution over time and the river's water surface elevation (WSE), riparian and wildlife habitat diversity would increase even when water is not flowing.

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. Water in side channels may be pumped to uplands or slowly metered into the mainstem river post-construction. These techniques would reduce the amount of turbid water that would ultimately reach the Trinity River during side channel connection.

2.1.4 Activity G (Alcoves)

Under Activity G, 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) and scoured/maintained during high flows to provide year-round juvenile fish habitat.

2.1.5 Activity H (Grade Control Removal)

Under Activity H, grade control structures, including constructed features, would be removed to increase channel complexity via promotion of channel migration, increased sinuosity, reduced fine sediment storage, increased coarse sediment transport, and restoration of bars.

2.1.6 Activity I (Sediment Management, Coarse and Fine)

In addition to site-specific creation and enhancement of alluvial features (bars), sediment management activities would occur at various sites under Activity I. Sediment management activities include augmentation of coarse sediment (e.g., spawning gravel) and removal of fine sediment (0.5–0.8 millimeter size fraction) at key locations. Long-term, large-scale coarse sediment augmentation sites would be established at select locations to encourage channel migration and the development of alternate bars. Augmentation activities also include measures required to provide a long-term supply of coarse sediment and to ensure that the TRRP has the administrative access necessary to implement these activities at specific locations.

Selected vegetation would be removed to facilitate the introduction of the coarse sediment along the channel margin. As appropriate, salvaged large wood would be retained and incorporated into riverine/in-channel activities to provide additional habitat complexity. The use of large wood is a vital component of channel rehabilitation work and includes incorporation of hydraulic structures (wood and/or rock), wood habitat structures, skeletal bars, and boulder habitat placement. Coarse sediment would be introduced via mechanized equipment (e.g., conveyor, mechanical placement below the ordinary high water mark) into the river channel under various high-flow conditions in a manner that facilitates the river's ability to route the coarse sediment downstream during high-flow periods.

2.1.7 Activity J (Placement of Excavated Materials)

Under Activity J, excavated materials would be placed in spoil areas so that there would be no increase in the elevation of the 100-year floodplain to comply with the requirements of Trinity County's Floodplain Ordinance. Appropriate site-specific spoil areas are identified and verified through hydraulic analysis so that they would have no effect on the 100-year flood elevation or only within established ordinance parameters. Spoiled materials would be spread in uniform layers that blend with the natural terrain. Placement of excavated and cleaned coarse sediment or cobbles may alternatively be used to create an infiltration gallery to allow subsurface water flow.

2.1.8 Activity K (Staging/Contractor Use Areas)

Under Activity K, excavated materials would be transported across the staging area to stockpile areas. Water would be applied to the excavated materials for construction purposes, including dust abatement, as directed by the Contracting Officer. The TRRP would use water to control dust generated from project activities that would have the potential to affect sensitive receptors adjacent to the project area. It is anticipated that two water trucks would be on site, a 4,000 gallon "ten wheel"

type truck and an "articulated" truck/trailer with a capacity of approximately 10,000 gallons. These would be used continuously on all access roads to and from Sky Ranch Road as well as haul roads on-site. These trucks would also use water to suppress dust where excavation and spoil activities are occurring. At the mobile gravel processing plant, planned for washing and sorting gravel in the DG U-1 or SC U-6 areas, a self-contained unit with spray bars would wash gravel and decrease dust coming off of the plant. The gravel processing operation also includes a 2-inch water hose to allow manual application of water as needed to control dust.

Activity in these areas would also 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.

2.1.9 Activities L and M (Roads, Existing and New)

Activities L and M pertain to existing and new access roads. The location of the activity areas within the project area would require construction of access roads that connect one activity area to others or to an existing public or private road authorized for use for specific project purposes. In some instances, these access roads would remain in use after the completion of the authorized project at the discretion of the land owner or manager. The site-specific design of these roads 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.

2.1.10 Activity N (Temporary Channel Crossings)

Temporary crossings under Activity N 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.

Fords would be constructed using imported clean gravel and native alluvial materials excavated from the bed and bank of the Trinity River or adjacent sources. Where equipment crossings are needed outside of the summer (July 15–September 15) in-channel work window (e.g., to perform wet season revegetation on the right bank), temporary, permitted conditions would be created to prevent spawning in the crossing until all crossings have been completed. All temporary crossings would be designed and constructed to meet the requirements for heavy equipment such as trucks and excavators. With the exception of rip-rap or other stabilizing materials, material would be primarily extracted from activity areas within identified, permitted sites. The use of fords to cross the river would be minimized, and fords would not be used to transport excavated materials across the channel. All extracted material would be placed on the same side from which it was taken.

Due to requirements to retain passage for fish and boats, at least one-third 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. All temporary crossings would be constructed in a manner that does not impede navigability at the specific site.

2.1.11 Activity O (Revegetation)

Impacts to vegetation are anticipated in most activity areas. Under Activity O, revegetation of riparian and upland areas would rely on a combination of planting and natural recruitment of native species consistent with TRRP's 2016 Draft Riparian Mitigation and Monitoring Plan and the needs of BLM and other cooperating, responsible, and trustee agencies. Native willows from the impact areas would be replanted as clumps during construction to speed recovery of vegetation. Replanting of affected native vegetation (e.g., willows and cottonwoods) would be completed after construction in accordance with a site-specific plan. This activity may include watering during the first 3 years post-planting.

In general, the TRRP objective is to ensure that riparian vegetation is minimally affected by TRRP activities and is replaced at a 1:1 ratio (no net loss of riparian area habitat) within the Trinity River corridor. Revegetation would provide aquatic refugia at high flows, improve terrestrial habitat for birds and other wildlife, provide future wood recruitment, and provide future terrestrial nutrient input to the river. Additional planting, seeding, mulching, and irrigation in the upland areas would occur at a 3:1 ratio using native seed and root stock available to Reclamation. Reclamation would also implement measures to control or inhibit the reestablishment of noxious and invasive plant species.

The proposed action also includes the extraction, processing, and use of mineral materials (e.g., gravel, cobble) for on-site activities. Consistent with the Master EIR, the design teams use activity areas to define discrete activities that would be implemented at the rehabilitation sites. The considerations that went into the designs at each site are summarized below, and the descriptions of the activities and activity areas follow the section that discusses design considerations section.

2.1.12 Detailed Master EIR Activities Described to Provide Additional Clarity Beyond That in Table 2-1

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

Activity P impacts were covered in the Master EIR as part of Activity I (Sediment Management) as well as other activities to facilitate side channel construction and maintenance (e.g., excavation of in-channel and riverine areas—activities E, F, and G). The TRRP would use appropriate materials to cause and enhance geomorphic action that would also be expected to improve aquatic and wildlife habitat. Addition of large rock (>6 inch as in the skeletal bars described in the ROD) 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 large wood and accompanying slash would be retained and used in riverine/in-channel activities to provide additional hydraulic and habitat complexity. This could include large wood 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. The 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 log jams to further engage the flow and act as a catalyst for natural processes of scour and channel migration. Construction of larger habitat structures or log jams may incorporate rock and boulders as ballast to ensure that the structures do not migrate with high flows. Furthermore, log jams may be built with downstream "skeletal bars," thus forming habitat complexes that would grow in depositional areas.

Processed alluvial construction material would be obtained and imported from off-site gravel processing areas, or purchased from local vendors for delivery. Unprocessed material or "pit-run" dirt and gravel from onsite excavation may be used in the construction of features and for habitat enhancement, using methods that would be continuously monitored for compliance with turbidity standards when in or near the river channel.

All large wood 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 large wood, any hazard of these structures to people.

The proposed action would place wood in alcoves to improve the quality of habitat by providing cover for juvenile fish, enhancing roughness and complexity, and increasing shading. Because of uncertainties about 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, tree tops, and branches for use in constructing large wood 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 area. The final locations and dimensions of wood and large rock placement would be determined in the field based on direction from Reclamation's field engineer.

Activity W (Wetland Complexes – Rearing Ponds)

Activities identified for Activity W were covered in the Master EIR under Activities A, B, C, or D. Ponds would be created off the mainstem Trinity River via excavation to capture groundwater and/or surface run-off. The water holding capability may be enhanced through the use of Beaver Dam Analog (BDA) features similar to those constructed in 2016 at the Bucktail site. The ponds would provide slow backwater refugia during high flow periods and rearing habitat for juvenile salmonid species. Groundwater infiltration and surface water inflow from side channels would supply the ponds with a cold water environment. The existing tree/shrub canopy would be saved during construction to provide food sources, shade, and protection from predation. The ponds would contain deep pools that have a connection to groundwater to supply needed cold water. Existing vegetative cover and revegetation planting would be incorporated into the ponds for food productivity.

2.1.13 Design Considerations

Early in the planning process, the TRRP identified six sensitive features that are critical with respect to design considerations (e.g., Ice Box Hole, Sheridan Spawning Riffle). Throughout this chapter, these features are referenced with respect to avoiding and/or protecting them to ensure that the overall design objectives are met. These features are illustrated on Figure 2-1.

The design teams worked closely with Reclamation and BLM cultural resources staff to avoid a number of dredge tailing deposits that provide important information on the mining history along the Trinity River. By combining the Deep Gulch and Sheridan Creek sites into one project, there is a reduction in the amount of dredge tailing features that would be impacted. Specifically, activity areas DG U-3 and DG U-4 are not currently planned to receive excavated material.

Initial design of the Deep Gulch rehabilitation site was assigned to the TRRP Federal Design Group, and design of the Sheridan Creek rehabilitation site was assigned to the Yurok Tribe; a design report was prepared for each site by the design teams. Preparation of these reports entailed a review of existing conditions at the site, such as vegetation communities, flow patterns, fluvial geomorphology, soil conditions and characteristics, and other physical characteristics; the reports also included an evaluation of future desired conditions, which considered the success of rehabilitation activities at other sites along the Trinity River and the opportunities available at the two sites. Copies of these design reports are available on the TRRP data portal at http://odp.trrp.net/.

The design teams later worked together to develop final designs for these sites that were responsive to the following physical, biological, and riparian objectives:

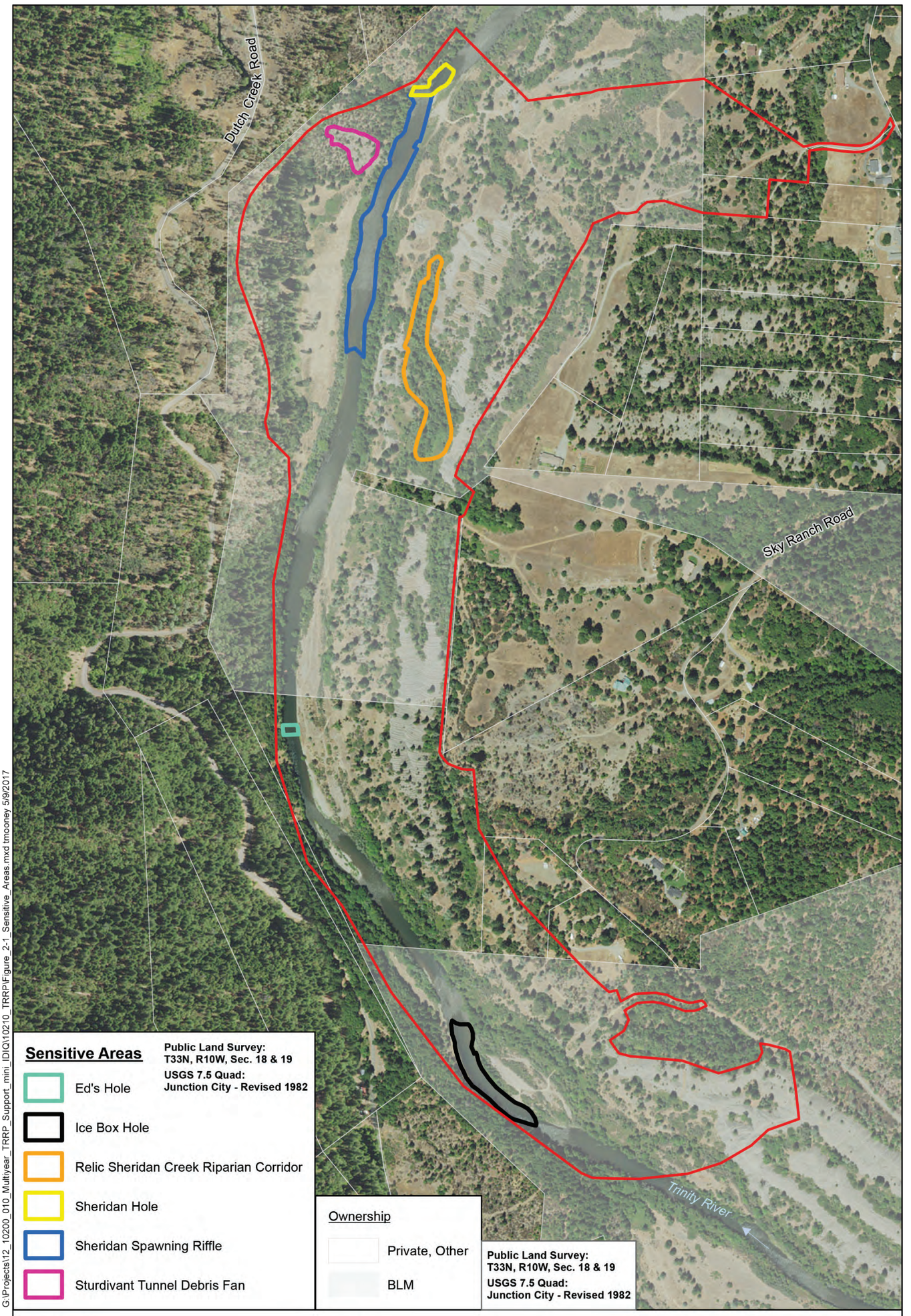
- Physical Objectives
  - Promote dynamic river processes
  - Increase functional floodplain area
  - Reduce wood storage deficit (wood structures and standing inventory)
- Biological Objectives
  - Eliminate the dip in habitat between low flows and 7,150 cfs
  - Double the amount of juvenile fish rearing habitat area–days across the range of critical habitat flows during the January–June time period
  - Encourage stream-type life history characteristics for rearing Chinook juveniles
  - Protect existing high-use spawning riffles above Sheridan Hole
  - Enhance existing amphibian habitat
  - Create perennial or seasonal surface water connection to existing and new off-channel water features

- Riparian Habitat Objectives
  - — Minimize impacts to existing multi-story riparian vegetation and cottonwoods
  - — Increase over existing conditions the riparian vegetation biomass and abundance in the tree, shrub, and herb layer along design features
  - — Increase the number of trees (especially cottonwood) that could supply logs larger than 24 inches diameter at breast height to the river
  - — Increase native species richness/abundance on surfaces that will be open and greater than 7 feet above the lowest groundwater of the year

2.1.14 Rehabilitation Activities

The proposed rehabilitation activities in the project area are described below. Table 2-1 summarizes the proposed activities by activity area, and Figure 2-2 illustrates the locations of each activity area in the project area. Table 2-1 and Figure 2-2 have been revised to reflect adjustments in the size and location of activity areas based on public comments. As the table shows, each activity area has been assigned a unique alphabetic label that corresponds to the type of activity area and the site name.

The activity areas include riverine areas, upland areas, and construction support areas. While these areas are intended to cover the full range of activities, the actual area that would be treated would typically be smaller. 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; access roads are labeled with an A; wetland/pond areas are labeled with a W; and temporary crossings are labeled with an X. Activities at Deep Gulch are labeled with "DG," and activities at Sheridan Creek are labeled with "SC." These labels are used throughout this document.



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TRINITY RIVER RESTORATION PROGRAM
Deep Gulch and Sheridan Creek Rehabilitation Sites

Figure 2-1
Deep Gulch and Sheridan Creek Sensitive Areas

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Table 2-1. Overview of Activity Areas at Deep Gulch and Sheridan Creek Rehabilitation Sites

Activity Area[a]	Primary Activity	Activity/ Treatment Area[b]	Earthwork (CY)[c]	Fill (CY)[c]
DG IC-1	Main channel	0.48 ac	3,565	–
DG IC-2	Bars and islands in channel *	0.53 ac	–	1,250
DG IC-3	Wood structure *	0.06 ac	200	245
DG IC-4	Wood structure *	0.02 ac	70	85
DG IC-5	Wood structure *	0.14 ac	400	525
DG IC-6	Wood structure *	0.04 ac	165	200
DG IC-7	Wood structure *	0.02 ac	130	160
DG IC-8	Wood structure *	0.03 ac	105	130
DG IC-9	Wood placement	0.08 ac	–	–
DG IC-10	Wood placement	0.13 ac	–	–
DG IC-11	Wood placement	0.07 ac	–	–
SC IC-1	Main channel – realignment	1.56 ac	11,469	1,045
SC IC-2	Bars and islands – gravel bar/alcove *	1.11 ac	734	5,534
SC IC-3	Wood structure *	0.04 ac	424	–
SC IC-4	Bars and islands – transverse riffle *	0.14 ac	–	458
SC IC-5	Main channel – realignment	1.16 ac	5,932	1,185
SC IC-6	Bars and islands – gravel bar/alcove *	0.52 ac	293	2,303
SC IC-7	Wood placement	0.46 ac	–	–
SC IC-8	Wood structure *	0.03 ac	–	–
SC IC-9	Wood structure *	0.05 ac	–	–
SC IC-10	Wood structure – hydraulic structure *	0.03 ac	–	–
	IC Subtotal =	**6.7 ac**	**23,487 CY**	**13,120 CY**
DG R-1	Banks and floodplains – floodplain *	3.99 ac	23,300	–
DG R-1a	Banks and floodplains – floodplain	0.02 ac	–	15
DG R-2	Banks and floodplains – channel *	0.25 ac	700	–
DG R-3	Side channel	0.46 ac	2,390	15
DG R-4	Banks and floodplains – floodplain *	1.67 ac	7,600	–
SC R-1	Banks and floodplains – floodplain construction *	0.39 ac	114	2,206
SC R-2	Banks and floodplains – floodplain construction*	0.09 ac	44	362
SC R-3	Banks and floodplains – floodplain construction	0.16 ac	78	337
SC R-4	Banks and floodplains – floodplain construction	0.24 ac	–	801

Table 2-1. Overview of Activity Areas at Deep Gulch and Sheridan Creek Rehabilitation Sites

Activity Area[a]	Primary Activity	Activity/ Treatment Area[b]	Earthwork (CY)[c]	Fill (CY)[c]
SC R-5	Banks and floodplains – floodplain transition	0.03 ac	22	12
	R Subtotal =	**7.3 ac**	**34,248 CY**	**3,748 CY**
SC W-1	Constructed wetland – ponds and riparian floodplain complex *	0.92 ac	7,128	45
SC W-2	Constructed wetland – ponds and riparian floodplain complex *	1.26 ac	8,953	75
SC W-3	Constructed wetland – ponds and riparian floodplain complex *	1.17 ac	8,717	34
SC W-4	Constructed wetland – enhance existing wetland drainage *	0.08 ac	220	6
SC W-5	Constructed wetland – ponds and riparian floodplain complex *	1.46 ac	11,471	26
	W Subtotal =	**4.89 ac**	**37,489 CY**	**1,186 CY[d]**
DG A-1	Temporary access	0.88 ac	–	–
DG A-2	Temporary access	0.63 ac	–	–
DG A-3	Temporary access	0.16 ac	–	–
DG A-4	Temporary Access	0.23 ac		
DG A-5	Temporary access	0.15 ac	–	–
DG A-7	Temporary access	0.09 ac	–	–
DG A-9	Existing access	0.89 ac	–	–
SC A-1	Temporary access	0.12 ac	–	–
SC A-2	Existing access	0.33 ac	–	–
SC A-3	Existing access	0.29 ac	–	–
SC A-4	Temporary access	0.14 ac	–	–
SC A-5	Temporary access	0.33 ac	–	–
SC A-6	Existing access	0.21 ac	–	–
SC A-7	Existing access	1.06 ac	–	–
SC A-10	Existing access	0.15 ac	–	–
	A Subtotal =	**5.66 ac**	**–**	**–**
DG C-1	Contractor use area, gravel processing (parking area post-construction)	1.65 ac	–	–
DG C-2	Contractor use area	3.49 ac	–	–
DG C-3	Contractor use area	0.62 ac	–	–
DG C-4	Contractor use area	0.40 ac	–	–
DG C-5	Contractor use area	0.36 ac	–	–
DG C-6	Contractor use area	1.14 ac	–	–
SC C-1	Contractor use area	1.07 ac	–	–
SC C-2	Contractor use area	0.38 ac	–	–
SC C-3	Contractor use area	0.23 ac	–	–
SC C-4	Contractor use area	1.18 ac	–	–

Table 2-1. Overview of Activity Areas at Deep Gulch and Sheridan Creek Rehabilitation Sites

Activity Area[a]	Primary Activity	Activity/ Treatment Area[b]	Earthwork (CY)[c]	Fill (CY)[c]
SC C-5	Contractor use area	1.38 ac	–	–
SC C-6	Contractor use area	0.34 ac	–	–
SC C-7	Contractor use area	0.64 ac	–	–
SC C-8	Contractor use area	0.93 ac	–	–
SC C-9	Contractor use area	0.46 ac	–	–
SC C-10	Contractor use area	0.40 ac	–	–
SC C-11	Contractor use area	1.83 ac	–	–
SC C-12	Contractor use area	3.13 ac	–	–
SC C-13	Contractor use area	1.03 ac	–	–
SC C-14	Contractor Use Area	2.56 ac		
	C Subtotal =	**24.271 ac**	**–**	**–**
DG U-1	Upland fill, gravel processing *	2.36 ac	–	26,865
DG U-2	Upland fill *	0.81ac		2,410
DG U-3	Upland fill [e]	0.94 ac	–	–
DG U-4	Upland fill *	1.41 ac	–	–
SC U-1	Upland drainage – rerouting *	0.37 ac	361	10
SC U-2	Upland fill – spoils area *	1.48 ac	–	37,581
SC U-3	Upland fill – spoils area [f] *	0.53 ac	–	–
SC U-4	Gravel processing – tailings *	0.57 ac	20,295	–
SC U-5	Upland fill, gravel processing – spoils area *	3.36 ac	–	14,324
	U Subtotal =	**11.02 ac**	**20,656 CY**	**81,087 CY**
DG X-1	Temporary river crossing	0.10 ac	–	–
DG X-2	Temporary river crossing	0.05 ac	–	–
SC X-1	Temporary river crossing – upstream	0.27 ac	–	450
SC X-2	Temporary river crossing – downstream	0.43 ac	–	–
	X Subtotal =	**0.85 ac**	**–**	**450 CY[g]**

a DG = Deep Gulch; SC = Sheridan Creek; IC = in-channel work area; R = riverine work area; U = upland activity area; C = construction staging/contractor use areas; A = access roads; X = temporary river crossing; W = wetlands.

b Area calculated from geographical information system (GIS) data; ac = acre.

c Provided by TRRP; CY = cubic yard.

d In addition to alluvial materials, approximately 150 logs (35 feet in length) would be used to construct wetland infiltration structures.

e Would only be used in the event SC U-5 is unavailable.

f Would only be used if SC U-2 has inadequate space.

g These crossings would also be used to transport woody materials (logs and/or slash) to activity areas on river left.

* Revegetation after construction

The implementation of the proposed action would require placement of alluvial materials at activity areas throughout the project area. The size of alluvial materials necessary to construct the in-channel, floodplain, and wetland/riparian features varies, depending on the function and location of the activity areas. Table 2-2 describes the size classes of processed alluvial materials called for by the design

teams that would be excavated and processed on lands managed by BLM. At activity areas DG-U-1 and SC U-4), the size and location were revised based on the outcome of cultural resource investigations and subsequent negotiations with BLM to ensure that representative dredge tailings features are retained. Dredge tailings would be used as a source of alluvial material. In addition to processed materials, additional alluvial material would be used as fill without processing (i.e., pit run).

Table 2-2. Material Types

Material	Description	D_{50} (inches)	D_{90} (inches)	D_{Max} (inches)	Percent Fines*
Clean gravel and cobble (CGC)	Gravel and cobble between 0.5 and 6 inches intermediate diameter	2	5	6	0
Modified pit run (MPR)	Excavated material processed to remove excess fines	2-3	5-6	10-12	<20
Cobble and small boulder (CSB)	Cobble and small boulders between 5 and 12 inches intermediate diameter	7-9	10-12	14	0
Sorted Cobble (SC)	Medium cobble between 4 and 8 inches intermediate diameter	5-7	7-8	10	0

*Fines are defined as material less than 0.5 inch in diameter.

Table 2-3 illustrates the volume of alluvial material anticipated to be processed for each site, by size class.

Table 2-3. Processed Material by Size Class

Site	CGC (Cu. Yd.)	MPR (Cu. Yd.)	CSB (Cu. Yd.)	SC (Cu. Yd.)
Deep Gulch	1,000	815	670	15
Sheridan Creek	3,836	4,080	1,747	0
Total	**4,836**	**4,895**	**2,417**	**15**

Note: About 9,600 yards of dredge tailing deposits would be excavated and processed from activity area SC U-4.

The implementation of the proposed action would require a large amount of large wood and slash for proposed activities in a variety of locations. In addition to large wood structures that incorporate the pin logs, root wads, and whole trees proposed at a number of locations (e.g., DG IC-3, SC IC-3), additional wood would be incorporated into a number of activity areas (e.g., IC-6, SC W-1). Slash and/or chips from on-site and off-site sources[1] would be used to increase site productivity, provide effective ground cover on disturbed areas, and function as cover habitat for terrestrial organisms. Table 2-4 illustrates the type and amounts of wood and slash necessary to implement the proposed

[1] All material from off-site sources would be acquired by Reclamation from public lands (as authorized by BLM) and private parcels in Trinity County.

action. The primary on-site sources of wood include upland material placement areas (e.g., SC U-2 and SC U-3) and riverine excavation areas (e.g., DG R-1 and DG-R-4).

Table 2-4. Woody Material Used for Rehabilitation Activities

Site	Whole Trees Harvested – On-Site (#)	Trees/Logs (Structural) (#)	Trees/Logs (Habitat) (#)	Slash (Cu. Yd.)
Deep Gulch	120	120	170	1,300
Sheridan Creek	200	90	110	900
Total	**320**	**210**	**280**	**2,200**

Notes: Whole trees are approximately 75 feet in length. Logs range from 10 feet to 35 feet in length. An additional 150 logs (35 feet in length) acquired from off-site sources would be used in the construction of the wetland complexes (e.g., SC W-1) at the Sheridan Creek site.

Deep Gulch Rehabilitation Activities

At the Deep Gulch rehabilitation site, the design focus would be on modifying the channel of the Trinity River to restore riverine processes and enhancing the floodplain through restoration of native riparian vegetation and excavation of terraces and floodplain surfaces. Critical features considered in the design process include Ice Box Hole and Ed's Hole (see Figure 2-1), historic dredge tailing deposits, public river access, and adjacent residences. Most activities would take place in the upstream (southern) half of the site. In-channel activities would include bank excavation (DG IC-1); creation of a bar (DG IC-2 and IC-3); and installation of woody material, consisting of individual pieces of wood, wood jams (primarily for habitat), and wood structures (primarily for hydraulic function; DG IC-3 through IC-11). Riverine activities would include lowering the floodplain (DG R-1, R-2, and R-4), filling a swale (DG R-1A), and creating a side channel (DG R-3). Additional details on these activities are presented below.

Floodplain Modifications (DG R-1 and R-1A)

The DG R-1 activity area encompasses approximately 3.99 acres on the right bank (east side) of the river at the upstream (southern) end of the rehabilitation site. Existing terrace and floodplain surfaces would be lowered by up to 7 feet to create a lower floodplain composed of two main topographic structures, requiring the excavation of approximately 21,200 cubic yards of material. The larger of the two structures would consist of a surface that slopes downvalley and away from the river toward a swale (DG R-1A) that drains into an alcove at the downstream end of the floodplain. The edge of this surface nearest the river would remain at its existing elevation. Inundation of the floodplain would begin at moderate flows from backwater entering from the alcove outlet at its downstream end. Downstream flow over the floodplain would increase at discharges greater than about 4,500 cfs and would overtop the surface at its upstream end. The upstream end would remain at the existing elevation so that construction of this feature does not alter flow conveyance outside the main channel. The other topographic structure would be a smaller excavation that allows backwater to inundate another portion of the constructed floodplain at moderate flow levels.

The floodplain at the DG R-1 activity area would provide slow water habitat that increases in area with an increase in 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

the 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 is maintained. Overtopping of the crest at the upstream end of the floodplain at higher discharges would allow periodic flushing of fines from the floodplain swales and maintain the downstream connectivity. The activity area would eventually provide wood and organic material as well as trophic production to the aquatic ecosystem, as well serving as a high-flow refugia with abundant cover. The habitat value of the floodplain is expected to increase as it becomes vegetated through natural recruitment and planting. Some bank erosion may occur along the floodplain adjacent to the DG IC-1 channel expansion (west side of DG R-1), but other major topographic changes would not be expected.

The DG R-1A activity area is at the downstream end of DG R-1 and encompasses approximately 0.02 acre. Approximately 15 cubic yards of coarse permeable fill would be placed in the swale at this activity area. The bottom of the swale, which is 10 to 15 feet wide, would be filled with 1 to 2 feet of fill to make it even with the ground on either side of the swale over a linear distance of about 15 feet. The purpose of the fill is to limit overbank flow velocities in the swale. Modification of the floodplain at DG R-1 would allow water from the main channel to enter the swale at a lower discharge than occurs under existing conditions. Flow velocities in the swale during moderate floods would therefore be larger than under existing conditions. The fill in the swale would enable surface flow to enter the swale when discharges are between 2,500 and 6,000 cfs, while ensuring that hyporheic flow continues unrestricted

Diagonal Bar Complex Creation (DG IC-1, IC-2, R-2, and IC-3)

The DG IC-1, IC-2, R-2, and IC-3 activity areas are just west of DG R-1 in the upstream (southern) portion of the rehabilitation site. These activity areas encompass approximately 1.32 acres. Both banks would be excavated to increase the bankfull channel width from about 175 feet to about 215 feet. A large constructed bar would be created in the main channel, and a smaller bar and wood structure would be incorporated into the left bank. The excavation of approximately 3,565 cubic yards from the right bank at DG IC-1 would lower the existing floodplain surface to a level about 2 feet below the baseflow water surface, matching the existing bed elevation at its downstream end. The excavation of approximately 700 cubic yards from the left bank at DG R-2 would lower the existing floodplain to a level slightly above the baseflow water surface elevation. A medial bar would be constructed at DG IC-2 by placing approximately 1,250 cubic yards of gravel and cobble fill to form the crest of the diagonal complex. The medial bar would be built so that it would be fully inundated at flows near 2,500 cfs. At DG IC-3, a bar and wood structure, consisting of approximately 245 cubic yards of gravel, cobble, small boulders, and wood, would extend about 40 feet into the channel from the left bank downstream of DG R-2. Approximately 200 cubic yards of material would be excavated at DG IC-3 to create the bar. Together with the bar at DG IC-2, they would create a diagonal structure that extends from upstream right to downstream left and would be cross cut by a pair of channels along the toe of each bank. The hydraulic control that regulates flow into the right channel would be approximately three times wider and about 1 foot deeper than the control regulating flow into the left channel, such that more than 90 percent of the baseflow discharge would be directed to the right of the medial bar.

The diagonal bar complex is intended to greatly increase local hydraulic and habitat diversity over a wide range of flows. At lower flows, the medial bar would emerge, which would double the length of emerged edge habitat in the area. More than 0.15 acre of new eddy habitat would be created. At higher flows, the medial bar would submerge and would provide cover, slower flowing water, and large eddies that span about 0.15 acre. The diagonal bar complex would also create the potential for increased bed scour and pool formation over an area of the bed covering at least 0.15 acre near the downstream end of DG R-1. The habitat value provided by the medial bar would increase as riparian vegetation becomes established on its surface. Topographic and ecological complexity is also expected to increase as high flows reshape the bar, bed, and banks. Modest bank erosion that further widens the channel is likely.

Side Channel Creation (DG R-3 and IC-4)

The DG R-3 and IC-4 activity areas are just downstream (north) of DG R-2 and IC-3 on the left bank of the river. They encompass approximately 0.48 acre.

A baseflow side channel would be created at DG R-3, and a wood structure that extends 15 feet into the main channel immediately downstream of the side channel inlet would be installed at DG IC-4. The inlet to the side channel would be cut through the riparian fringe about 200 feet downstream of the new diagonal bar complex. The final elevation of the inlet would allow surface water flow in the side channel at a rate of about 15 cfs during baseflow periods. In addition, the inlet would be over-excavated during construction and backfilled with longitudinally oriented large wood and rock to allow hyporheic flow into the side channel regardless of whether surface water connectivity is maintained in the future. An estimated 2,410 cubic yards of material would be excavated to create the side channel, and about 15 cubic yards of rock and wood would be placed along the channel. Flow into the side channel would continue through existing low areas and sections of excavated channel into an alcove that grades into the mainstem channel bed near the center of the site. The wood structure adjacent to the side channel at DG IC-4 would contain approximately 85 cubic yards of coarse fill and wood, and approximately 70 cubic yards of material would be excavated to install the wood structure.

The new side channel is intended to provide additional rearing habitat at low and intermediate flows. The wood structure along the side channel is intended to help prevent clogging of the side channel inlet and would provide a small amount of additional cover and slow water habitat. The side channel would provide rearing habitat indefinitely. The inlet design incorporates hyporheic flow to ensure future function even if the inlet aggrades.

Wood Jam Installation (DG IC-5)

The DG IC-5 activity area is on the right bank of the river across from DG R-3 and encompasses approximately 0.14 acre. A wood jam would be installed at this activity area. It would extend about 40 feet into the channel from the right bank and would contain approximately 525 cubic yards of gravel, cobble, small boulders, and wood. An estimated 400 cubic yards of material would be excavated to install the wood jam. The top elevation of the jam would be constructed approximately equal to the water surface elevation at the design discharge of 8,500 cfs. The back of the structure

(the side away from the river) would be anchored with vertical posts[2], which would not be keyed far into the floodplain. This would allow flood flows to potentially scour the floodplain behind the structure, increasing complexity and possibly creating additional aquatic habitat.

The wood jam is intended to increase hydraulic and habitat diversity by causing bed scour at its base, creating an eddy in its lee, and providing direct cover habitat. This feature is located in an area that currently can be described as a planar bed that gradually slopes up toward the next hydraulic control. Zones of scour and deposition associated with the jam would shorten the length of bed lacking local topographic relief. High flows would scour the bed near the leading edge of the jam, and deposition of fine gravel and sand is expected in portions of the eddy zone. The jam is intended to remain in place for 10-20 years.

Floodplain Modifications and Wood Jam Installation (DG R-4, IC-6, IC-7, and IC-8)

The DG R-4, IC-6, IC-7, and IC-8 activity areas are on the right bank of the river near the downstream or northern portion of the rehabilitation site. These activity areas encompass approximately 1.76 acres. At the DG R-4 activity area, the floodplain surface would be lowered, requiring the excavation of approximately 7,600 cubic yards of material. The upstream third of the excavated floodplain would be constructed so that it would inundate at flows as low as 2,000 cfs. A rise in ground elevation by about 2 feet at the downstream end of this low region (i.e., near the center of DG R-4) would keep flow conveyance in the area very small until the higher area in the middle of the activity area is overtopped at flows greater than 2,500 cfs. A wood jam would be installed at DG IC-6 on the existing bank immediately downstream of the intersection between the low floodplain and the main channel. The top elevation of the wood jam would be the same as the existing top of the bank. The wood jam would consist of approximately 200 cubic yards of rock and wood fill, and approximately 165 cubic yards of material would be excavated to install the wood jam.

The downstream two-thirds of the excavated floodplain would slope downstream but away from the river toward a swale that empties into a series of three alcoves, similar to the floodplain modifications at DG R-1. Existing terrace and floodplain surfaces would be lowered to varying degrees. Typical excavation depths would be less than 3 feet, but larger cut depths of up to 6 feet would be required where the alcove at the far downstream end grades into the existing channel bed. Inundation of this downstream section of floodplain would begin at moderate flow by backwater entering the swale from the alcove. The swale extends upstream along the distal edge of the floodplain until it grades into the broad low area in the upstream third of DG R-4. Three sections of existing bank between the alcoves would remain unexcavated, increasing the topographic complexity of the surface. A wood jam would be installed at DG IC-7 on the existing bank at the upstream edge of the middle of the three unexcavated areas. The top elevation of the wood jam would be near the existing top of bank. The wood jam would consist of approximately 160 cubic yards of rock and wood fill, and approximately 130 cubic yards of material would be excavated to install the wood jam. Another wood jam would be installed at DG IC-8 on the existing bank immediately downstream of the alcove. The top elevation of the wood jam would also be similar to the existing top of bank. The wood jam would consist of approximately 130 cubic yards of rock and wood fill, and approximately 105 cubic yards of material would be excavated to install the wood jam.

[2] Anchoring may include the use of pile-driving equipment at one or more activity areas.

The upstream third of the floodplain at DG R-4 would inundate at very low discharge levels, and the lack of downstream gradient would keep flow velocities very low. This floodplain is expected to provide abundant high-quality rearing habitat. The downstream two-thirds of the floodplain at DG R-4 is intended to function similar to the floodplain at DG R-1; more habitat would become available with increasing discharge due to backwatering from downstream. The entire excavated area would be inundated at discharges near 4,500 cfs. The unexcavated portions of bank in this area would create local eddies, promote local scour, and provide riparian cover. All three of the wood jams associated with this floodplain are also intended to promote local scour and hydraulic diversity. Scour at the toe of the wood jam at DG IC-6 is specifically intended to maintain a low gap in any natural levee that might deposit along the floodplain margin so that the floodplain continues to inundate at low discharge levels in the future. The wood jam at DG IC-8 is intended to split the flow draining toward the main channel from the downstream part of the floodplain, potentially causing incision of an additional alcove on the right side of the wood jam. The entire floodplain would eventually provide wood and allochthonous trophic production to the aquatic ecosystem, as well serve as a high-flow refugia with abundant cover. The habitat value of the floodplain would increase as it becomes vegetated through natural recruitment and planting. Some bank erosion may occur adjacent to the main channel, but other major topographic changes are not expected.

Woody Materials Installation (DG IC-9, IC-10, and IC-11)

The DG IC-9 and IC-10 activity areas are along the left and right banks, respectively, near the DG R-3 and DG IC-5 activity areas in the middle portion of the rehabilitation site. The DG IC-11 activity area is on the right bank near the DG R-4 activity area. These activity areas encompass approximately 0.28 acre. Woody debris would be installed in the baseflow channel to provide immediate cover habitat and a substrate for primary and macroinvertebrate production. Approximately 214 cubic yards of slash and 61 large wood pieces would be placed along the river at these activity areas.

Sheridan Creek Rehabilitation Activities

At the Sheridan Creek rehabilitation site, the design focus is on modifying the channel of the Trinity River to restore riverine processes and enhancing the floodplain through creation of multiple wetland/pond complexes. Critical features considered in the design process include Sheridan Hole, Sheridan Spawning Riffle, Relic Sheridan Creek Riparian Corridor, and the Sturdivant Tunnel Debris Fan. In-channel activities would include creation of a meander complex (SC IC-1, IC-2, IC-4, IC-5, and IC-6) and installation of woody material, consisting of wood placement as individual pieces, wood jams (primarily for habitat), or wood structures (primarily for hydraulic function; SC IC-3 and IC-7 through IC-10). Riverine activities would include elevating the floodplain (SC R-1 and R-2) and constricting the floodplain (SC R-3 and R-4). At SC R-5, a notch would be created through the riparian berm to encourage formation of a high-flow scour channel around the log jam at SC IC-10. Wetland activities include creating wetland/pond complexes along both sides of the river and connecting them to the river (SC W-1 through W-5). Additional details of these activities are presented below.

Meander Complex (SC IC-1, IC-2, IC-4, IC-5, IC-6, R-1, and R-2)

The SC IC-1, IC-2, IC-4, IC-5, R-1, and R-2 activity areas are adjacent to one another along the main channel and left bank of the river in the upstream (southern) end of the rehabilitation site. These activity areas encompass a total of approximately 4.97 acres. A meander complex would be constructed at these activity areas that would include two constructed bars and alcoves (SC IC-2 and IC-6), excavated bends with scour pools and side slope transitions (SC IC-1 and IC-5), one constructed riffle (SC IC-4), and two raised floodplains (SC R-1 and R-2). Overall, the meander complex would increase sinuosity and hydraulic complexity in this reach to create a diverse suite of habitats. The meander complex is also intended to increase shear stress along the right edge of SC IC-5 (an old dredger tailings pile) to promote bank erosion and to provide additional sediment for transport and deposition downstream.

The meander complex would encompass about 1,050 feet of the river and would end about 230 feet just upstream of Sheridan riffle, one of the most important and highly used spawning riffles on the mainstem Trinity River. The location and length of the meander complex would be constrained upstream by the valley wall on river left and preservation of the spawning riffle downstream. The separation between the complex and spawning riffle is important in order to minimize changes to the velocity and shear stress fields across the existing spawning riffle where redds are typically located. Overall, the meander complex is expected to be self-maintaining, with minor adjustments to the channel and planform dimensions following high flows.

At the SC IC-2 and IC-6 activity areas, bars and alcoves would be constructed to adjust the river meander. The bars would have variable flow widths ranging from 84 feet at baseflow to a bankfull width of 200 feet. Gravel, cobble, excavated materials, and boulders would be obtained from the U-4 and U-5 activity area and placed in the river to create the bars. An estimated 2,615 cubic yards of clean gravel and cobble would be placed below the 450 cfs water surface elevation at SC IC-2, and approximately 2,619 cubic yards of well-graded excavated materials and 300 cubic yards of cobbles and small boulders would be placed above the 450 cfs water surface elevation. An estimated 542 cubic yards of clean gravel and cobble would be placed below the 450 cfs water surface elevation at SC IC-6, and approximately 1,461 cubic yards of well-graded excavated materials and 300 cubic yards of cobbles and small boulders would be placed above the 450 cfs water surface elevation. The maximum size of added substrate (excluding boulders that vary between 3 and 6 feet in diameter) would be 12 to 14 inches in diameter, consistent with the existing range of substrate size that allows for long-term geomorphic processes. The proposed substrate for the constructed bars is expected to remain semi-stable under the modeled shear stress. In addition, alcoves would be excavated to create shallow/slow water habitat on the backside of the constructed bars. An estimated 734 and 293 cubic yards of material would be excavated from the SC IC-2 and IC-6 activity areas, respectively, and transported to one of the upland activity areas. Once constructed, large wood would be incorporated into the bars, and the surface of these bars would be planted with native vegetation to reduce flow velocity and promote depositional processes.

The SC IC-2 bar is expected to maintain its form as shear stresses across the bar would be low at all flows. Shear stress in the alcove would also be low, and the alcove is expected to fill in over time. Overbank flows across the backside of SC IC-2 may form an incised channel leading into the alcove. These overbank flows would help maintain the alcove. It is unlikely that this incised channel would

be cut off because the shear stress would be low. The substrate of the SC IC-6 bar is sized to withstand the modeled shear stress and allow the bar to persist and redirect mainstem flows towards river right. The bar is expected to deflate somewhat as an armor layer develops. The shear stresses across the top of the SC IC-6 bar should be sufficient to maintain an incised channel and alcove on the backside of the bar.

At the SC IC-1 and IC-5 activity areas, the river banks would be excavated to modify the bend and create scour pools and side slope transitions. An estimated 11,469 cubic yards of material would be excavated from the SC IC-1 activity area, and an estimated 1,045 cubic yards of fill (gravel, cobble, and boulders) would be placed in the activity area. An estimated 5,932 cubic yards of material would be excavated from the SC IC-5 activity area, and an estimated 1,185 cubic yards of fill would be placed in the activity area. The excavated material would be transported to one of the upland activity areas for processing and/or disposal. Boulders[3] would be added to the deeper portions of the activity areas to increase hydraulic complexity. The outer bank of SC IC-5 is expected to erode over time, widening the channel and creating a more gradual transition back to the original downstream channel. The bank erosion process is expected to reach quasi-equilibrium without substantial lateral channel migration (i.e., without corresponding growth of the SC IC-6 bar), although lateral migration is desirable if it occurs.

A riffle would be constructed at the SC IC-4 activity area, which is entirely in the main channel. Approximately 229 cubic yards of clean gravel and cobble and 229 cubic yards of cobbles and small boulders from the U-4 or U-5 activity area would be placed at the SC IC-4 activity area. The substrate size would be slightly larger than the existing bed substrate, but no bigger than 12 to 14 inches in diameter for the gravel and cobble. Boulders would be 3 to 6 feet in diameter. The transverse bar at SC IC-4 would connect the bar at SC IC-2 to the bar at SC IC-6 and would adjust its size and elevation to accommodate the new channel hydraulics.

The floodplain on river left would be raised at activity areas SC R-1 and R-2 to minimize flanking associated with the new meander complex. This would maintain flow conveyance in the mainstem channel and minimize overbank bypass flows. Floodplain modifications would include some excavation of the banks and placement of fill, primarily gravel and cobble. Woody material may also be incorporated opportunistically into these activity areas. At SC R-1, an estimated 114 cubic yards of material would be excavated, and an estimated 2,206 cubic yards of material would be placed in the activity area; the fill material would preferentially come from excavation of native alluvium at the SC W-1 and W-2 activity areas. If the excavated native alluvium is too small, the fill would need to be imported from U-4 or U-5 or from a local commercial source. At SC R-2, an estimated 44 cubic yards of material would be excavated, and an estimated 362 cubic yards of material would be placed in the activity area. Any excess or unusable excavated material would be transported to the SC U-2 or U-3 activity areas.

River Left Wetland Complex (SC W-1, W-2, W-3, U-1, IC-3, R-3, and R-4)

The SC W-1, W-2, W-3, IC-3, R-3, and R-4 activity areas are adjacent to one another on the left bank of the river and extend from the border of SC R-1 and R-2 activity areas about 1,200 feet

[3] The size and number of boulders available from on-site are uncertain. It is expected that some boulder-sized alluvium would be procured from a local commercial source; a commercial pit within several miles of the project area has boulders available.

downstream. These activity areas encompass approximately 3.78 acres. The U-1 activity area consists of an ephemeral stream that conveys seasonal flow onto the existing floodplain on river left, just west of SC W-1. The activity area encompasses approximately 0.37 acre. A wetland/pond complex would be constructed at the SC W-1, W-2, and W-3 activity areas, and the floodplain would be modified at the SC R-3 and R-4 activity areas. The ephemeral stream at the U-1 activity area would be modified to direct flow to the SC W-1 activity area. A large wood jam would be installed at the SC IC-3 activity area, which is between the floodplain modifications proposed at SC R-1 and R-2.

The floodplain and wetland complexes are designed to provide a large area of high-quality rearing habitat across a wide range of flows, as well as off-channel over-summer and over-winter habitat for both fry and presmolt salmonids. Due to the high density of redds in this reach, juvenile fish densities are anticipated to be very high. These complexes would help reduce densities of rearing fish, especially for those migrating into this area. The floodplain and wetland complex is also intended to raise local groundwater levels to promote robust riparian forest growth and enhance riparian and salmonid habitat. In addition, the complex was designed to protect high-quality adult steelhead holding habitat near the SC IC-10 activity area in the downstream portion of the site by keeping overbank velocities low and locating the floodplain outlets of SC W-2 and W-3 upstream of SC IC-10.

Three wetland/pond complexes would be constructed at the SC W-1, W-2, and W-3 activity areas. The ponds would have variable depths: 6 to 8 feet during summer baseflow conditions and as much as 10 to 12 feet when the ponds are inundated during higher flows. Each pond would have side slopes that allow for emergency egress for wildlife. The ponds would be constructed adjacent to existing riparian vegetation to optimize shade and cover, and wood would be placed in the ponds to enhance juvenile rearing habitat. Shade plus groundwater connectivity are expected to maintain water temperatures adequate for fry/juvenile rearing. The small ephemeral channel at the SC U-1 activity area would be redirected to flow into the wetland/pond complex at SC W-1. An existing scrub wetland at SC W-3 would be modified to enhance the functions and values of the wetland/pond complex by conversion of this scrub wetland.

All three wetland ponds would be perennial and would be reliant on a hyporheic connection with the river under base flow conditions (i.e., 450 cfs) based on site-specific groundwater monitoring data collected by members of the design team. The ponds would be graded to collect ephemeral flow emanating from small drainage features along the valley wall. In addition, the SC IC-3 wood jam would be constructed to supply some additional surface and hyporheic water from the mainstem into the SC W-1 pond, while filtering out mainstem sediment. Surface water supplied from the SC IC-3 activity area during base flow conditions is expected to dissipate into the groundwater, elevating the local groundwater table, but would be insufficient to provide a perennial surface water supply to the downstream SC W-2 wetland. If a perennial surface water connection does develop, it would be desirable.

Floodplain swales at the SC W-1, W-2, and W-3 activity areas would provide surface water connections between the wetland ponds and the Trinity River. The swales would be compound features that are 25 feet wide and 1 foot deep, with an inner swale that is 10 feet wide and 2 feet deep. The swales would allow overbank flows to backwater into the wetland ponds when mainstem flows are greater than about 1,200 cfs and would provide fish passage between the wetlands and the river

under those conditions. Surface water flow in the floodplain swales is not expected during low-flow conditions due to the groundwater connection at the wetland complex. Riparian floodplains surrounding the wetland complex are designed to progressively inundate between 2,500 cfs and 4,500 cfs to provide rearing habitat and promote natural riparian vegetation recruitment that increases cover and habitat quality over the long term. Side slope transition areas would transition back to the existing ground surface. The extent of grading necessary to establish the wetland/pond complexes would vary. With the exception of fine sediments that are excavated and stockpiled on site to enhance revegetation efforts on the constructed floodplain, all spoils generated from excavation activities would be transported to the SC U-2 or U-3 activity areas on river left to minimize the number of river crossings. An estimated 25,661 cubic yards of material would be excavated for the wetland/pond complexes, and about 130 cubic yards of specified fill material would be transported across the river from excavations or processing sites in the activity areas on river right for use as backfill at the SC W-1, W-2, and W-3 activity areas.

The SC W-3 wetland and floodplain maintain a minimum buffer distance of 125 feet from the hydraulic mining debris fan on river left at the confluence of Deep Gulch (located immediately upstream of Sheridan Hole). The buffer would prevent the sedimentation of the constructed features from ongoing erosion of the toe of the Sturdivant Tunnel Debris Fan and maintain the existing mainstem outflow connection, preventing outflow and associated sediment from draining into SC W-3. The existing riparian vegetation that separates the mainstem and constructed floodplains would be retained as a buffer between the wetland complex and the existing spawning riffle during high flows. This buffer of riparian vegetation would also act as a sediment filter, promoting sediment deposition on the floodplain where it benefits riparian growth and minimizes deposition in the wetland ponds (extending their life). The SC IC-3 wood jam is also intended to reduce sediment delivery from the mainstem directly into the wetlands. This wood jam would contain various rootwads, logs, whole trees, and slash.

Floodplain constrictions would be established between each wetland complex at the SC R-3 and R-4 activity areas. These constrictions are designed to reduce overbank flow velocities during high-discharge events in excess of 6,000 cfs. The flow paths in and out of the river-left floodplain and wetland complex would work together with the floodplain constrictions to limit overbank flow velocities. The effect would make overbank floodplain flow hydraulically ineffective in order to preserve the existing shear stresses in the mainstem, thereby protecting the existing spawning riffle. Hyporheic connections through SC R-3 and R-4 would be established to increase groundwater exchange between all three wetland ponds. The hyporheic connections would be constructed by over-excavation of a 4-foot-wide trench, placement of cobbles and wood in the bottom to create a porous matrix (i.e., french drain), and backfilling with native material to the design elevations of the surrounding features such that no trench or depression would be visible. An estimated 78 cubic yards of material would be excavated at the SC R-3 activity area, and an estimated 337 and 801 cubic yards of material would be placed at the SC R-3 and R-4 activity areas, respectively. Alluvial materials (e.g., gravel, cobble, boulders) would be excavated and processed from activity areas on river right and transported to river left using the temporary crossings at SC X-1 and X-2.

Riparian planting and natural recruitment would revegetate the floodplains over time to create a robust and diverse riparian forest. Native vegetation from the excavated pond areas (e.g., mugwort) would be salvaged during the initial excavation efforts, and steps would be taken to ensure salvaged

plants are available for incorporation into wetland revegetation efforts after grading is completed. Overbank flows are expected to cause some minor changes in the pond and floodplain configuration post construction. The wetland ponds are anticipated to maintain their general depth and volume for many decades because mainstem sediment supply would be restricted by the SC IC-3 feature and the existing riparian vegetation along the mainstem. Over time, the pond bottoms would accumulate organic matter that could reduce porosity and reduce (but not eliminate) groundwater connectivity. The potential warming effect caused by reduced groundwater connectivity is expected to be offset by development of a riparian forest that provides shade and organic input. Fines would most likely accumulate in the SC IC-3 wood jam, reducing the amount of surface water flowing into SC W-1 over time.

Alternatively, the wood structure at SC IC-3 may degrade over the long term, increasing the amount of overbank flow that may pass into SC W-1. Although improbable, it is conceivable that such overbank flows may convert SC W-1 into a side channel that would also provide a wealth of complex rearing habitat. The SC R-3 floodplain constriction would return potential surface and overbank flows back to the mainstem upstream of the existing spawning riffle to maintain high flow confinement and shear stresses.

Sheridan Creek (SC W-4)

Sheridan Creek and Sheridan Spring are currently disconnected from each other and from the Trinity River as a result of remnant dredger tailings piles. The SC W-4 activity area encompasses approximately 0.1 acre (10 feet wide by 40 feet long) on the east side of the rehabilitation site near Sheridan Spring. At the SC W-4 activity area, a channel would be constructed by excavating approximately 220 cubic yards of material from the adjacent tailings pile to intercept perennial flow from Sheridan Spring and redirect it across an old road surface and through tailings piles to the high-quality, 1,300-foot-long riparian corridor that is associated with a relic reach of Sheridan Creek located between the SC W-4 and W-5 activity areas. Both Sheridan Spring and Sheridan Creek contribute to an elevated groundwater table that supports the riparian corridor. This riparian corridor forms contiguous, gently sloping habitat that connects SC W-4 to W-5 and contains several ephemeral wetlands. It is located between two tailings piles that isolate Sheridan Creek and Sheridan Spring from the mainstem, and a broad terrace near SC W-5 blocks surface water from exiting the riparian corridor. The riparian corridor is shaded with a grassy bottom and maintains moist soil conditions and cooler air temperatures throughout the summer, even in drought years. During wet periods in the winter and spring, water from Sheridan Creek and Sheridan Spring elevate the perched groundwater table, causing the riparian corridor to become ponded for several months at a time. No construction would take place in this riparian corridor to protect the soil profiles, maintain the perched groundwater table, and encourage formation of a perennial surface water connection between Sheridan Spring and the SC W-5 wetland. Over the long term, the constructed channel (SC W-4) is expected to remain very stable because of the perennial source of water emanating from Sheridan Spring.

River Right Wetland Complex (SC W-5)

The SC W-5 activity area is near the northern portion of the rehabilitation site on the right bank of the river. It encompasses approximately 1.46 acres of an elevated floodplain terrace adjacent to high-quality spawning habitat upstream of Sheridan Hole. At this activity area, the floodplain would be

lowered and an off-channel wetland would be constructed. The purpose of the wetland complex is to provide high-flow refugia and intermittent access to the off-channel wetland that supports over-summer and over-winter habitat for juvenile salmonids. An estimated 11,471 cubic yards of material would be excavated from the floodplain to create the wetland. During the initial grading, temporary stockpiling of excavated fines would occur for use in site rehabilitation and revegetation efforts. The excavated material would be transported to the processing/disposal area at the SC U-3 activity area for re-use or disposal.

Fish passage between the mainstem and SC W-5 would be possible when the mainstem flow exceeds approximately 2,500 cfs and the off-channel wetland backwaters. The wetland bottom at SC W-5 would be 8 feet below the mainstem water surface at 450 cfs to facilitate a groundwater connection that maintains a perennial wetland with water temperatures suitable for salmonids. Post construction, new riparian vegetation on the SC W-5 floodplains would provide shade and additional water temperature benefits in the wetland as the vegetation matures. Wood would be added to the floodplain to provide cover.

Excavation of Sheridan Spring at SC W-4 may provide a surface water supply via the relic reach of Sheridan Creek and/or via localized groundwater sources to the wetland at SC W-5. Such additional water supply would be beneficial, but is uncertain. Therefore, the wetland was designed to function without any water supply from Sheridan Spring and would, instead, continue to rely on a hyporheic connection to the mainstem. In the event that flow from Sheridan Spring reaches this wetland, the flow would improve water temperature, increase water supply, and increase the level of ponding and associated riparian and aquatic habitat. Active bars along the right bank of the Trinity River preclude establishment of a perennial connection between SC W-5 and the Trinity River that would be suitable for fish passage under low flows.

*Downstream Wood Jam Complex (SC IC-7, IC-8, IC-9, IC-10, and R-5)**

A wood jam complex would be established along the right bank at the SC IC-7, IC-8, IC-9, and IC-10 activity areas at the downstream end of the rehabilitation site. These activity areas encompass approximately 0.57 acre. The SC IC-7 activity area would provide high-quality rearing habitat, with whole trees anchored into the existing riparian vegetation. The wood jams at SC IC-8 and IC-10 would be on active bars and are intended to increase bar complexity by redirecting water along the backside of the bars to create and maintain scour channels and local deposition, as well as collect and store woody debris being transported during high flow events. Minor excavation along the floodplain at the SC R-5 activity area would initiate formation of a scour channel upslope of SC IC-10 through the existing riparian berm. An estimated 22 cubic yards of material would be excavated from the SC R-5 activity area, which encompasses approximately 0.03 acre. Approximately 12 cubic yards of alluvial material from the project area would be used as backfill along the berm to anchor the wood jam.

Individually, the SC IC-8 and IC-10 wood structures would create local scour and deposition zones on bar surfaces to create bar complexity and a patchier mosaic of riparian vegetation and fish habitat. The wood structures may temporarily collect more wood material from the river during high flows, but would be overtopped too frequently to retain much debris. Local scour and deposition patterns around and downstream of the wood structures would be dynamic over time. The wood structures would not appreciably change the location or the magnitude of shear stress magnitude across the

nearby spawning riffles or Sheridan Hole downstream. The SC IC-8 and IC-10 wood structures would emulate natural wood jams and would slowly degrade over time, as well as occasionally collect additional wood. Riparian vegetation would be used in the design and construction of the wood jams to increase the longevity of the wood structures if the vegetation matures before the structures degrade.

The hillslope on river left adjacent to the SC IC-9 activity area is an active fan associated with eroding debris from the construction and use of the Sturdivant Tunnel upslope (See Figure 2-1). The toe of this depositional feature is subject to periodic erosion, resulting in the release of small fan deposits in the mainstem. The wood feature at SC IC-9 would be designed and built consistent with site conditions at the time of construction within an existing fan deposit to mimic a natural slide deposit that contains both wood and sediment. Boulders would also be added to the river in front of the feature. The wood and boulders would increase mainstem complexity next to and downstream of the structure. This wood feature is not intended to capture additional sediment from the eroding mining debris fan. Over time, the wood feature is expected to degrade, and the wood and rocks would mobilize downstream, mimicking a natural small debris flow.

In addition to the activity areas described above, several beaver dam analog (BDA) features would be constructed in conjunction with the wetland complexes on either side of the river. The specific locations of these features will be identified in conjunction with construction activities based on input from regulatory agencies, TRRP biologists, and design team members. These features would allow an adaptive approach to raising water surface elevations at various flows to backwater areas in the newly constructed wetlands. These BDAs would consist of buried posts (12 inches in diameter) that provide a framework for willow cuttings to be woven between the posts. This would regulate water depth in the wetland upstream. The BDA features would be reviewed the first year following construction to determine the level of adjustment necessary to allow high winter and spring flows to pass without obstruction and the ability to reduce the potential for deposition of fine sediment behind them. An adaptive approach would be necessary to successfully achieve riparian and wetland plant success as well as encourage fine sediment deposition outside the low-flow channel thalweg.

2.1.15 Revegetation Activities

The TRRP's goal for revegetation of the Deep Gulch and Sheridan Creek rehabilitation sites is to promote the establishment and growth of a more diverse assemblage of riparian shrubs and deciduous hardwoods with varying ages so that the size, frequency, and distribution of native vegetation would increase in the future. By meeting this goal, the functions and values of native riparian and upland vegetation are expected to increase over time. In addition, the revegetation plan emphasizes the expansion of large conifers and hardwoods that could be naturally recruited as woody material into the mainstem. The revegetation activities described in this section are based on the TRRP's project experience and subsequent yearly monitoring efforts since the first channel rehabilitation site (Hocker Flat) was constructed in 2006.

Revegetation at both the Deep Gulch and Sheridan rehabilitation sites would include preparing planting areas; planting a mixture of wetland, riparian, and upland plant species; and installing plant protection over woody plants after planting. A number of the plant species used for revegetation at these sites are used for various purposes by members of the Native American community.

Revegetation efforts may also include the use of anadromous salmonid carcasses as a source of supplemental fertilizer in an effort to reintroduce marine nutrients into the riparian ecosystem. The plantings would include plants salvaged from the sites, nursery container stock available from USFS nurseries and or commercial sources[4], live hardwood poles, bareroot trees, and herbaceous plugs. Plant species expected to be incorporated into the revegetation plan for either site include California brome (*Bromus carinatus*), incense cedar (*Calocedrus decurrens*), sedge (*Carex* spp.), wildrye (*Elymus* spp.), rush (*Juncus* spp.), ponderosa pine (*Pinus ponderosa*), cottonwood (*Populus trichocarpa*), oak (*Quercus* spp.), and willow (*Salix* spp.). Mulch and other tree protection and stabilization devices (e.g., stakes, fencing, cages) would be installed after the planting is done. These devices would be removed once the revegetation efforts are deemed successful by the TRRP, typically within a 3-year period after vegetation is established. Revegetation activities may start during the latter part of construction efforts (e.g., planting and watering as appropriate) and would continue primarily in the wet season (October through March) after final grading and site stabilization measures are completed. Planting and seeding efforts may extend into the year following construction, depending on site and weather conditions. Herbaceous bare root material and hardwood poles would be used if planting occurs in or after November.

The TRRP anticipates that most planting areas would not require watering post project. However, given recent drought years, some intermittent watering of revegetated areas during dry conditions may increase plant survival. Source water for any irrigation efforts would be pumped from the Trinity River consistent with existing riparian water rights available from willing landowners or from the river on public lands as authorized by the BLM. If this subsequent irrigation is needed, gasoline pumps and irrigation equipment would be brought into the site; where vehicle access is limited, irrigation equipment would be brought in using authorized watercraft. Equipment would be used to water plants as needed, stored on site for use during dry periods, or brought in as water demands require. Any irrigation measures would be temporary to improve establishment and survival of vegetation. The decision to implement irrigation measures would be based on site-specific monitoring information (e.g., soil moisture, plant stress) concerning planting areas during or subsequent to initial revegetation efforts. Irrigation measures would likely occur during the first 3 years following initial revegetation efforts. Post-project monitoring may indicate the need for additional irrigation and other measures to ensure successful revegetation. These measures may include weeding, in-planting, and replanting as conditions require.

The revegetation plan at the Deep Gulch rehabilitation site includes approximately 6.8 acres within in six elevation zones; 12.4 acres would be seeded and mulched. Planting zones include emergent wetland (0.8 acre), herbaceous toe zone (1.2 acres), willow (0.5 acre), cottonwood (2.75 acres), transition (1.0 acre), and upland (0.5 acre). Each zone would have different combinations of herbaceous, shrub, and tree species. Plantings in wetland and toe zones would be herbaceous and have approximately 3 feet between plant centers, about 5,500 plants per acre. Plantings in willow, cottonwood, and transition zones would be sedges, shrubs, and trees and have approximately 5 to 8 feet between plant centers, with about 872 plants per acre. Plantings in upland zones would be shrubs and trees and have approximately 10 to 12 feet between plant centers with about 326 plants per acre.

Throughout the Sheridan Creek rehabilitation site, trees, shrubs, forbs, and herbs would be planted immediately alongside select constructed features and islands of remnant riparian vegetation.

[4] All plant materials used in revegetation efforts are acquired in a manner to ensure they are pathogen-free.

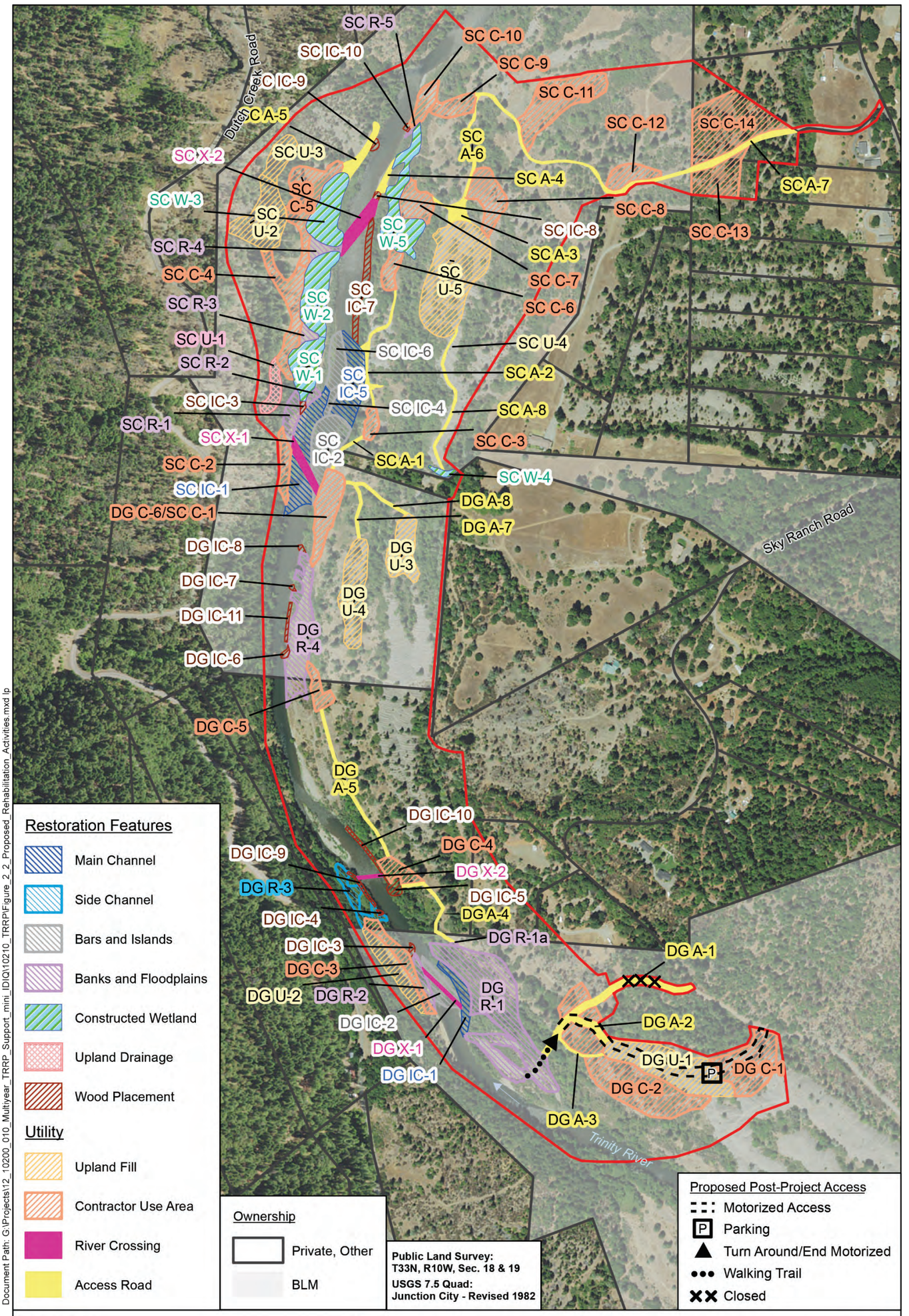
Cottonwoods and tree willows are target woody riparian species because of their ability to meet the riparian goal in the next 30 to 50 years. Revegetating constructed features (e.g., floodplains, side channels) improves the complexity of aquatic habitats in the 300 cfs to 2,000 cfs range; covers areas where non-native, invasive, and less preferable plant species could grow (i.e., sweet-clover, Bermuda grass, Himalayan blackberry, and narrowleaf willow); and speeds the recovery of activity areas. Revegetation was designed to complement the functional values and structural diversity of remnant riparian vegetation after construction by planting tree and shrub species together. To varying degrees, activity areas that are cleared would be revegetated with black cottonwood, shiny willow, and red willow in an arrangement that promotes greater riparian patch interior area and continuity with existing vegetation. Revegetation of the activity areas is expected to increase the riparian corridor width and riparian connectivity throughout the site. Post-project riparian land cover types would cover a greater area and be less linear in shape than the existing narrow and often discontinuous patches of riparian and upland vegetation.

The revegetation plan at the Sheridan Creek rehabilitation site includes approximately 5.75 acres within seven elevation zones and up to 40.3 acres that would be seeded and mulched. Planting zones include deepwater wetland (about 0.16 acre), emergent wetland (about 0.5 acre), herbaceous toe (about 1.0 acre), willow (about 1.1 acres), cottonwood (about 1.5 acres), transition (about, 0.9 acre), and upland (about 0.7 acre). Each zone would have different combinations of herbaceous, shrub, and tree species. Plantings in wetland and toe zones would be herbaceous and have approximately 3 feet between plant centers, with about 5,500 plants per acre. Plantings in willow, cottonwood, and transition zones would be sedges, shrubs, and trees and have approximately 5 to 8 feet between plant centers, with about 872 plants per acre. Plantings in upland zones would be shrubs and trees and have approximately 10 to 12 feet between plant centers, with about 455 plants per acre.

2.1.16 Access and Other Associated Activities

To support the rehabilitation activities, designated contractor use areas were identified by the design team to avoid sensitive resources. These areas would be used for stockpiling materials, staging equipment, contractor parking, and similar activities (these are labeled with “C” in Table 2-1 and Figure 2-2). Similarly, excavated material from each rehabilitation site would be stored in upland spoils areas if it is not re-used on-site (these are labeled with “U” in Table 2-1 and Figure 2-2).

Primary access to the upstream portion of the Deep Gulch rehabilitation site would be from Sky Ranch Road through DG C-1, DG C-2, and U-1 via connections to DG A-1 from DG A-2 and A-3. Generally, these access areas would be 40 feet wide to allow flexibility in the alignment so that off-highway trucks and other heavy equipment can use these activity areas for two-way traffic. Administrative access to this site would be available via an existing road (DG A-1). That portion of DG A-1 from Sky Ranch Road to DG C-2 would primarily be used for administrative access and would not be improved for construction access. Access area DG A-6 identified in the Draft EA/IS has been excluded from the proposed action in response to a comment from an adjacent landowner. Access between activity areas during rehabilitation activities would be via the temporary access routes, which would be decommissioned after both the Deep Gulch and Sheridan Creek sites have been constructed and revegetation efforts have been successfully completed. Access routes DG A-4 and A-5 may be required for a longer period of time to access the lower portion of Deep Gulch and upstream portion of the Sheridan Creek site in the event construction is staged over multiple years.



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TRINITY RIVER RESTORATION PROGRAM
Deep Gulch and Sheridan Creek Rehabilitation Sites

Figure 2-2
Proposed Rehabilitation Activities

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Some degree of decommissioning of these access routes (e.g., DG A-2, A-3, A-5, and A-7) would occur as part of final grading and site stabilization (i.e., narrowing route width); however, some level of access for high-clearance vehicles would be required for up to 5 years following revegetation efforts. Two river crossings (DG X-1 and X-2) would be used to access activity areas on river left. These crossings would be low-water fords and would not require placement of fill prior to use. The temporary crossings would provide access across the river primarily for equipment and worker access. Over the course of several days, these crossings would also be used to convey rehabilitation materials (e.g., logs, slash, cobbles, and gravel) for placement in the left bank activity areas (i.e., DG R-3 and IC-4). In order to avoid transport of spoil material across the river, a small disposal area was incorporated into the design (DG U-2).

After construction of the project has been completed, a portion of the DG C-1 or U-1 activity areas, which are entirely on BLM lands, would be graded to create a small parking area (up to 10 parking spaces) and an interpretive display (e.g., historic mining landscape, TRRP activities) accessible from Sky Ranch Road. Beyond this parking area, a route for high-clearance vehicles would remain after project construction to provide public access through these activity areas to a newly proposed new turn-around area near the end of access route DG A-1 in the vicinity of its intersection with access route DG A-3. Figure 2-2[5] illustrates the location of this proposed turn-around. Vehicular access to the riparian corridor, the adjacent floodplain and Ice Box Hole would be blocked at the turn-around; however, pedestrian/equestrian access to BLM lands on the river, via an existing native-surface route (access route DG A-2)[6], would remain. The existing user-created access route (DG A-1) would be closed to motorized vehicles upon completion of the project, recontoured to match the existing topography, and revegetated.

Access to the Sheridan Creek rehabilitation site from Sky Ranch Road would be via a private native surface road in the northeast corner of the site. Access is initially via Dredger Place (SC A-7); following a split in the road approximately 500 feet west of Sky Ranch Road, access follows the right fork on an unnamed road that crosses onto BLM land. The road then connects with other existing routes that parallel the river upstream to the Deep Gulch project site. Access between activity areas during rehabilitation activities would be via existing unmaintained primitive roads within the project boundary. Access roads SC A-1, A-2, A-3, A-6, and A-10 on river right follow existing roads; these roads would be widened to enable two-way construction traffic. Upon completion of the rehabilitation activities, access roads SC A-2, A-3, and A-6 would be rehabilitated for use as unmaintained, nonmotorized access routes on BLM land. Access road SC A-7, A-4, and A-6 would be rehabilitated consistent with pre-construction conditions. Access road SC A-5 would provide temporary access between river left activity areas and would be decommissioned after work on the river left activity areas is complete. Access to the lower portion of this site would require an agreement between Reclamation and a private landowner.

Two river crossings on BLM lands would be needed to access activity areas along the left bank. The upstream crossing at SC X-1 would require placement of about 450 cubic yards of alluvial material (e.g., gravel, cobble) processed from either a Deep Gulch or Sheridan Creek activity area on river right to create a crossing at a grade that enables high-clearance vehicles and equipment to cross in a manner that would not impede fish passage or boat navigation. Once construction equipment is

[5] Figure 2-2 was revised to illustrate this route.
[6] This change from the Draft EA/IS has been made in response to a public comment.

transported to the river left activity areas, daily trips would transport project staff over the course of several months during low-flow conditions. In the event of a multi-year construction schedule, the SC X-1 crossing may require some degree of reconstruction with heavy equipment (e.g., excavator) to ensure that the width and depth of the crossing is adequate for construction traffic. This crossing would be reshaped after use to facilitate erosion and transport of the fill material to supplement spawning habitat downstream. The downstream crossing at SC X-2 would be located in a shallow area that would not require additional fill material to raise the grade of the crossing.

The use of fords to cross the river would be minimized, and the SC crossings would not be used to transport excavated materials across the channel. A small amount of alluvial material (154 cubic yards) necessary for construction within activity areas SC W-1, W-2, and W-3 would be transported over these crossings during the initial construction of these features. In addition, these crossings would be used to deliver approximately 1,200 logs necessary for construction of the infiltration galleries associated with SC wetland complexes. These crossings would also provide daily access for project staff; fuel and maintenance vehicles would also use these crossings periodically during the construction period.

SC-U-2 is the primary disposal area on river left; SC U-3 is available as necessary to ensure that all spoils are placed in a location above the floodway and reduce the need to remove established upland vegetation (see Figure 2-2). Under the proposed action, it is assumed that both of these sites would be cleared and graded in a manner that would allow full use of these areas for efficient placement of spoils using heavy equipment. Any spoils placed in SC U-3 would be placed upstream of the active erosion zone of the Sturdivant Tunnel Debris Fan (see Figure 2-1). Spoils would be placed in such a manner as to permit passage of surface water drainage from the valley wall.

On both river left and right, suitable nesting habitat for western pond turtles would be constructed on southern aspects in dry areas consistent with BLM's recommendation to use best management practices provided in Oregon Department of Fish and Wildlife *Guidance for Conserving Oregon's Native Turtles* (ODFW 2015). Several of these sites were identified by BLM's biologist, including SC W-1 and SC W-5. TRRP staff, in consultation with BLM, will identify additional sites during the final grading efforts prior to site stabilization and revegetation activities. These nesting benches would be sparsely seeded post construction.

Spoils from river right would be placed at various locations throughout SC U-5 to establish an area amenable for reestablishing upland vegetation. Gravel processing of the tailings excavated from SC U-4 and, to a lesser degree from SC U-5, would occur within the SC U-5 activity area in order to provide the volume of alluvial materials (e.g., sand, cobble, gravel, boulders) necessary for construction and restoration purposes. Also, the large pile of gravel and dirt at the SC C-7 activity area would be re-graded, smoothed out, and covered with fine sediment to make it more suitable for revegetation and associated upland habitat (e.g., western pond turtle nesting habitat).

2.1.17 Construction Methods and Schedule

Earthmoving equipment that may be used to complete the rehabilitation activities includes off-road articulated dump trucks, wheel loaders, tracked excavators, dozers, push-pull scrapers, water tenders, and graders. In addition, equipment capable of driving piles (e.g., large logs) with a hydraulic ram may be used to anchor or stabilize wood structures in various activity areas. For materials that are

hauled from off-site, such as large wood, trucks capable of hauling up to 20 cubic yards at a time would obtain the materials from private forested lands throughout the Trinity River watershed. Large boulders, cobbles, and gravel would primarily be obtained through processing of alluvial material in the project area (see Table 2-2) or would come from a local commercial source. Gravel would be transported from clean stockpiles stored at previous TRRP channel rehabilitation/gravel processing sites. Potential stockpiles include those on private lands at the Lower Junction City and Upper Junction City sites, as well as at other authorized sources on BLM lands. The proposed rehabilitation activities are planned for construction between 2017 and 2019; the availability of funding may accelerate some elements of the project. Some staging of materials, such as trees and gravel, may occur on private land within the project area before construction begins, and on BLM lands after completion of the NEPA process and acquisition of required permits. The flow release schedule established for a particular water year may limit surface disturbance activities below the ordinary high water mark during the late spring through early summer. Processing of alluvial and material and dredger tailings (i.e., DG U-1 and SC-U4/U-5) is expected to take 4 to 6 weeks and could be accomplished at any time of year. Although the majority of in-channel and river left excavation and grading activities would typically occur between July 15 and September 15, excavation may continue later as long as surface water runoff does not increase the mainstem Trinity River turbidity by more than 20 percent. (Trinity River summer turbidity is typically very low at between 0.5 and 5.0 nephelometric turbidity units [NTUs]). 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 construction or during the year after construction. If access across the river is needed for revegetation work, equipment would use the crossings only during the in-river work window from July 15 to September 15.

Construction of in-river work at both sites would be a priority, and it would be preferable to also perform the efforts associated with processing alluvial material at both sites to reduce noise and air quality impacts. To increase efficiency and reduce construction-related impacts, processing and stockpiling activities would ideally occur once, rather than several times during the course of the project. To the extent possible, activity area DG U-1 would be the priority area for processing and stockpiling within the project area. After all in-river work (IC areas) is completed, excavation and grading on the right bank would continue through the fall with project construction completed by December. Alternatively, construction would be sequenced as funding and environmental constraints allow, within the guidelines discussed previously this section.

2.1.18 Environmental Commitments

Reclamation, as the implementing agency for the proposed rehabilitation activities, has committed to implementing the mitigation measures identified in the Master EIR to avoid or minimize potential impacts associated with the proposed action (refer to MMRP in Master EIR, Table 2) for descriptions of these measures). These measures have been incorporated as design features as defined under NEPA and are considered environmental commitments included in the proposed action for purposes of the NEPA analysis. They also serve as CEQA mitigation measures that will be implemented in accordance with a project-specific mitigation monitoring and reporting program (MMRP, Appendix B). The environmental commitments are labeled according to their resource topic, as shown in Table 2-5, for easy referencing throughout this document. Also throughout this document, reference to these commitments is cross-referenced with the corresponding mitigation measure from the MMRP.

Table 2-5. Environmental Commitments

Label	Commitment
	Mineral Resources
EC-MR-1	Reclamation will provide notice of the project to landowners in and adjacent to the project area and to individuals with mining claims within the project sites. Notice will be given prior to project implementation and will include a schedule of river access closures. Reclamation will coordinate with private landowners and owners of active mining claims to develop site-specific measures that can be implemented to avoid or lessen project-related impacts to mineral resources associated with the Trinity River and its tributaries.
	Fluvial Geomorphology and Soils
EC-GS-1	Reclamation will implement the following measures during construction activities: ▪ Areas where ground disturbance will occur will be identified in advance of construction and limited to only those areas that have been approved by Reclamation. ▪ All vehicular construction traffic will be confined to the designated activity areas, access routes, and staging areas. ▪ Disturbance will be limited to the minimum necessary to complete all rehabilitation activities. ▪ All supervisory construction personnel will be informed of environmental concerns, permit conditions, and final project specifications.
EC-GS-2	Reclamation will prepare a Storm Water Pollution Prevention Plan (SWPPP) to prevent erosion and control sediment into adjacent water bodies. Measures for erosion control will be prioritized based on proximity to the Trinity River. Reclamation will provide the SWPPP for review by associated agencies (e.g., BLM, the Regional Water Board, NMFS, and CDFW) upon request. Reclamation's project manager will ensure the preparation and implementation of an erosion and sediment control plan prior to the start of construction. The following features will be used as a guide to develop this plan: ▪ Restore disturbed areas to pre-construction contours to the fullest extent feasible. ▪ Salvage, store, and use the highest quality soil for revegetation. ▪ Discourage noxious weed competition and control noxious weeds. ▪ Clear or remove roots from steep slopes immediately prior to scheduled construction. ▪ Leave drainage gaps in topsoil and spoil piles to accommodate surface water runoff. ▪ To the fullest extent possible, cease excavation activities during significantly wet or windy weather. ▪ Use bales, wattles, and/or silt fencing as appropriate. ▪ Before seeding disturbed soils, work the topsoil to reduce compaction caused by construction vehicle traffic. ▪ Rip feathered edges (and floodplain surfaces where appropriate) to approximately 18 inches deep. The furrowing of the river's edge will remove plant roots to allow mobilization of the bed, but will also intercept sediment before it reaches the waterway. ▪ Spoil sites will be located such that they do not drain directly into a surface water feature, if possible. If a spoil site will drain into a surface water feature, catch basins will be constructed to intercept sediment before it reaches the feature. Spoil sites will be recontoured and revegetated to reduce the potential for erosion. ▪ Sediment control measures will be in place prior to the onset of the rainy season to ensure that surface water runoff does not occur. Project areas will be monitored and maintained in good working condition until disturbed areas have been seeded and mulched or revegetated in another fashion. If work activities take place during the rainy season, erosion control structures will be in place and operational at the end of each construction day.

Table 2-5. Environmental Commitments

Label	Commitment
	Water Quality
EC-WQ-1	The project will comply with the water quality objective for turbidity levels in the Trinity River, as listed in the most recent version of the Basin Plan for the North Coast Region (current version is dated May 19, 2011) or in the General Permits issued to the TRRP, whichever is more stringent: ▪ Due to the nature of the proposed restoration activities and the clarity of the Trinity River during low flow conditions, the Regional Water Board has determined that an allowable zone of turbidity dilution is appropriate and necessary in order for Trinity River restoration activities to be accomplished in a meaningful, timely, and cost-effective manner that fully protects beneficial uses without resulting in a violation of the water quality objective for turbidity. The 2015 General Order provides an allowable zone of turbidity dilution within which turbidity levels may be increased to more than 20 percent above naturally occurring background levels. ▪ Project activities that occur in areas outside of the active river channel will not increase turbidity levels by more than 20 percent above naturally occurring background levels. During in-river construction activities and until the first extended period of post-construction high flow (i.e., flows of at least 6,000 cfs inundate the project areas and floodplain for a minimum of 7 days) a zone of turbidity dilution within which higher percentages will be tolerated are defined in the 2015 general discharge permits as the full width of the river channel within 500 linear feet downstream of any project activity that increases naturally occurring background levels, provided that all other required controls and appropriate BMPs for sediment and turbidity control are in place and downstream beneficial uses are also fully protected. When naturally occurring background levels are less than or equal to 20 NTUs, turbidity levels immediately downstream of the zone of turbidity dilution shall not exceed 20 NTUs. If naturally occurring background levels are greater than 20 NTUs, turbidity levels immediately downstream of the 500 linear foot zone of dilution shall not be increased by more than 20 percent above the naturally occurring background level. To ensure that turbidity levels do not exceed the thresholds described above during in-river project construction activities, Reclamation will monitor turbidity levels upstream within 50 feet of project activities (i.e., natural background) and 500 feet downstream of the in-river construction activities that could increase turbidity. At a minimum, field turbidity measurements shall be collected whenever a visible increase in turbidity is observed. Monitoring frequency shall be a minimum of every two hours during in-river work periods and when activities commence that are likely to increase turbidity levels above any previously monitored levels. During in-river project construction activities, the Applicant shall monitor turbidity levels upstream within 50 feet of project activities (i.e., natural background) and 500 feet downstream of the in-river construction activities (point of compliance) that could increase turbidity. The Applicant shall monitor for turbidity increases and shall collect field turbidity measurements in accordance with Mitigation Measure 4.5 1a and Mitigation Measure 4.51b in the MMRP. At a minimum, field turbidity measurements shall be collected whenever a visible increase in turbidity is observed. Monitoring frequency shall be a minimum of every two hours during in-river work periods and when activities commence that are likely to increase turbidity levels above any previously monitored levels. If grab sample results at the point of compliance indicate that turbidity levels exceed 20 percent above naturally occurring background or 20 NTUs, whichever is greater, remedial actions will be implemented to reduce and maintain turbidity at or below this threshold level at the point of compliance. Potential remedial actions include halting or slowing construction activities and implementation of additional Best Management Practices (BMPs) until turbidity levels are at or below 20 percent above naturally occurring background or 20 NTUs, whichever is greater. If naturally occurring background levels are greater than 20 NTUs, turbidity levels at the point of compliance shall not exceed 20 percent above the naturally occurring background level. A monitoring report containing all turbidity measurements shall be submitted in a tabular format to the Regional Water Board upon annual project completion. The monitoring report shall be written in a manner that clearly demonstrates compliance with all water quality monitoring requirements.
EC-WQ-2	Fill gravels used on the streambeds, stream banks, and river crossings or alluvial material used for coarse sediment additions will be composed of clean, spawning-sized gravels (3/8- to 5-inches diameter) from a local Trinity River Basin source. Gravel will be washed to remove any silts, sand,

Table 2-5. Environmental Commitments

Label	Commitment
	clay, and organic matter and will be free of contaminants such as petroleum products. Clean gravel will pass Caltrans cleanliness test #227 with a value of 85 or greater. Abutment and embankment materials used for bridges will be native alluvium available from the project area.
EC-WQ-3	Reclamation will prepare and implement a SWPPP that describes BMPs for the project, including silt fences, sediment filters, and routine monitoring to verify effectiveness. Proper implementation of erosion and sediment controls will be adequate to minimize sediment inputs into the Trinity River until vegetation regrowth occurs. All required controls and BMPs, including sediment and erosion control devices, will be inspected daily during the construction period to ensure that the devices are properly functioning. Excavated and stored materials will be kept in upland activity areas with erosion control properly installed and maintained. Excavated and stored materials will be staged in stable upland activity areas. All applicable erosion control standards will be required during stockpiling of materials.
EC-WQ-4	To minimize the potential for increases in turbidity and suspended sediments entering the Trinity River as a result of access routes (e.g., roads), Reclamation will implement the following design features: ▪ Keep bare soil to the minimum required by designs. Erosion control devices/measures will be applied to areas where vegetation has been removed as needed to reduce short-term erosion prior to the start of the rainy season. ▪ Keep runoff from bare soil areas well dispersed. Dispersing runoff keeps sediment on-site and prevents sediment delivery to streams. Direct any concentrated runoff from bare soil areas into natural buffers of vegetation or areas with more gentle slopes where sediment can settle out. ▪ Disconnect and disperse flow paths, including roadside ditches that might otherwise deliver fine sediment to stream channels or other water bodies. ▪ Decompact or rip floodplain areas so that surfaces are permeable and no surface water runoff occurs. To reduce the potential for the access routes to continually contribute soil materials to the Trinity River following project construction, thereby increasing turbidity and total suspended solids in the river, these routes will be stabilized or decommissioned upon completion of work in those areas. Decommissioning is defined as removing those elements of a road that reroute hillslope drainage and present slope stability hazards.

Table 2-5. Environmental Commitments

Label	Commitment
EC-WQ-5	Construction specifications will include the following features to reduce potential impacts associated with accidental spills of pollutants (fuel, oil, grease, etc.) on vegetation and aquatic habitat resources within the project boundary: ▪ Equipment and materials will be stored away from wetland and surface water features. No hazardous materials, including fuels, oils, and solvents, will be stored or transferred within 150 feet of the active Trinity River channel. ▪ Vehicles and equipment used during construction will receive proper and timely maintenance to reduce the potential for mechanical breakdowns leading to a spill of materials. Construction equipment that will come in contact with the Trinity River will be inspected daily for leaks prior to entering the flowing channel. External oil, grease, and mud will be removed from equipment using steam cleaning. Untreated wash and rinse water will be adequately treated prior to discharge if that is the desired disposal option. ▪ Areas for fuel storage, refueling, and servicing will be located at least 150 feet from the active river channel or within an adequate secondary fueling containment area. Gasoline engines and pumps operated on the floodplain will be isolated from the ground by an impermeable barrier so that any leaking petroleum products are isolated from the ground. ▪ Spill containment booms will be maintained onsite at all times during construction operations and/or staging of equipment or fueling supplies. Fueling trucks will maintain a spill containment boom at all times. ▪ The contractor will develop and implement site-specific BMPs, a water pollution control plan, and spill prevention and containment plan in accordance with applicable federal and state requirements. The contractor will be responsible for immediate containment and removal of any toxins released.
	Fishery Resources
EC-FR-1	The proposed construction schedule avoids in-channel work during the period in which it could affect spawning spring- and fall-run Chinook salmon, coho salmon, and steelhead or their embryos once in the gravel. As directed by the 2000 Biological Opinion (National Marine Fisheries Service 2000), Reclamation will ensure that all in-channel construction activities are conducted during late-summer, low-flow conditions (e.g., July 15-September 15). Alluvial material used for coarse sediment additions will be composed of washed, spawning-sized gravels (3/8- to 5-inches diameter) from a local Trinity River Basin source. Gravel will be washed to remove any silts, sand, clay, and organic matter; will be free of contaminants, such as petroleum products; and will pass Caltrans cleanliness test #227 with a value of 85 or greater.
EC-FR-2	To avoid or minimize potential injury and mortality of fish during riverine activities (e.g., addition and grading of coarse sediment), equipment will be operated slowly and deliberately to alert and scare adult and juvenile salmonids away from the work area. Reclamation will minimize potential injury and mortality of fish during the use of low-flow channel crossings. This will be accomplished by minimizing vehicle traffic and by operating equipment and vehicles slowly and deliberately to alert and scare adult and juvenile salmonids away from the crossing area, or by having a person wade ahead of equipment to scare fish away from the crossing area. To avoid or minimize potential injury and mortality of fish during excavation and placement of fill materials in the active low-flow channel, equipment will be operated slowly and deliberately to alert and scare adult and juvenile salmonids away from the work area. Reclamation will ensure that before submerging an excavator bucket or laying gravel below the water surface, the excavator bucket will be operated to "tap" the surface of the water, or a person will wade ahead of fill placement equipment to scare fish away from the work area. To avoid impacts to mobile life stages of salmonids that may be present in the water column, the first layers of clean gravel that are being placed into the wetted channel will be added slowly and deliberately to allow fish to move from the work area.

Table 2-5. Environmental Commitments

Label	Commitment
	To avoid impacts to juvenile salmonids during high flow gravel injections, gravel will only be injected in select locations where water velocities are too high and juvenile salmonids would not be expected to be holding.
EC-FR-3	Monitoring of the constructed inundation surfaces for salmon fry stranding will be performed by a qualified fishery biologist immediately after recession of flood flow events designated as a 1.5-year or less frequent event (i.e., Q >6,000 cfs) for a period of 3 years following construction. These flows, and associated fry stranding surveys, will typically occur between January and May. If substantial stranding is observed, Reclamation will take appropriate measures to return stranded fishes to river habitats and to subsequently modify the constructed surfaces prior to the next managed flow release to reduce the likelihood of future occurrences of fry stranding.
EC-FR-4	Reclamation will continue to implement the Riparian Revegetation and Monitoring Plan during project implementation. The plan acknowledges that the ultimate goals of the TRRP include enhancement and maintenance of functional riparian habitat and no net-loss of riparian habitat and jurisdictional wetlands within channel rehabilitation site boundaries and generally throughout the 40-mile reach of the Trinity River below the TRD. Reclamation will initiate a 10-year mitigation monitoring program after the first growing season following project implementation. After a period of 5 years, the need for additional riparian habitat and wetland enhancement will be evaluated in a written report. At that time, Reclamation, in consultation with the USACE, Regional Water Board, and CDFW, will determine whether there is a need to further enhance or create additional areas of riparian habitat or jurisdictional wetlands within the project boundary so that there will be no net loss of riparian habitat after a 10-year monitoring period. In addition, wetlands will be redelineated 5 years post-project implementation to ensure no net loss of wetland habitat. Riparian habitat reporting 5 years after project implementation and wetland delineation 5 years after implementation will provide Reclamation with needed data in a timely fashion to take additional pro-active measures towards meeting the goals of no net loss of riparian and jurisdictional wetland habitat within rehabilitation site boundaries after 10 years.
EC-FR-5	Low water crossings will only be constructed and used between July 15 and September 15. The number of vehicle and equipment crossings of the Trinity River will be minimized. Reclamation will construct the low-flow channel crossings to allow adequate depths and velocities for adult and juvenile salmonids to pass safely. Flows associated with storm events are not considered critical because the width and hydrologic conditions associated with low-flow channel crossings in the Trinity River are not considered to limit fish passage at elevated flows and would be comparable to hydrologic conditions in local riffle-and-run features. For Trinity River low-flow channel crossings at base flows, velocities will not exceed 2 feet per second to allow for juvenile fish passage and water depths will not be less than 12 inches in two-thirds of the river channel to provide adequate depth for adult salmon and steelhead passage. Reclamation will not impede the physical features or hydraulic process of the Trinity River in a fashion that would be inconsistent with the 2000 Biological Opinion (National Marine Fisheries Service 2000), or result in a temporary impairment to fish passage related to a bridge.
	Vegetation, Wildlife, and Wetlands
EC-VW-1	Prior to the start of construction activities, Reclamation will retain a qualified biologist to identify potential construction access routes to ensure that these features avoid and/or minimize to the fullest extent impacts to riparian habitats and jurisdictional waters. In addition, Reclamation will clearly identify, and flag in the field, biologically sensitive areas (e.g., jurisdictional waters and riparian habitat) to be protected, and will provide the contractor with specific instructions to avoid any construction activity within these features. Reclamation will inspect and maintain marked areas on a regular basis throughout the construction phase.
EC-VW-2	A qualified botanist will conduct a minimum of two pre-construction surveys to determine if special-status plant species occur within the project site. Surveys shall be conducted during the blooming periods of the plants potentially occurring at the site to determine (1) if the species occur and (2)

Table 2-5. Environmental Commitments

Label	Commitment
	the quality, location, and extent of any populations. If a special-status plants species is found within 250 feet of any proposed disturbance, the following measures will be implemented. ▪ Prior to the start of disturbance, exclusionary fencing will be erected around the known occurrences. If necessary, a qualified botanist shall be present to assist with locating these special-status plant populations. The exclusionary fencing will be periodically inspected throughout each period of construction and be repaired as necessary. ▪ If a population cannot be fully avoided, Reclamation will retain a qualified botanist to (1) determine appropriate salvage and relocation measures and (2) implement appropriate measures in coordination with CDFW staff.
EC-VW-3	Prior to the start of construction, a qualified biologist will conduct a survey of the rehabilitation sites to determine whether suitable nesting habitat for the little willow flycatcher is present. If suitable habitat is present, the following measures will be implemented. ▪ Grading and other construction activities will be scheduled to avoid the nesting season to the extent possible. The nesting season for this species in Trinity County extends from June 1 through July 31. If construction occurs outside of the breeding season, no further mitigation is necessary. If the breeding season cannot be completely avoided, the following measures will be implemented. ▪ A qualified biologist will conduct a minimum of one pre-construction survey for the little willow flycatcher within the rehabilitation sites and a 250-foot buffer around the sites. The survey will be conducted no more than 15 days prior to the initiation of construction in any given area. The pre-construction survey(s) will be used to ensure that no nests of this species within or immediately adjacent to the rehabilitation site will be disturbed during project implementation. To the extent possible given timing for construction and with the contract award, pre-construction surveys will conform to methodologies identified in a Willow Fly Catcher Survey Protocol for California available online at: http://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html#Birds (Bombay et al., 2003). If an active nest is found, CDFW will be contacted prior to the start of construction to determine the appropriate mitigation measures. ▪ If vegetation is to be removed by the projects and all necessary approvals have been obtained, potential nesting substrate (e.g., shrubs and trees) that will be removed by the projects will be removed before the onset of the nesting season, if feasible. This will help preclude nesting and substantially decrease the likelihood of direct impacts.
EC-VW-4	If any construction in the Trinity River channel will occur prior to August 1 of any construction season, a pre-construction survey for the foothill yellow-legged frog larvae and/or eggs will be conducted by a qualified biologist. This survey will be conducted within the construction boundary no more than 2 weeks prior to the start of in-stream construction activities. If larvae or eggs are detected, the biologist will relocate them to a suitable location outside of the construction boundary. In the event that a foothill yellow-legged frog is observed within the construction boundary, the contractor will temporarily halt in-stream construction activities until qualified personnel have moved the frog(s) to a safe location within suitable habitat outside of the construction limits. Planned locations for placement of transferred animals will be downstream of the construction limits and will be reported to the CDFW prior to construction.
EC-VW-5	A minimum of one survey for western pond turtle nests will be conducted during the nesting season (generally late June-July) prior to construction. A qualified biologist will be retained by Reclamation to conduct the survey. If a western pond turtle nest is found, the biologist will flag the site and determine whether construction activities can avoid affecting the nest. If the nest cannot be avoided, the nest will be excavated by the biologist and reburied at a suitable location outside of the construction limits. Prior to construction in open water habitat, a qualified biologist will trap and move western pond turtles out of the construction area to nearby suitable habitats.

Table 2-5. Environmental Commitments

Label	Commitment
	During construction, in the event that a western pond turtle is observed within the construction limits, the contractor will temporarily halt construction activities until qualified personnel have moved the turtle(s) to a safe location within suitable habitat outside of the construction limits. Planned locations for placement of transferred animals will be downstream of the construction limits and will be reported to the CDFW prior to construction.
EC-VW-6	Prior to the start of construction, a qualified biologist will conduct surveys of the rehabilitation sites to determine whether suitable nesting habitat for California yellow warblers, yellow-breasted chats, and Vaux's swifts is present. If suitable habitat is present, the following measures will be implemented. Grading and other construction activities will be scheduled to avoid the nesting season for these species to the extent possible. The nesting season for these species in Trinity County extends from March 15 through July 31. If construction occurs outside the breeding season, no further mitigation is necessary. If construction during the breeding season cannot be completely avoided, the following measures will be implemented. A qualified biologist will conduct a minimum of one preconstruction survey for these species within the rehabilitation sites and a 250-foot buffer around the sites. The survey will be conducted no more than 15 days prior to the initiation of construction in any given area. The preconstruction surveys will be used to ensure that no nests of these species within or immediately adjacent to the rehabilitation sites will be disturbed during project implementation. If an active nest is found, a qualified biologist will determine the extent of a construction-free buffer zone to be established around the nest. If vegetation is to be removed by the project and all necessary approvals have been obtained, potential nesting habitat (e.g., shrubs and trees) that will be removed by the projects will be removed before the onset of the nesting season, if feasible. This will help preclude nesting and substantially decrease the likelihood of direct impacts.
EC-VW-7	Due to the removal of the bald eagle from the endangered species list and the availability of the National Bald Eagle Management Guidelines provided by the US Fish and Wildlife Service to protect the bald eagle, modified commitments are outlined below. These measures are now stricter than those outlined in the Master EIR and provide additional protections for the bald eagle to abide by directives within the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d): ▪ Prior to the start of construction, a qualified biologist will conduct a survey of the rehabilitation sites to determine whether suitable habitat for Bald Eagle and/or northern goshawks is present. If suitable habitat is present, the following commitment will be implemented. ▪ Construction will be scheduled to avoid the nesting season for bald eagles and northern goshawks to the extent feasible. The nesting season for most raptors in Trinity County extends from February 15 through July 31. Thus, if construction can be scheduled to occur between August 1 and February 14, the nesting season will be avoided and no impacts to nesting bald eagles and/or northern goshawks. If it is not possible to schedule construction during this time, the following measures will be implemented. ▪ Pre-construction surveys for bald eagles and nesting northern goshawks will be conducted by a qualified biologist to ensure that no disturbance will occur during project implementation. These surveys will be conducted no more than 14 days prior to the initiation of construction activities. The biologist will conduct surveys immediately adjacent to the impact areas for bald eagles and northern goshawk nests. If eagles or an active nest are found within 500 feet of the construction areas to be disturbed by these activities, the biologist, in consultation with the CDFW and the National Bald Eagle Management Guidelines, will determine the extent of a construction-free buffer zone to be established. ▪ If vegetation is to be removed as part of the project and all necessary approvals have been obtained, potential nesting habitat (i.e., trees) that will be removed by the projects will be removed before the onset of the nesting season, if feasible. This will help preclude nesting and substantially decrease the likelihood of direct impacts. Directives under the Bald and Golden Eagle Management Protection Act will be adhered to.

Table 2-5. Environmental Commitments

Label	Commitment
EC-VW-8	Pre-construction surveys for roosting bats and ring-tailed cats will be conducted prior to the start of construction activities. The surveys will be conducted by a qualified biologist. No activities that will result in disturbance to active roosts of special status bats or dens of ring-tailed cats will proceed prior to completion of the surveys. If no active roosts or dens are found, no further action is needed. Because bats are known to abandon young when disturbed, if a maternity roost is located, a qualified bat biologist will determine the extent of a construction-free zone to be implemented around the roost. If a bat maternity roost or hibernaculum is present, or a ring-tailed cat den is present, the following commitment will be implemented. CDFW will also be notified of any active bat nurseries within the disturbance zones. If an active maternity roost or hibernaculum is found, the projects will be redesigned to avoid the loss of the tree or structure occupied by the roost, if feasible. If the projects cannot be redesigned to avoid removal of the structure, demolition of that structure will commence before bat maternity colonies form (i.e., prior to March 1) or after young are volant (flying) (i.e., after July 31). The disturbance-free buffer zones described above will be observed during the bat maternity roost season (March 1–July 31). If a non-breeding bat hibernaculum is found in a tree or structure to be razed, the individuals will be safely evicted under the direction of a qualified bat biologist, by opening the roosting area to allow air to flow through the cavity. Demolition will then follow no sooner than the following day (i.e., there will be no less than one night between initial disturbance for air flow and the demolition). This action will allow bats to leave during dark hours, thus increasing their chance of finding new roosts with a minimum of potential predation during daylight. Trees with roosts that need to be removed will first be disturbed at dusk, just prior to removal that same evening, to allow bats to escape during darker hours. Ring-tailed cats are fully protected species under Fish and Game Code Section 4700. Fully protected species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research. If an active ring-tailed cat nest is found, the projects will be redesigned to avoid the loss of the tree occupied by the nest if feasible. If the projects cannot be redesigned to avoid removal of the occupied tree, the CDFW will be contacted for their input. If approved by CDFW, demolition of the tree will commence outside of the breeding season (February 1 to August 30). If a non-breeding den is found in a tree scheduled to be removed, prior to disturbance, the CDFW will be notified to review and approve proposed procedures to ensure that no take occurs as a result of the action. Trees with dens that need to be removed will first be disturbed at dusk, just prior to removal that same evening, to allow ring-tailed cats to escape during the darker hours.
EC-VW-9	In order to avoid and/or minimize the potential introduction and/or spread of noxious weeds, the following measures will be implemented: ▪ When using imported erosion control materials (as opposed to rock and dirt berms), use only certified weed-free materials, mulch, and seed. Preclude the use of rice straw in riparian areas. Limit any import or export of fill to materials to those that are known to be weed free. ▪ Ensure all construction equipment is thoroughly washed prior to entering and leaving the worksite. Equipment will be inspected to ensure that it is free of plant parts as well as soils, mud, or other debris that may carry weed seeds. ▪ Use a mix of native grasses, forbs, and non-persistent non-native species for seeding disturbed areas that are subject to infestation by non-native and invasive plant species. Where appropriate, a heavy application of mulch will be used to discourage introduction of these species. Use of planting plugs of native grass species may also be used to accelerate occupation of disturbed sites and increase the likelihood of reestablishing a self-sustaining population of native plant species.

Table 2-5. Environmental Commitments

Label	Commitment
	▪ Within the first 3 to 5 years post-project, if it is determined that the project has caused non-native invasive vegetation to out-compete desired planted or native colonizing riparian vegetation, opportunities to control these non-native species will be considered. When implementing weed control techniques, the approach will consider using all available control methods known for a weed species. Within the first 3 to 5 years post-project, if it is determined that on-site revegetation/post-project conditions do not meet landowner requirements, opportunities to revisit the site and remedy the concern will be considered.
EC-VW-10	Reclamation will develop and implement a plan to minimize impacts to freshwater mussels {e.g., western pearlshell mussel) and lamprey ammocetes that occupy habitat within the project area. This plan will include measures to collect, transport and relocate mussel populations to appropriate alluvial habitat within the project area. Relocation of ammocetes would occur using techniques to extract them from substrate habitat and move into the water column; thereby being transported to alluvial habitat downstream.
	Recreation
EC-RE-1	Reclamation will provide precautionary signage to warn recreational users of the potential safety hazards associated with project construction activities. Signs and/or buoys shall be placed within and directly adjacent to the project boundaries along the Trinity River in accordance with the requirements specified in Title 14, Article 6 of the California Code of Regulations. Notification signs shall be posted at public river access areas located within the project area and managed by BLM. Additionally, public notification of proposed project construction activities and associated safety hazards shall be circulated in the local Trinity Journal newspaper prior to the onset of project construction.
EC-RE-2	Reclamation will repair and/or replace any facilities associated with the project that are impacted by project activities. This feature includes installation of interpretive signage consistent with the requirements of the BLM. Preconstruction meetings between Reclamation and landowners/land managers will identify the amount of vegetative screening to be retained at each recreation site within the project area.
	Cultural Resources
EC-CU-1	Prior to initiation of construction or ground-disturbing activities, all construction workers will be alerted to the possibility of discovering cultural resources. This includes prehistoric and/or historic resources. Personnel will be instructed that upon discovery of buried cultural resources, work within 50 feet of the find will be halted and Reclamation's designated archaeologist will be consulted. Once the find has been identified, Reclamation will be responsible for developing a treatment plan for the cultural resource including an assessment of its historic properties and methods for avoiding any adverse effects, pursuant to the PA and in compliance with the NHPA.
EC-CU-2	If human remains are encountered during construction on non-federal lands, work in that area will be halted and the Trinity County Coroner's Office will be immediately contacted. If the remains are determined to be of Native American origin, the Native American Heritage Commission (NAHC) will be notified within 24 hours of determination, as required by PRC, Section 5097. The NAHC will notify designated Most Likely Descendants, who will provide recommendations for the treatment of the remains within 24 hours. The NAHC will mediate any disputes regarding treatment of remains. If Native American human remains and associated items are discovered on federal lands, they will be treated according to provisions set forth in the Native American Protection and Repatriation Act (25 USC 3001) as well as Reclamation's Directives and Standards LND 02-01. If the find is determined to be a historical resource or a unique archaeological resource, as defined by CEQA, contingency funding and a time allotment sufficient to allow for implementation of avoidance measures or other appropriate mitigation will be made available. Work may continue on other parts of the project while mitigation for historical or unique archaeological resources takes place.

Table 2-5. Environmental Commitments

Label	Commitment
	Air Quality
EC-AQ-1	Reclamation will implement a dust control program to limit fugitive dust and particulate matter emissions. The dust control program will include the following elements as appropriate: ▪ Inactive construction areas will be watered as needed to ensure dust control. ▪ Pursuant to the California Vehicle Code (Section 23114), all trucks hauling soil or other loose material to and from the construction site will be covered or will maintain adequate freeboard to ensure retention of materials within the truck's bed (e.g., ensure 1-2 feet vertical distance between top of load and the trailer). ▪ Excavation activities and other soil-disturbing activities will be conducted in phases to reduce the amount of bare soil exposed at any one time. Mulching with weed-free materials will be used to minimize soil erosion. ▪ Watering (using equipment and/or manually) will be conducted on all stockpiles, dirt/gravel roads, and exposed or disturbed soil surfaces, as necessary, to reduce airborne dust. ▪ All paved access roads, parking areas, and staging areas will be swept (with water sweepers), as required by Reclamation. ▪ Paved roads will be swept (with water sweepers) if visible soil material is carried onto adjacent private and public roads, as required by Reclamation. ▪ All ground-disturbing activities with the potential to generate dust will be suspended when winds exceed 20 mph, as directed by the NCUAQMD. Reclamation or its contractor will designate a person to monitor dust control and to order increased watering as necessary to prevent transport of dust offsite. This person will also respond to citizen complaints. Reclamation will comply with NCUAQMD Rule 104 (4.0) Particulate Matter. This compliance could occur by using portable internal combustion engines registered and certified under the state portable equipment regulation (Health & Safety Code 41750 through 41755).
EC-AQ-2	Vegetative piles to be burned will consist only of dried vegetative materials. Burn piles will be no larger than 10 feet in diameter. Field personnel will be on site during all hours of burning, and materials necessary to extinguish fires will be available at all times. In general, all requirements of a NCUAQMD "Non-Standard" burn permit will be met for burning. Burn management planning will include but not be limited to the following: ▪ Ensure that burning occurs only on approved burn days as defined by the NCUAQMD (determined by calling 1-866-BURN-DAY). ▪ Burning will only occur during suitable conditions to ensure control of ignited fires. For instance, water to wet the litter and duff layer and penetrate the mineral soil layer to 1/4 inch or more will be present, wind speeds will be low (<10 mph), and temperature will be low (<80 ºF). ▪ Piles will be covered with a 5-foot x 5-foot sheet of 4-mil polyethylene plastic to promote drying of the slash. At least 3/4 of each pile surface will be covered and the plastic anchored to preserve a dry ignition point. Dry fuel conditions will minimize smoke emissions. ▪ Slash piles will not be constructed on logs, stumps, or talus slopes within 25 feet of wildlife trees with nest structures, in roadways, or in drainage ditches. Piles will not be placed within 10 feet of trees intended to be saved (reserved trees) or within 25 feet of a unit boundary. ▪ Reclamation will notify the public each day that burning is to occur. Signs or personnel will notify residents and traffic on nearby access routes.
EC-AQ-3	Construction activity occurring within 300 feet of elementary schools will be limited to the period when school is not in session. Construction activity occurring within 300 feet of residences will be limited to Monday through Saturday, from the hours of 9 a.m. to 5 p.m. Reclamation will notify

Table 2-5. Environmental Commitments

Label	Commitment
	residences within 300 feet of the site and project activity and elementary schools will be notified of construction activity located near the school prior to site construction activities.
EC-AQ-4	Reclamation will ensure that a notice is posted at/adjacent to the rehabilitation site, which contains a phone number for the public to contact for concerns related to air quality.
	Noise
EC-NO-1	Construction activities near residential areas will be scheduled between 7:00 a.m. and 7:00 p.m., Monday through Saturday. No construction activities will be scheduled for Sundays or other hours and days established by the local jurisdiction (i.e., Trinity County). The contractor may submit a request for variances in construction activity hours, as needed.
EC-NO-2	Reclamation will require that all construction equipment be equipped with manufacturer's specified noise muffling devices. Reclamation will require placement of all stationary noise-generating equipment as far away as feasibly possible from sensitive noise receptors or in an orientation minimizing noise impacts (e.g., behind existing barriers, storage piles, unused equipment).
	Public Services
EC-PS-1	Reclamation will require that staging and construction work, including temporary road or bridge closures occurs in a manner that allows for access by emergency service providers. Reclamation will provide 72-hour notice to the local emergency providers and affected users prior to the start of temporary closures.
EC-PS-2	Reclamation will coordinate road closures occurring during the school year (mid-August through mid-June) with the appropriate school districts to avoid disruption of school attendance and student access to bus service.
	Transportation/Traffic Circulation
EC-TC-1	Reclamation will post signs during gravel haul activities notifying travelers of trucks entering the roadway. Reclamation will ensure that gravel trucks maintain a speed limit of 15 mph on residential and private roads and operate only between the hours of 7 a.m. and 7 p.m., Monday through Saturday.
EC-TC-2	Reclamation will maintain access throughout the construction period for all private residences adjacent to the project boundary and access roads adjacent to the Trinity River. During the construction phase of the project, Reclamation will limit the amount of daily construction equipment traffic by staging construction equipment and vehicles within the project boundary throughout the work period. All large equipment "lowbed" movements will be performed as required by CHP/Caltrans, etc., using pilot vehicles in the front and rear. A "scout vehicle" can be sent forward in the narrow areas to avoid/advise oncoming public traffic.
EC-TC-3	Reclamation will perform a pre-construction survey of local federal and state roads to determine the existing roadway conditions of the construction access routes and will consult with the relevant agencies/private parties about road conditions prior to construction activity and post construction activity. An agreement will be entered into prior to construction that will detail the pre-construction conditions and post-construction requirements for potential roadway rehabilitation.
EC-TC-4	Reclamation will prepare and implement a traffic control plan that will include provision and maintenance of temporary access through the construction zone, reduction in speed limits though the construction zone, signage and appropriate traffic control devices, illumination during hours of darkness or limited visibility, use of safety clothing/vests to ensure visibility of construction workers by motorists, and fencing as appropriate to separate bicyclists, pedestrians, and equestrians from construction activities. During the times that truck traffic and movement of equipment may result in a traffic obstacle or safety hazard (as defined in the traffic control plan), construction flagging and/or pilot cars will be used to ensure safe traffic conditions on Sky Ranch Road and other public access routes. Reclamation will obtain encroachment permits from the appropriate entities to work

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Label	Commitment
	within road easements. These permits will require traffic control and signage to meet California standards.

2.1.19 No Action Alternative

The no action alternative represents ongoing activities and operations of the TRRP and other entities involved in restoring the Trinity River with the exception of the proposed action. Under the no action alternative, no rehabilitation activities would be implemented at the Deep Gulch and Sheridan Creek rehabilitation sites. Other activities already being implemented in compliance with the 2000 ROD would continue to be implemented. These include:

- Implementation of the annual flow release schedule based on recommendations of the Trinity Management Council (TMC) to Reclamation; and
- Implementation of annual high flow coarse sediment (gravel) augmentation, at designated long-term sites along the Trinity River mainstem, based on recommendations of the TMC to Reclamation; and
- Implementation of watershed restoration and rehabilitation projects at other locations in the Trinity River Basin, including those funded by the TRRP, members of the TMC, BLM, and the Trinity County Resource Conservation District.

2.2 Alternatives Considered but Eliminated from Further Evaluation

Within the general confines of the defined activity areas and rehabilitation site boundaries, the designers used models to inform themselves about 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. The designers have been evaluating how these 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. Results of modeling were used to select optimal configurations, presented as the proposed action here, for maximum aquatic habitat quality for juvenile salmonids (e.g., depth, velocity, and substrate) and to predict changes to the river and floodplain (e.g., erode, aggrade, or vegetate) under envisioned ROD flow conditions.

While no discrete action alternatives were identified for consideration, the type and scale of activity areas originally considered by the respective design teams included the location of access roads, contractor use areas, and the location and use of processing/disposal areas for a long-term source of coarse sediment. Several access roads initially considered by the design team were eliminated due to resource conflicts (e.g., cultural resources) and concerns raised by landowners. In one case, an access area (DG A-1) was relocated to increase the distance from a private property and include restrictions on maintenance to avoid impacts to cultural resources. The boundaries of activity areas identified for processing and/or disposal of material were adjusted to address resource concerns associated with

wetlands, wildlife habitat, and cultural resources. Specifically, the boundaries of DG U-1 and SC U-2 and U-3 were revised several times prior to final design to address these concerns. In addition to including additional contractor use areas through the design process, several of these areas were revised to ensure adequate space was available to support the adjacent activities.

Initially, the project included a component that would provide processing of alluvial materials to develop a long-term source of coarse sediment available for subsequent TRRP channel rehabilitation and gravel augmentation projects. The temporal scale of this type of activity would have required use of certain activity areas (A, C, and U) for multiple entries. BLM requested that the proposed action exclude consideration of these areas for long-term TRRP activities.