3.4 Water Resources

This section describes surface water hydrology and groundwater associated with the Lewiston–Dark Gulch Rehabilitation Sites: Trinity River Mile 105-4–111.7 from both regional and local perspectives, as well as site-specific location hydraulics The following evaluation is based on field investigations conducted to develop and calibrate a hydraulic model; a review of existing literature and data; and field reconnaissance to identify local water resource conditions, including private wells within the site boundaries established for the proposed action.

3.4.1 Affected Environment/Environmental Setting

Regional Hydrology

Surface Water Hydrology

Since 1960, the TRD has been the major determinant of the hydrologic conditions affecting the Trinity River in the reach downstream of Lewiston Dam. Accretion flows from tributaries to the Trinity River modify the flow regime and contribute water, sediment, and other materials throughout the water year (Figure 3.4-1).

The Trinity River basin encompasses approximately 2,965 square miles, about one-quarter of which is upstream of the TRD. Elevations range from 9,025 feet (msl) at Mount Eddy at the northeastern extremity of the watershed to 300 feet msl at the confluence of the Trinity and Klamath rivers. The climate is Mediterranean, with an average precipitation of 62 inches per year; throughout the basin, precipitation varies from 30 to 70 inches annually and typically occurs as rain in the lower elevations and snow at the higher elevations.

The Trinity River is the largest tributary to the Klamath River. From its headwaters to its confluence with Klamath River at Weitchpec, the mainstem Trinity River is 170 miles long (Figure 3.4-2).

Construction of the TRD commenced in 1957 and storage of Trinity River water began in 1960. The Lewiston and Carr Powerhouses commenced operation in April 1964. The TRD consists of a series of dams, tunnels, and powerplants that export water from the Trinity River basin into the Sacramento River basin. Trinity and Lewiston dams currently regulate Trinity River flows, particularly downstream of RM 112. With a capacity of 2.4 million acre-feet (maf), Trinity Lake is the largest component of the TRD. Discharges from Trinity Lake are regulated in Lewiston Reservoir prior to release downstream into the Trinity River. Lewiston Reservoir also acts as a forebay for the trans-basin export of water into Whiskeytown Reservoir via the Clear Creek Tunnel. Since the TRD was constructed, Lewiston Dam has marked the upstream limit of anadromous salmonid access on the Trinity River.

The reach of the Trinity River downstream of Lewiston Dam to the confluence with the North Fork Trinity River is most affected by the changes in hydrologic regimes imposed by the TRD. Tributaries contribute relatively little accretion flow to this reach on an annual basis, although certain components of the annual hydrograph are locally modified by various tributary inflows. Prior to authorization of the 2000 ROD, the average annual flow volumes released from the TRD into the Trinity River at Lewiston

Dam were historically reduced by as much as 90 percent compared to pre-dam conditions. Consequently, channel form and function in this reach have been substantially altered.

Prior to the completion of the TRD, flows in the Trinity River were highly variable, ranging from summer flows of 25 cubic feet per second (cfs) to extreme winter events with instantaneous peak flows greater than 100,000 cfs. The maximum recorded flow at Lewiston was 71,600 in 1955. Annual hydrographs typically followed a seasonal pattern of high winter and spring flows followed by low summer and fall flows. Total annual flow volumes at Lewiston ranged from 0.27 to 2.7 maf, with an average of 1.2 maf.

From 1962 to 1979, CVP diversions delivered nearly 90 percent of the Trinity River annual water yield (above Lewiston) into the Sacramento River for urban and agricultural use[1]. After 1979, river releases were increased from 110,000 to 340,000 acre-feet (af) annually, thereby increasing the available flow in the Trinity River by as much as 70 percent.

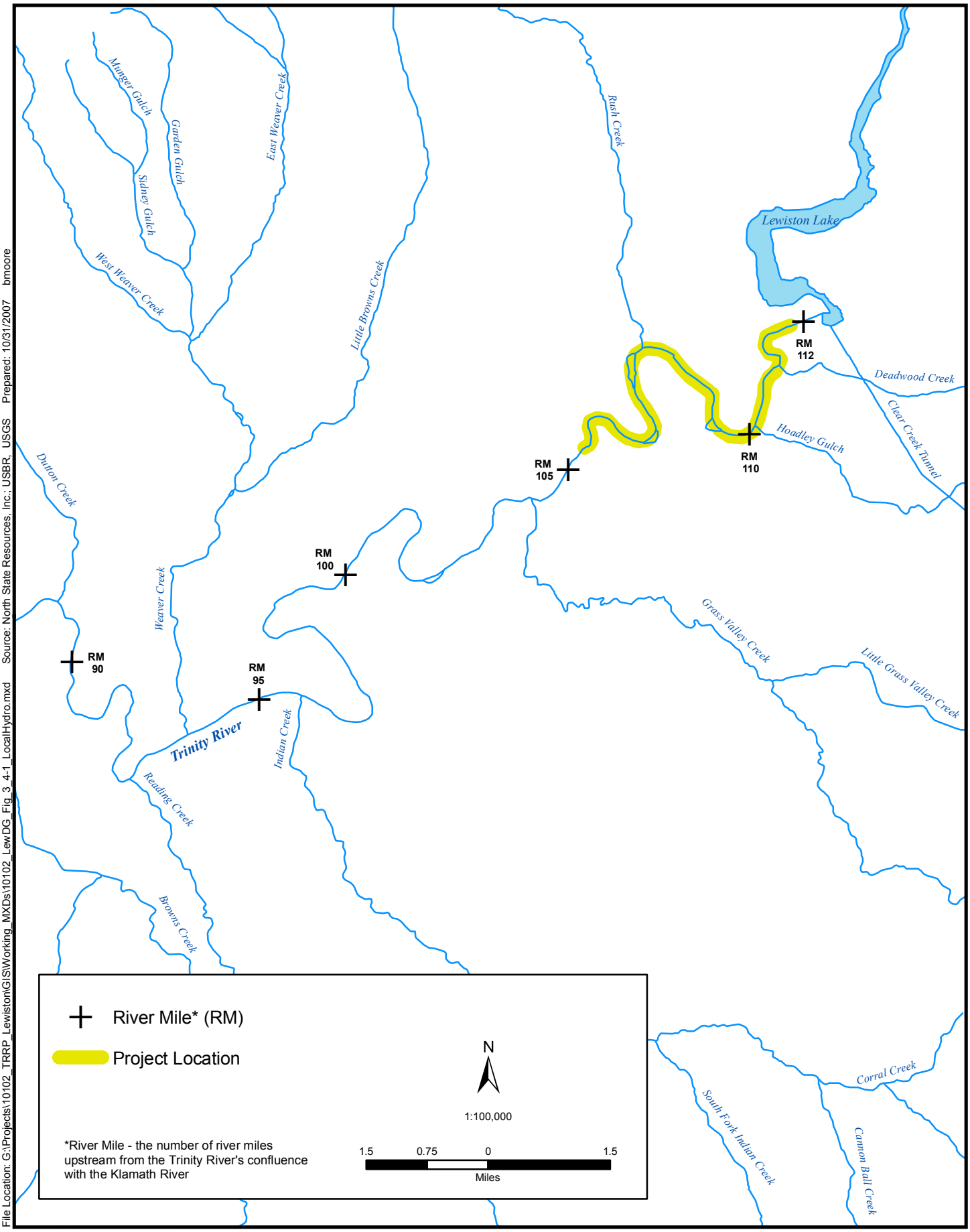
Although the 2000 ROD established an annual volume based on water year types, litigation in federal court resulted in delayed implementation of the flow releases for water years 2001–2004. Ultimately, the ROD was upheld, and the 2005 water year incorporated the schedule established by the TRRP in accordance with the ROD. This schedule is revised each year based on water year type. As the operator of the TRD, Reclamation is responsible for establishing the water year type every spring.

Periodically, increased water releases are made from Trinity Dam consistent with Reclamation safety of dams criteria intended to prevent overtopping of Trinity Dam. Although flood control is not an authorized purpose of the TRD, flood control benefits are provided through normal operations.

Trinity Dam has limited release capacity below the spillway crest elevation. Studies completed by the USACE in 1974 and Reclamation in 1975 showed the spillway and outlet works at Trinity Dam are not sufficient to safely pass the anticipated design flood inflow. Therefore, Reclamation implemented safety of dams criteria stipulating flood season release and storage criteria at Trinity Dam to reduce the potential for overtopping during large flood events. The safety of dams criteria attempt to prevent storage from exceeding 2.1 maf from November through March. The safety of dams criteria begin to prescribe reservoir releases when storage in Trinity Lake is forecast to exceed 2.0 maf during the November to March period.

The safety of dams release criteria specify that the Judge Francis Carr Powerplant should be used as a first-preference destination for safety of dams releases made at Trinity Dam. Releases to the Trinity River are made as a second-preference destination. During significant northern California high-water flood events, the Sacramento River water stages are also at concern level. Under such high water conditions, the water that would otherwise move through the Carr Powerplant is routed to the Trinity River.

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



File Location: G:\Projects\10102_TRRP_Lewiston\GISWorking_MXDs\10102_LewDG_Fig_3_4-1_LocalHydro.mxd Source: North State Resources, Inc.; USBR, USGS Prepared: 10/31/2007 bmoore

Figure 3.4-1
Local Hydrology and Tributaries

Source: Trinity River Flow Evaluation Report, 1999

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Figure 3.4-2
Regional Hydrology

The flood season within the Trinity River basin is typically between October and April, when over 90 percent of the annual precipitation falls. Floods on the Trinity River are controlled to some extent by the TRD. The greatest flood recorded for the area occurred in December 1955, although the ungaged flood of 1861–1862 likely exceeded all known historical events. Floods have also been recorded for the years 1926, 1928, 1937, 1940, 1941, 1948, 1950, 1958, 1960, 1963, 1964, 1972, 1974, and 1997 (Federal Emergency Management Agency 1996).

From Lewiston Dam downstream, a number of major tributaries provide accretion flow to the Trinity River before it enters the Klamath River. These tributaries include Rush Creek, Indian Creek, Weaver Creek, Canyon Creek, the North Fork Trinity River, Big French Creek, New River, South Fork Trinity River, Willow Creek, Horse Linto Creek, Tish Tang Creek, and Mill Creek.

The amount of winter precipitation increases steadily westward in the basin, as favorable orographic conditions extract more moisture from Pacific weather fronts closer to the coast and rain shadow effects reduce precipitation in the eastern portion of the watershed. Consequently, winter peak flows in the downstream portions of the Trinity River are much higher than those upstream, with greatly reduced influence from the control of flows by the TRD. Trinity River flows at the Hoopa gage average about 10,000 cfs from January through March. A peak flow volume of 122,000 cfs was recorded at the Hoopa gage during the January 1997 flood, although less than 7,000 cfs was released from Lewiston Dam.

During the seasonal dry period following peak spring snowmelt from the high mountainous areas of the watershed, flow accretion and its influence on mainstem hydrology decrease dramatically. During summer and fall baseflow periods, tributary accretion flows contribute minimally to low release volumes from the TRD. In general, during low-flow periods, flow accretion is minimal from Lewiston Dam to Canyon Creek, and becomes most significant downstream of the confluence with the North Fork Trinity River. However, during high flows (e.g., > 10 year recurrence interval), tributary accretion substantially exceeds dam release flows within 15 to 20 miles downstream of Lewiston Dam (McBain and Trush 1997). Tributary flow influence on this reach during flood events and as a proportion of the high range of average daily flows is a reversal of pre-dam conditions, where mainstem flows would almost always exceed the contribution of tributaries. Despite tributary contributions, flood frequency and peak flows in the uppermost reaches of the mainstem below the TRD are greatly reduced compared to pre-dam conditions.

Groundwater

Most usable groundwater in the mountainous Trinity River basin occurs in widely scattered alluvium-filled valleys, such as those immediately adjacent to the Trinity River. These valleys contain only small quantities of recoverable groundwater, and, therefore, are not considered a major source. A number of shallow wells adjacent to the river provide water for domestic purposes. Several of these wells have been improved with funding from the TRRP to ensure that ROD flows do not affect domestic water sources. Additionally, there are a number of wells that are designed to be inundated, and often are during the course of a water year.

Local Hydrology

Surface Water Hydrology

Within the boundaries of the project sites, the Trinity River has adjusted to a flow and sediment regime imposed in large part by the TRD. While the development of berms is not as pronounced in the reach upstream of Grass Valley Creek, the channel has been simplified to varying degrees. In general, the aquatic habitat within this reach of the river is considered simplified, with a reoccurring sequence of runs and low-gradient riffle habitat, pools, and glides. Additional information on morphologic processes and aquatic habitat is provided in Section 3.3 and Section 3.6 of this document.

Flood flow estimates used in the hydraulic modeling analyses were taken from three sources:

- Flood Plain Information Report: Trinity River, Lewiston Lake to Junction City, Trinity County, California (U.S. Army Corps of Engineers, 1976);
- Estimation of 50- and 100-Year Tributary Accretion Floods document (McBain 2002); and
- Flood Plain Infrastructure Modifications: Spring Flow Events draft report (U. S. Bureau of Reclamation 2005).

The 1976 Corps report provides the 100-year and 500-year annual flood events and hydraulic analyses used by FEMA to develop the current flood insurance rate maps (FIRMs) for the Trinity River. The 2002 McBain report provides flood flows as measured at mainstem Trinity River gages during the January 1997 flood and estimates of tributary accretion between mainstem gages during this event. The 2005 Reclamation draft report provides an estimate of 10-year and 100-year spring tributary flows during the time period when maximum fishery flows (MFF) (11,000 cubic feet per second [cfs]) would be occurring from Lewiston Dam. Because the 1976 Corps report provided flow rates only at Lewiston and Douglas City, the 2002 McBain report was used to approximate how flows would have accumulated between these locations if the flood assumed in the 1976 study were similar to that which occurred in 1997. Design flows, including the 1997 flood flows, used in this analysis are provided in Table 3.4-1.

Table 3.4-1. Design Flood Flows

Location	Maximum Fishery Flow[a] (cfs)	1997 Flood[b] (cfs)	FEMA 100-Year Flood[c] (cfs)
Trinity River at Lewiston	11,000	6,000	8,500
Trinity River below Rush Creek	12,096	12,500	19,300
Trinity River below Grass Valley Creek	13,692	15,050	23,600
Trinity River above Indian Creek	14,549	15,200	23,800
Trinity River below Indian Creek	15,771	19,000	30,200
Trinity River below Weaver Creek	17,544	22,000	35,200
Trinity River below Reading Creek	18,613	24,000	38,500

Notes:
[a] MFF=11,000 cfs Lewiston Dam Release plus 100-year spring tributary flows (2005 Reclamation draft report)
[b] 2002 McBain report
[c] 1976 Corps report (used in FIRM study)

The information provided in Table 3.4-1 indicates that the annual hydrograph is influenced by accretion flow from tributaries that augments TRD releases. The timing of peak flow and ramping-down releases under the ROD corresponds to the typical annual period of peak snowmelt floods in the watershed for each of the various water year classes described in the ROD.

Two substantial tributaries, Deadwood Creek and Rush Creek, enter the Trinity River within the 6.3-mile reach that constitutes the project area. Deadwood Creek enters the river within the boundary of the Lewiston site, and Rush Creek enters the river several miles upstream of the Dark Gulch site.. Deadwood Creek drains watersheds emanating from the Shasta Bally Batholith, while Rush Creek enters the Trinity River from the north from the Trinity Alps. These tributaries contribute flow, sediment, and other materials to the mainstem Trinity River throughout the year.

The location hydraulic study conducted by the TRRP was used to develop and apply a HEC-RAS model for the project. While the model was developed and calibrated to evaluate the impact of the alternatives considered in this EA/Draft EIR, model outputs were also used to ensure that the action alternatives were evaluated in the context of achieving the goals and objectives of the Proposed Action, including enhancing the 10 healthy alluvial river attributes and, consequently, improving salmonid habitat. The implementation of the Proposed Action would provide an opportunity to use the hydraulic models to evaluate the rehabilitated channel's ability to mobilize and redistribute sediments, maintain diverse riparian habitat, and improve the functionality of the floodplain.

Groundwater

Several community water systems use near-surface groundwater via intake galleries adjacent to the Trinity River. These systems include the Lewiston Community Services District, which maintains a water intake facility near activity areas U-2 DC and C-4 DC. The proposed activities at these activity areas take into account concerns regarding the intake gallery.

Floodplain Hydraulics

The floodplain of the Trinity River is identified in the Flood Insurance Study, Trinity County, California, and Incorporated Areas by FEMA. Actual floodplain designations are in the accompanying Flood Insurance Rate Map (FIRM). Figure 3.4-3 represents the delineation of the FIRM map as it pertains to the Proposed Action. The floodplain designations for the Trinity River in the general vicinity of the Lewiston and Dark Gulch sites were identified from a flood study performed by the USACE (U.S. Army Corps of Engineers 2004). The countywide FIRM map became effective on August 16, 1988.

Except for some upland areas, the project boundaries are within the 100-year floodplain designated by FEMA and within Special Flood Hazard Area Zones AE and X. Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. These AE zones correspond to locations where

BFEs or depths are shown, although the channel geometry has changed substantially since the zones were delineated. Lenders require flood insurance within Zone AE. Zone X is the flood insurance rate zone that

correspond to areas outside the 100-year floodplains, areas of 100-year sheet flow flooding where average depths are less than 1 foot, areas of 100-year stream flooding where the contributing drainage area is less than 1 square mile, or areas protected from the 100-year flood by levees. No BFEs or depths are shown within this zone.

Recent studies elsewhere on the river indicate that the flood magnitude determined by the 1976 Corps study may underestimate the actual flood magnitude and, therefore, the extent of the floodplain. As this project and other TRRP rehabilitation projects are implemented in the future, updated hydrological and topographical information could be used to revise the flood insurance study and flood insurance rate maps. This issue will be addressed at the appropriate time by FEMA and Trinity County. Under the County's Floodplain Management Ordinance, projects within the floodplain are not to increase the 100-year flood elevations by more than 12 inches. This criterion was used by the design team to ensure that actions proposed for each activity area are all feasible.

To gauge the effect of the project on the floodplain, water surface profiles for the existing and proposed ground surfaces were developed as part of the hydraulic modeling used in project design. These profiles show that the activities proposed in the action alternatives will not increase flood elevations over current conditions. This criterion was used by the design team to ensure that actions proposed for each activity area are all feasible.

Chapter 2 provides a discussion of hydraulic analysis used to analyze the water surface elevations (WSEs) and channel velocities for design flows prescribed in the ROD. This analysis was used to ensure that the Proposed Action and Alternative 1 incorporate the design elements required to comply with the County's Floodplain Management Ordinance.

3.4.2 Regulatory Framework

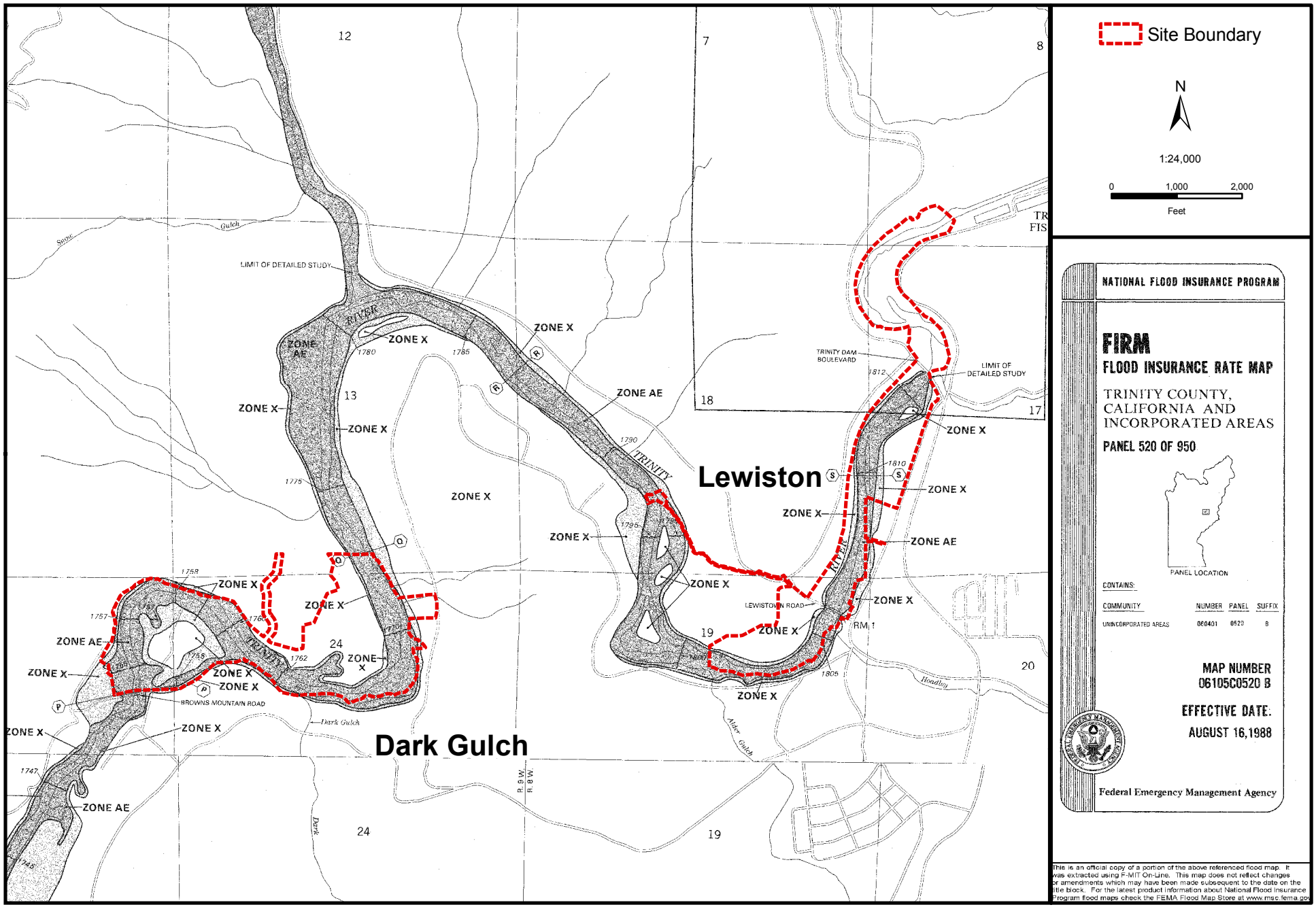
Federal

Federal Emergency Management Agency

Projects encroaching on a designated floodplain, as established by FEMA, are required to prepare a Location Hydraulic Study to assess risk in compliance with Executive Order 11988. The Location Hydraulics Study prepared for this project is available at the TRRP office in Weaverville, California. This study provided the foundational hydrology used to design and evaluate the proposed federal project as set forth in FEMA procedures. It also evaluates and discusses risks and impacts of base floodplain encroachment. The purpose of the evaluation is to ensure that all projects avoid significant floodplain encroachments where practicable.

Trinity County is a participant in the National Flood Insurance Program (NFIP). As a participant, the County is eligible for federal flood disaster assistance funds, including for damages to roads, bridges, and other public works infrastructure. In addition, federal flood insurance is made available to all property owners throughout the county. In return, the County is required to enforce, at a minimum, the standards established by FEMA. One of these standards requires that construction not result in a rise in the BFE for

File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_LewDG_Fig_3_4-3_100-yr_Floodplain.mxd Source: North State Resources, Inc.; FIRM Prepared: 09/06/2007 bmoore



North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.4-3
100-year Floodplain and Flood Insurance Rate Map

areas within a regulatory floodway. It also includes minimum standards for areas where no floodways have been established, such as portions of the Trinity River downstream of Lewiston. These standards state that no development shall be permitted unless it can be shown that it would not increase the WSE of the base flood more than 1 foot at any point within the community. Minimum standards also require that a Letter of Map Revision be submitted to FEMA to correct the Flood Insurance Rate Map if base flood elevations increase or decrease.

Federal Executive Order 11988 (Floodplain Encroachment)

Trinity County's requirements under the Floodplain Management Ordinance will be followed to ensure compliance with Federal Executive Order 11988.

Local

Trinity County Floodplain Management Ordinance

The Trinity County Floodplain Management Ordinance, found in Section 29.4 of the County Zoning Ordinance, requires a Floodplain Development Permit for projects that alter the Trinity River floodplain on private lands within the jurisdiction of Trinity County. The principal requirement of the permit is certification by a registered professional engineer or architect that construction or replacement of bridges, roadways, and bank slope protection devices will not adversely affect the flood-carrying capacity of any altered portion of the watercourse, and will not cumulatively raise the 100-year floodplain elevations by more than 1 foot within the project boundary. The ordinance also requires notification of adjacent communities, the CDFG, USACE, the Regional Water Board, and DWR prior to any alteration or relocation of a watercourse, and the submission of evidence of such notification to FEMA.

The Trinity County Floodplain Management Ordinance includes the following goals and policies:

Flood Hazard (FH) Zoning District

Applicability of Flood Hazard (FH) Zoning District

All of the following areas shall be zoned as FH:

A. Areas designated as a Regulatory Floodway or Zone AE on FEMA's Flood Insurance Rate Maps (FIRM)
B. Areas designated on the FIRM as Zone A along the Trinity River
C. Areas identified as 100-year flood plain on parcel maps and final maps filed for record in accordance with the Trinity County Subdivision Ordinance
D. Areas identified as 100-year flood plain in a use permit condition or other county entitlement
E. Areas identified as 100-year flood plain by a flood study approved by the County Board of Supervisors

Uses Permitted

A. Agricultural uses not involving the construction of structures or other uses which would limit the flow of flood waters

B. Placement and repair of three strand smooth-wire or barbed-wire fencing
C. Maintenance and repair of existing bridges, culverts, and roadways
D. Recreational mining or dredging, not subject to the Surface Mining and Reclamation Act (SMARA)

Uses Permitted Subject to First Securing a Floodplain Development Permit

The following uses may be permitted subject to first securing a Director's Issued Floodplain Development Permit, and, where applicable, complying with Regulatory Floodway provisions excerpted from Section 2.5 of the Trinity County Floodplain Management Ordinance as listed below.

A. Construction or replacement of bridges, culverts, roadways, bank slope protection devices and levees, and fisheries or wildlife habitat improvement projects shall be allowed, provided a certification by a registered professional engineer is provided demonstrating that the net effect of the project, in conjunction with all other projects developed on the affected stream reach since the effective date of the FIRM for said stream, will not cumulatively increase flood waters of the stream by more than one foot in the project boundary. Such certification shall be provided to the Floodplain Administrator.
B. Substantial improvements to existing structures, subject to compliance with development standards in the Flood Hazard Overlay (FHO) zoning district.
C. Development of structures within the FH zoning district may be permitted upon first securing a Floodplain Development Permit, provided that there are no building sites lying outside of the FH zoning district. If approved, development shall comply with development standards in Section 3.4.

Uses Permitted in Regulatory Floodways

A "Regulatory Floodway," lying within an area of special flood hazard as shown on a FIRM map, is an extremely hazardous area due to the velocity of floodwaters, which carry debris, potential projectiles, and erosion potential. [There are no regulatory floodways within the project boundaries.]

Development Standards for Lands Lying Within the Flood Hazard (FH) Zoning District

Development standards for the allowable uses listed above for lands lying within the FH zoning district are the same as development standards for lands lying within the FHO zoning district (Section 3.4).

Flood Hazard Overlay (FHO) Zoning District

Applicability of the Flood Hazard Overlay (FHO) Zoning District

The following areas shall be zoned FHO:

- All of those lands as designated on FEMA's FIRMs as Zone AO or AH (areas of shallow flooding), or lands designated as Zone A which are not included in a Flood Hazard zoning district.

Permitted Uses

All uses permitted in the underlying zone shall be permitted in the FHO district, provided that a Floodplain Development Permit shall be obtained prior to commencement of construction and issuance of any other county entitlement.

Trinity County General Plan Goals and Objectives

The Trinity County General Plan contains goals and policies designed to guide the future physical development of the county, based on current conditions. The General Plan contains all the state-required elements, including community development and design, transportation, natural resources, health and safety, noise, housing, recreation, economic development, public facilities and services, and air quality. The following goals and policies related to water resources issues associated with the Proposed Action were taken from the applicable elements of the General Plan (Trinity County 2001) and the Lewiston Community Plan (Trinity County 1986).

County Wide Goals and Objectives

Safety Element

The following goals, objectives, and policies are applicable to the Proposed Action.

Flood Hazard Goal

Reduce loss of life and property by establishing development standards for areas subject to flooding.

- Require all development to meet federal, state and local regulations for floodplain management protection, including the encouragement of upgrading existing structures to meet adopted standards.
- Require all development to meet the development standards of the National Flood Insurance Act regulations in Title 44 of the Code of Federal regulations, Section 60.3, as implemented through the County Zoning Ordinance section 29.4.
- Maintain or return to Open Space lands subject to flooding.

Lewiston Community Plan Goals and Objectives

This plan includes the area centered on the Trinity River from Lewiston Lake to slightly downstream of the confluence of Grass Valley Creek and the Trinity River.

Hazards

Goal: To protect public and private developments from flood hazards

3.4.3 Environmental Consequences/Impacts and Mitigation Measures

Methodology

The Proposed Action is designed to minimize placement of excavated material below the BFE. Hydraulic models were used to evaluate the alternatives described in Chapter 2, and a design criterion was developed to ensure that none of proposed activities would result in an obstruction to flow or an increase

in the BFE by more than 12 inches. The two action alternatives evaluated in this document are designed to ensure that no increase in BFE over what currently exists would occur.

Also, to reduce the risk of loss of structures or injury or death of people within or adjacent to the project boundary, specific flood frequency flows and corresponding water surface elevations were calculated for the action alternatives. This was necessary because specific hydrologic and hydraulic data were not available from the FEMA FIRM information and because of the age and datum used in the 1976 Corps study. The Location Hydraulic Study prepared by Reclamation identified 100-year frequency flood flows based on additional hydrologic data and assuming the full implementation of the flow regime prescribed in the ROD (U.S. Department of Interior 2000). To assess the sensitivity of the river to placement of material below the BFE, a hydraulic analysis was performed for each alternative to simulate the potential effects of the various activities. The analysis was performed to assess the sensitivity of the river to encroachments, not to assess the feasibility of a specific design.

Significance Criteria

A project would have a significant impact related to water resources if one of the following conditions occurred:

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

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

- an increase in the base floodwater surface elevation greater than 1 foot;
- substantial alteration of the existing drainage pattern of a site or area, including through the alteration of the course of a stream or river, or substantial increase of the rate or amount of surface runoff in a manner that would result in flooding on- or off-site; or
- exposure of people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

The Proposed Action would result in a significant impact to groundwater if one of the following conditions occurred:

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

Groundwater impacts were assessed at the scale of a groundwater basin or sub-basin. The significance of declining (or increasing) water levels depends in part on the duration and permanence of the impact.

Because groundwater elevations fluctuate naturally due to changes in rainfall, short-term changes in groundwater elevations are not considered significant impacts.

Impacts and Mitigation Measures

Table 3.4-2 summarizes the potential water resources impacts that could result from construction of the project.

Table 3.4-2. Summary of Water Resource Impacts for the No-Action Alternative, Proposed Action, and Alternative 1

No-Action Alternative	Proposed Action	Alternative 1	Proposed Action with Mitigation	Alternative 1 with Mitigation
Impact 3.4-1.	Implementation of the proposed project could result in a temporary or permanent increase in the base floodwater elevation.			
NI	LS	LS	N/A[1]	N/A[1]
Impact 3.4-2.	Implementation of the proposed project could result in a permanent decline in groundwater elevations or a permanent change in groundwater quality.			
NI	LS	LS	N/A[1]	N/A[1]
Impact 3.4-3.	Implementation of the proposed project would expose people or structures to a significant risk of injury, death or loss involving flooding.			
NI	LS	LS	N/A[1]	N/A[1]

Notes:
LS = Less than Significant S = Significant SU = Significant Unavoidable
NI = No Impact B = Beneficial N/A = Not Applicable
[1]Because this potential impact is less than significant, no mitigation is required.

Impact 3.4-1: Implementation of the proposed project could result in a temporary or permanent increase in the base floodwater elevation. ***No Impact for the No-Action Alternative; Less-than-Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, the Trinity River floodplain would not be altered and the existing BFEs would not change because the project would not be constructed.

Proposed Action and Alternative 1

Under either action alternative, the elevation and area of the floodplain of the Trinity River would be modified through the activities described in Chapter 2. The hydraulics analysis indicates that removing all the excavated material from the riverine rehabilitation areas and placing it as coarse sediment within the channel or above the BFE in upland activity areas would not result in an increase in the FEMA BFE.

Additionally, the analysis indicates that there would be no increase to the FEMA BFE from the placement of low-flow channel crossings at the Dark Gulch site.

Mitigation Measures

No-Action Alternative, Proposed Action, and Alternative 1

Since no significant impact was identified, no mitigation is required.

Significance after Mitigation

N/A

Impact 3.4-2: Implementation of the proposed project could result in a permanent decline in groundwater elevations or permanent changes in groundwater quality. ***No Impact for the No-Action Alternative; Less-than-Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, no effects on local groundwater levels would occur because the project would not be constructed.

Proposed Action and Alternative 1

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

Mitigation Measures

No-Action Alternative, Proposed Action, and Alternative 1

Since no significant impact was identified, no mitigation is required.

Significance after Mitigation

N/A

Impact 3.4-3: Implementation of the proposed project would expose people or structures to a significant risk of injury, death, or loss involving flooding. ***No Impact for the No-Action Alternative; Less-than-Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, no people or structures would be exposed to flood risks associated with the proposed project because the project would not be constructed.

Proposed Action and Alternative 1

Implementation of either action alternative would not result in changes to the BFE. Both of the action alternatives are designed to avoid exposing people or structures to a significant risk of injury, death, or loss involving flooding; therefore, no significant impact would occur.

Mitigation Measures

No-Action Alternative, Proposed Action, and Alternative 1

Since no significant impact was identified, no mitigation is required.

Significance after Mitigation

N/A

3.5 Water Quality

This section describes water quality conditions related to the Proposed Action from regional and local perspectives. The following evaluation is based on a review of existing literature and data, particularly the Water Quality Control Plan for the North Coast Region, as amended June 28, 2001 (Basin Plan) (North Coast Regional Water Quality Control Board 2001).

The principal components of the TRD include Lewiston Dam, Trinity Dam, and the facilities that divert runoff from the Trinity River watershed to the Sacramento River basin. Prior to full implementation of the ROD, construction of the dams and diversion facilities diverted up to 90 percent of the natural flows of the Trinity River and substantially altered water quality in the river, particularly its temperature and sediment regimes. Additional information on this topic is provided in Section 3.4, Water Resources, and Section 3.6, Fisheries.

3.5.1 Affected Environment/Environmental Setting

Water Quality Management

Basin Plan

The Proposed Action is subject to compliance with the Basin Plan prepared by the Regional Water Board. The Basin Plan applies to the entire North Coast Region, which comprises all basins, including the Lower Klamath Lake and Lost River basins, draining into the Pacific Ocean from the California–Oregon state line south to the southern boundary of the watershed of the Estero de San Antonio and Stemple Creek in Marin and Sonoma Counties. The Trinity River is the largest tributary in the Klamath River basin. Section 3.4, Water Resources, provides additional discussion of the Trinity River and the tributaries that influence the project sites.

The beneficial uses and water quality objectives for the Trinity River are contained in the Basin Plan and are listed in Table 3.5-1. This table also shows whether these beneficial uses currently exist or whether they have the potential to exist.

In addition to municipal and domestic water supply, the beneficial uses affected by water quality in the Trinity River are primarily those associated with supporting high-quality habitat for fish. Recreation (contact and non-contact) is another important beneficial use potentially affected by various water quality parameters (e.g., sediment, temperature). Recreation activities in the general vicinity of Lewiston include whitewater recreation, fishing, swimming, and sightseeing.

The Basin Plan identifies both numeric and narrative water quality objectives for the Trinity River. Table 3.5-2 summarizes the water quality objectives by categories that have been established by the Regional Water Board to protect designated beneficial uses.

In addition to water quality objectives, the Basin Plan includes two waste discharge prohibitions that pertain to logging, construction, and associated nonpoint source activities:

- The discharge of soil, silt, bark, sawdust or other organic and earthen material from any logging, construction, or associated activity of whatever nature into any stream or watercourse in the basin in quantities deleterious to fish, wildlife, or other beneficial uses is prohibited.
- The placing or disposal of soil, silt, bark, slash, or sawdust or other organic and earthen material from any logging, construction, or associated activity of whatever nature at locations where such material could pass into any stream or watercourse in the basin in quantities deleterious to fish, wildlife, or other beneficial uses is prohibited.

Table 3.5-1. Trinity River Beneficial Uses

Beneficial Water Uses	Existing or Potential
Municipal and domestic supply	Existing
Agricultural supply	Existing
Industrial service supply	Existing
Industrial process supply	Potential
Groundwater recharge	Existing
Freshwater replenishment	Existing
Navigation	Existing
Hydropower generation	Potential and existing
Water contact recreation	Existing
Non-contact water recreation	Existing
Commercial and sport fishing	Existing
Cold freshwater habitat	Existing
Wildlife habitat	Existing
Rare, threatened, or endangered species	Existing
Migration of aquatic organisms	Existing
Spawning, reproduction, and/or early development	Existing
Shellfish harvesting	Potential
Aquaculture	Potential and existing

Source: Water Quality Control Plan for the North Coast Region. 2001. North Coast Regional Water Quality Control Board.

Table 3.5-2. Water Quality Objectives for the Trinity River

Category	Objective Threshold	Applicable Portion of Water Body
Bacteria	The bacteriological quality of waters of the North Coast region shall not be degraded beyond natural background levels. In waters designated for contact recreation, the median fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed 50/100 milliliters (ml), nor shall more than 10 percent of the total number of samples taken during any 30-day period exceed 400/100 ml.	Lower Trinity River
Biostimulatory substances	Water shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.	Entire Trinity River
Color	Water shall be free of coloration that causes nuisance or adversely affects beneficial uses.	Entire Trinity River
Chemical constituents	Waters designated for use as domestic or municipal supply shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the California Code of Regulations.	Entire Trinity River
Dissolved oxygen	Shall not be depressed below 8.0 mg/L and 50% or more of the monthly means for a calendar year must be greater than or equal to 10 mg/L.	Lower Trinity River
Floating material	Water shall not contain floating material, including solids, liquids, foams and scum in concentrations that cause nuisance or adversely affect beneficial uses.	Entire Trinity River
Oil and grease	Waters shall not contain oils, greases, waxes, or other materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses.	Entire Trinity River
pH	Shall not be depressed below 7.0 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses.	Entire Trinity River
Pesticides	No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses. There shall be no bioaccumulation of pesticide concentrations found in bottom sediments or aquatic life. Waters designated for use as domestic or municipal supply shall not contain concentrations of pesticides in excess of the limiting concentrations set forth in the California Code of Regulations (CCR).	Entire Trinity River

Table 3.5-2. Water Quality Objectives for the Trinity River

Category	Objective Threshold	Applicable Portion of Water Body
Radioactivity	Radionuclides shall not be present in concentrations which are deleterious to human, plant, animal, or aquatic life nor which result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or aquatic life. Waters designated for use as domestic or municipal supply shall not contain concentrations of radionuclides in excess of the limits specified in the CCR.	Entire Trinity River
Sediment	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.	Entire Trinity River
Settleable material	Water shall not contain substances in concentrations that result in the disposition of material that causes nuisance or adversely affects beneficial uses.	Entire Trinity River
Suspended material	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.	Entire Trinity River
Tastes and odors	Water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.	Entire Trinity River
Temperature	At no time or place shall the temperature of any COLD water be increased by more than 5^{o} F above the natural receiving water temperature. Temperatures will be consistent with those outlined in Table 3.5-3 of this EA/Draft EIR.	Trinity River subject to Interim Action Plan
Toxicity	All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life.	Entire Trinity River
Turbidity	Turbidity shall not be increased more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof.	Entire Trinity River

Source: Water Quality Control Plan for the North Coast Region. 2001. North Coast Regional Water Quality Control Board.

Two additional documents address specific elements of water quality in the Trinity River basin. The Interim Action Plan for the Trinity River incorporated into the Basin Plan addresses flow and temperature issues in that portion of the river affected by the TRD. The Trinity River Total Maximum Daily Load (TMDL) for Sediment (North Coast Regional Water Quality Control Board 2001) identifies the total load of sediment that can be delivered to the Trinity River and its tributaries without exceeding water quality standards, based on current flow conditions and estimated flows under the ROD.

Trinity River Water Quality

The releases from the TRD influence flow volumes and velocities, water quality, and channel geometry downstream of Lewiston Dam. These influences are particularly important to water quality parameters such as temperature, turbidity, and suspended sediments. A dramatic decrease in the abundance of Trinity River coldwater fishes has taken place since the TRD began operation (U.S. Fish and Wildlife Service and Hoopa Valley Tribe 1999).

Water quality in the Trinity River is also affected by acid mine drainage from abandoned mines and past mining activities; sediment releases from land use practices associated with unstable soils and decomposed granite (e.g., roads, vegetation management, subdivisions); septic tanks; aboveground and underground tanks; and lumber mills (North Coast Regional Water Quality Control Board 2001).

Disturbances, primarily fires, floods, and landslides, are a natural part of the riverine ecosystem that directly influence water quality and, therefore, beneficial uses. The beneficial uses associated with salmonid species are subject to natural fluctuations in response to disturbances. Anthropogenic (human-caused) activities can affect the severity and frequency of these disturbance processes.

Temperature

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

Table 3 in Section 3 of the Basin Plan and the Interim Action Plan define temperature objectives that apply to the Trinity River. These objectives are effective from July 1 through December 31 for the 40-mile reach between Lewiston Dam and the North Fork Trinity River. Table 3.5-3 lists these objectives; the Basin Plan also stipulates that water released into the Trinity River may be no more than 5 °F warmer than receiving water temperatures.

Table 3.5-3. Temperature Objectives for the Mainstem Trinity River

Temperature	Dates	Trinity River Reach
60 °F (15.6 °C)	July 1 – September 14	Lewiston Dam to Douglas City Bridge
56 °F (13.3 °C)	September 15 – October 1	Lewiston Dam to Douglas City Bridge
56 °F (13.3 °C)	October 1 – December 31	Lewiston Dam to confluence with North Fork

Source: Water Quality Control Plan for the North Coast Region. 2001. North Coast Regional Water Quality Control Board.

Sediment

In 1992, the State of California determined the Trinity River to be sediment impaired under the provisions of Section 303(d) of the CWA. At that time, the river was added to the EPA's Section 303(d) list of sediment impaired rivers. The primary adverse impacts associated with excessive sediment in the Trinity River pertain to degradation of habitat for anadromous salmonids. The state water quality standards consist of designated uses, water quality criteria to protect the uses, and an antidegradation policy.

The TMDL for sediment describes how seasonal variation is considered. Sediment delivery in the Trinity River watershed has considerable inherent inter-annual and seasonal variability. Due to this variability in magnitude, timing, duration, and frequency of sediment input, the TMDL and load allocation apply to the sources of sediment and estimate average sediment input using a 10-year rolling average.

The TMDL does not allocate flow; however, it does take into account critical conditions for flow, sediment loading, and water quality parameters. Restriction of streamflow downstream of the TRD has greatly contributed to the impairment of the Trinity River below Lewiston Dam (U.S. Environmental Protection Agency 2001). Reduction in available coarse sediment upstream of Rush Creek and the significant contribution of fine sediment from Grass Valley Creek have combined to severely affect the sediment flux and particle size distribution in the river. These effects are observable downstream as far as the North Fork Trinity River.

In order to alleviate adverse impacts associated with excessive sediment in the Trinity River, a series of projects have been implemented to manage excessive fine sediment inputs from creeks in the Trinity River, including Grass Valley Creek, Rush Creek, and Deadwood Creek. The Bureau of Reclamation constructed the Buckhorn Sediment Dam and Hamilton Ponds in 1984 and 1991, respectively, to address the problem of fine sediment output from Grass Valley Creek. Since their construction, the Grass Valley Creek Watershed Restoration Project has continued to implement a series of projects, including revegetation, bioengineering, grade stabilization, and sediment capture to further reduce the amount of soil erosion and transport of sediment. Additional regulations and limitations have been instituted on land use. Other recent efforts to reduce sediment input into the Trinity River include treatment projects on Deadwood Road completed by the Trinity County Department of Transportation and excavation of fine sediments from the Hamilton Ponds.

Mercury

Another source of potential water quality impairment of the Trinity River is the presence of mercury, although the river is not listed under Section 303(d) of the CWA for mercury impairment. The general significance of mercury as a biological toxin, and the likely sources of mercury in regional and local contexts, is discussed in Section 3.15, Hazards and Hazardous Materials. Elevated concentrations of mercury have been found in water, sediment, and biota (fish, frogs, and predatory aquatic insects) in the upper Trinity River basin, upstream of Lewiston dam (U.S. Geological Survey, unpublished data). Biological samples taken in the lower Trinity River system have not yielded significantly elevated levels of mercury in biota from various trophic levels to date; however, studies that focus on the river downstream of the TRD and specifically the project sites and vicinity are ongoing (Ashley et al. 2002).

Initially, the TRRP recognized the possibility that mercury releases from tailings and/or fluvial fine sediments could be disturbed and mobilized by rehabilitation activities. Subsequently, on-going investigations and monitoring at the Hocker Flat Demonstration Project suggested that the alluvial materials that are subject to project-related disturbance contain levels of mercury well below the numeric criteria promulgated by the EPA for priority toxic pollutants. The levels are also well below the narrative threshold, which states that toxic substances should not be in such concentrations that they produce detrimental physiological responses in humans or aquatic life. Furthermore, testing has found that mercury concentrations in water that leached through sediments of relatively high mercury levels were low (U.S. Geological Survey, unpublished data). Under the California Toxics Rule, the numeric water quality objectives for total measured mercury are 0.050 part per billion, unfiltered, for water. Overall, the U.S. Geological Survey's (USGS's) assessment of site-specific methylation data suggests that the bioavailability of mercury within the Trinity River floodplain is not presently high.

3.5.2 Regulatory Framework

U.S. Environmental Protection Agency

California Toxics Rule

The EPA has promulgated numeric water quality criteria for priority toxic pollutants and other water quality standards provisions to be applied to waters in the State of California, known as the California Toxics Rule (CTR). EPA promulgated this rule based on the Administrator's determination that the numeric criteria are necessary in the State of California to protect human health and the environment. EPA promulgated this rule to fill a gap in California water quality standards that was created in 1994 when a state court overturned California's water quality control plans containing water quality criteria for priority toxic pollutants.

Under Section 303(c)(2)(B) of the CWA, states must adopt numeric criteria for the priority toxic pollutants listed under Section 307(a) if those pollutants could be reasonably expected to interfere with the designated uses of state waters. In April 1991, California adopted numeric criteria for priority toxic pollutants in the Inland Surface Water Plans and Enclosed Bays and Estuaries Plans. In 1994, the State of California was ordered to rescind these water quality control plans. Thus, the State of California was without numeric water quality criteria for many priority toxic pollutants as required by the CWA,

necessitating the action by EPA. The federal criteria are legally applicable in the State of California for inland surface waters, enclosed bays, and estuaries for all purposes and programs under the CWA. The final rule promulgated numeric water quality criteria to replace the criteria that were rescinded by the state court. The State of California also remains under the jurisdiction of the National Toxics Rule promulgated in 1992 for certain waters and pollutants (U.S. Environmental Protection Agency 2004); http://www.epa.gov/ost/standards/ctr/factsheet.html).

The CTR is set forth in the Federal Register (40 CFR 131, 2000; http://www.epa.gov/ost/standards/ctr/toxic.pdf). It establishes human health criteria for mercury in the water column of 0.050 part per billion (ppb) of total recoverable mercury for drinking water supplies and aquatic organisms, and 0.051 ppb for waters that are not drinking water supplies. These criteria are derived from a calculated reference dose, based on concentrations of mercury below which extra risk for neurological damage should not occur.

National Recommended Water Quality Criteria

EPA has issued national recommended water quality criteria for the protection of aquatic life and human health for approximately 150 pollutants (U.S. Environmental Protection Agency 2004; http://www.epa.gov/waterscience/pc/revcom.pdf). These criteria are published pursuant to Section 304(a) of the CWA and provide guidance for states and Tribes to use in adopting water quality standards under Section 303(c) of the CWA. In 2001, EPA announced the availability of a recommended water quality criterion for methylmercury (66 FR 1344). At that time, EPA withdrew its previous ambient human: health water quality criteria for mercury as the recommended Section 304(a) water quality criteria. (These criteria were the same as those set forth in the CTR, as described above.) The new water quality criterion describes the concentration of methylmercury in freshwater and estuarine fish and shellfish tissue that should not be exceeded to protect consumers of fish and shellfish among the general population. This concentration is set at 0.3 parts per million (ppm). The EPA expects the criterion recommendation to be used as guidance by states, Tribes, and the EPA in establishing or updating water quality standards for waters of the United States and in issuing fish and shellfish consumption advisories. This is the first time EPA has issued a water quality criterion expressed as a fish and shellfish tissue value rather than as a water column value. This approach is a direct consequence of the scientific consensus that consumption of contaminated fish and shellfish is the primary human route of exposure to methylmercury.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act directs the Regional Water Board to formulate and adopt a Basin Plan for all areas within the region. The act requires the Regional Water Board to establish water quality objectives in the Basin Plan that in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance. Factors to be considered by the Regional Water Board in establishing water quality objectives shall include, but not necessarily be limited to, the following:

- past, present, and probable future beneficial uses;

- environmental characteristics of the hydrographic unit under consideration, including the quality of the water available thereto;
- water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area;
- economic considerations;
- the need for developing housing within the region; and
- the need to develop and use recycled water.

California Regional Water Quality Control Board

The Regional Water Board requires that a project proponent apply for and obtain a CWA Section 401 Water Quality Certification for any project that requires a CWA Section 404 permit from the Corps. Since either action alternative would have the potential to affect water quality in the Trinity River, the Regional Water Board is likely to impose water quality limitations and project conditions through issuance of Waste Discharge Requirements for Section 401 Certification. Reclamation will prepare and submit to the Regional Water Board an application for Section 401 Water Quality Certification and/or Waste Discharge Requirements (Dredge/Fill). The application will be submitted to the Regional Water Board when the pre-construction notification is sent to the Corps.

The Regional Water Board controls the discharge of wastes to surface waters through the National Pollutant Discharge Elimination System (NPDES) permit process. Waste Discharge Requirements are established in NPDES permits to protect beneficial uses. An NPDES General Permit for Storm Water Discharges Associated with Construction Activities (General Permit) is required for any of the action alternatives. The General Permit requires preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP) to help identify the sources of sediment and other pollutants that would affect the quality of storm water discharges and to describe and ensure the implementation of Best Management Practices (BMPs) to reduce or eliminate sediment and other pollutants in storm water and non-storm water discharges.

California Office of Environmental Health Hazard Assessment

If elevated levels of mercury are found to occur in fish species that are commonly considered sport fish, the California Office of Environmental Health Hazard Assessment (OEHHA) will issue a health advisory recommending safe consumption levels for possibly contaminated fish. Safe consumption limits for fish of various species from various localities with known toxic contamination hazards are listed by the OEHHA (http://www.oehha.ca.gov/fish/general/99fish.html). If risks from consumption of contaminated fish are judged to be high, people are advised to consume no fish from those areas. Mercury toxicity poses higher risks to pregnant or nursing women and to children under age six, so warnings may be specifically addressed to these population groups.

Human health water quality criteria are numeric values that EPA believes will protect human health for pollutant concentrations in ambient waters and edible tissue. Because consumption of contaminated fish tissue is the primary route of human exposure to methylmercury, EPA expresses this water quality criterion as a fish tissue value rather than as a water column value. The EPA human health fish tissue

residue water quality criterion for concentrations of methylmercury in fish tissue is 0.3 milligrams methylmercury/kilogram fish (parts-per-million [ppm]) wet weight. The Food and Drug Administration (FDA) action level for commercial fish is 1.0 ppm. In 2003, the FDA revised its fish consumption advisory to equal the EPA standard. Black bass were collected from Trinity Lake in the Upper Trinity River watershed that exceeded these thresholds (May et al. 2002). It is thought that the inactive Altoona Mercury mine, which drains into the East Fork Trinity River above Trinity Lake, is a significant contributor of mercury to the lake.

In addition, a preliminary investigation of Trinity Lake and several streams and ponds upstream has revealed elevated levels of mercury in certain fish populations. As part of an on-going investigation of mercury impacts from historic gold and mercury mining in the Trinity River watershed, the USGS has conducted a screening study of mercury concentrations in several fish species. While the mercury levels found are sufficient to warrant a Health Notification, the fish sample group in individual water bodies is limited and more study is needed (Office of Environmental Health Hazard Assessment 2005).

Trinity County General Plan Goals and Objectives

The Trinity County General Plan contains goals and policies designed to guide the future physical development of the county, based on current conditions. No goals and policies relative to water quality issues specific to TRRP activities were identified in the General Plan (Trinity County 2001). The General Plan includes the Lewiston Community Plan (Trinity County 1986).

Lewiston Community Plan Goals and Objectives

The Lewiston Community Plan does not identify specific goals and objectives that relate to water quality.

Trinity County Water Quality Control Ordinance

The Trinity County Water Quality Control Ordinance establishes the necessity to ensure the water quality of watersheds and water supply areas in Trinity County and dictates that “no use, application, discharge, disposal of any polluting substance or any other controllable water quality activities may be initiated, undertaken, or maintained by any person if said use or activity results in a detectable discharge of polluting substances into waters of the state located in or flowing through the county” (Ordinance #1072, County Code Section 8.60.010-8.6-020).

Project Consistency with the Trinity County General Plan and Community Plans

This section compares the goals and objectives of the Proposed Action to the relevant local planning policies (i.e., Trinity County General Plan, Lewiston Community Plan) to determine if there are any inconsistencies.

The goals and objectives described in Chapter 1 are generally compatible with the applicable General Plan goals and policies summarized above. The overall goal of either the Proposed Action or Alternative 1 is to rehabilitate the sites so that they function in a manner that is closer to historic conditions (i.e., pre-Lewiston Dam).

3.5.3 Environmental Consequences/Impacts and Mitigation Measures

Methodology

Impacts on water quality were determined by analyzing whether the proposed modification of the physical features and biological conditions at the project sites would comply with Basin Plan objectives for the Trinity River.

Significance Criteria

The proposed project would result in significant adverse impacts if it would result in any of the following:

- violations of state or federal numerical water quality standards or state or federal narrative water quality objectives for construction activities;
- substantial degradation of water quality, such that existing beneficial uses are precluded specifically because of adverse water quality;
- violation of any waste discharge requirements and/or Section 401 Certification conditions;
- substantial alterations of the course of a stream or river in a manner that would result in substantial erosion or siltation onsite or offsite; or
- violation of site-specific temperature objectives for the Trinity River contained in the Water Quality Control Plan for the North Coast Region (North Coast Regional Water Quality Control Board, 1993, as amended) and included as Table 3.5-3 of this EA/Draft EIR.

Impacts and Mitigation Measures

Table 3.5-4 summarizes the potential water quality impacts resulting from construction and operation of the project.

Table 3.5-4. Summary of Water Quality Impacts for the No-Action Alternative, Proposed Action, and Alternative 1

No-Action Alternative	Proposed Action	Alternative 1	Proposed Action with Mitigation	Alternative 1 with Mitigation
Impact 3.5-1.	Construction of the project could result in short-term, temporary increases in turbidity and total suspended solids levels during construction.			
NI	S	S	LS	LS
Impact 3.5-2.	Construction of the project could result in short-term, temporary increases in turbidity and total suspended solids levels following construction.			
NI	S	S	LS	LS
Impact 3.5-3.	Construction of the project could potentially cause contamination of the Trinity River from hazardous materials spills.			
NI	S	S	LS	LS

Table 3.5-4. Summary of Water Quality Impacts for the No-Action Alternative, Proposed Action, and Alternative 1

No-Action Alternative	Proposed Action	Alternative 1	Proposed Action with Mitigation	Alternative 1 with Mitigation
Impact 3.5-4	Construction and maintenance of the project could result in increased stormwater runoff and subsequent potential for erosion.			
NI	LS	LS	N/A[1]	N/A[1]
Impact 3.5-5	Construction and maintenance of the project could result in the degradation of Trinity River beneficial uses identified in the Basin Plan.			
NI	S	S	LS	LS

Notes:
LS = Less than Significant S = Significant SU = Significant Unavoidable
NI = No Impact B = Beneficial N/A = Not Applicable
[1]Because this potential impact is less than significant, no mitigation is required.

Impact 3.5-1: Construction of the project could result in short-term temporary increases in turbidity and total suspended solids levels during construction. ***No Impact for the No-Action Alternative; Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, no construction-related short-term increases in turbidity or total suspended solids levels would occur because the project would not be constructed.

Proposed Action

Under the Proposed Action, the activities described in Chapter 2 would temporarily increase turbidity and total suspended solids in the Trinity River. River's edge and in-river construction activities will be staged to minimize the potential turbidity effects. During in-channel construction activities, however, increases in turbidity levels could occur as a result of excavation of alluvial material, including the material currently stored behind the weir at R-1 SO. The removal of grade control features to enhance point bar development will result in short-term increases in turbidity levels as this material is removed and/or redistributed within the channel. Fine sediments may be suspended in the river for several hours following construction activities. The extent of downstream sedimentation would be a function of the size and mobility of the substrate. For example, fine-grained sediments like silts and clays can be carried several thousand feet downstream of construction zones, while larger-sized sediments like sands and gravels would tend to drop out of the water column within several feet of the construction zone.

Low-flow channel crossings adjacent to IC-2 DG and IC-5 DG (X-1 DG and X-2 DG) would provide access to river right activity areas at the Dark Gulch Site. Low-flow channel crossings will be constructed of clean gravel-sized alluvial materials. Size criteria for alluvial materials that would be used in the construction of low-flow channel crossings are defined further in Chapter 3.6. Placement of alluvial fill

materials could temporarily increase turbidity and suspended materials during and immediately following construction of the crossing. Removal and distribution of alluvial materials upon connection of low-flow channels with the Trinity River could also increase turbidity and suspended materials during and immediately following excavation.

Collectively, the activities included in the Proposed Action could result in short-term increases in turbidity and suspended solids concentrations in the water column that could potentially violate the Basin Plan objectives for turbidity in the Trinity River. Short-term increases in turbidity and suspended solids levels during construction would be a significant impact.

Alternative 1

Temporary increases in turbidity or total suspended solids levels associated with construction of Alternative 1 would likely be higher than under the Proposed Action, particularly from the activities proposed at R-1 SO and R-3 DG. A larger part of the weir at the bottom of the R-1 SO area would be modified to enhance the functional value of the low-flow side channel, which could result in the remobilization of more fine-textured sediment than under the Proposed Action. At the Dark Gulch site, Alternative 1 would include construction of large floodplain and side channel features within the R-3 DG area. The excavation of this area would provide an on-site source of coarse sediment available for processing. The potential for increases in turbidity and suspended sediments associated with grading and the installation of the crossings (including the bridge over the side channel) would be higher than under the Proposed Action due to the larger area that would be disturbed.

Similar to the Proposed Action, rehabilitation activities would be staged to minimize potential turbidity effects. These activities could result in short-term increases in turbidity and suspended solids concentrations in the water column that could potentially violate the Basin Plan objectives for turbidity in the Trinity River. Short-term increases in turbidity and suspended solids levels during construction would be a significant impact.

Mitigation Measures

No-Action Alternative

Since no significant impact was identified, no mitigation is required.

Significance after Mitigation

N/A

Proposed Action and Alternative 1

1a Turbidity increases associated with project activities shall not exceed the water quality objectives for turbidity in the Trinity River basin. Turbidity levels are defined in nephelometric turbidity units (NTUs). The current threshold for turbidity levels in the Trinity River, as listed in the Basin Plan for the North Coast Region (2001), is summarized below.

- Turbidity shall not be increased by more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof.

1b To ensure that turbidity levels do not exceed the threshold listed above during river's edge project construction activities, Reclamation or its contractor shall monitor turbidity levels 50 feet upstream and 500 feet downstream of the point of river's edge construction activities. At a minimum, field turbidity measurements shall be collected on a daily basis during river's edge construction (within 10 feet of the water line). Whenever a visible increase in turbidity is observed, monitoring frequency shall be a minimum of every 2 hours during this period.

- If the grab sample results indicate that turbidity levels exceed the thresholds established in the Basin Plan, actions shall be implemented immediately to reduce and maintain turbidity at or below the thresholds. Potential remedial actions include temporarily halting construction activities and implementation of additional Best Management Practices (BMPs) until turbidity is at or below the thresholds.

1c Fill gravels used on the streambeds, stream banks, and river crossing will be composed of washed, spawning-sized gravels from a local Trinity Basin source. Gravel will be washed to remove any silts, sand, clay, and organic matter and will be free of contaminants such as petroleum products. Washed gravel will pass Caltrans cleanliness test #227 with a value of 85 or greater.

1d Reclamation or its contractor shall prepare and implement a Storm Water Pollution Prevention Plan (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 shall be adequate to minimize sediment inputs into the Trinity River until vegetation re-growth occurs. All BMPs and 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 sites with erosion control properly installed and maintained. Excavated and stored materials will be staged in stable upland sites. All applicable erosion control standards will be required during stockpiling of materials.

1e To minimize the potential for increases in turbidity and suspended sediments entering the Trinity River as a result of the new access roads, Reclamation or its contractor shall implement the following protocols. (To ensure that turbidity levels do not exceed the thresholds listed in 1a, see measure 1b listed above).

- Keep bare soil to the minimum required by designs. Erosion control devices/measures shall be applied to areas where vegetation has been removed 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 to gentler sloping areas where sediment can settle out.
- Disconnect and disperse flow paths, including roadside ditches, that might otherwise deliver fine sediment to stream channels.

- Decompact or rip floodplain areas so that surfaces are permeable and no surface water runoff occurs.

Significance after Mitigation

Less than significant

Impact 3.5-2: Construction of the project could result in short-term temporary increases in turbidity and total suspended solids levels following construction. ***No Impact for the No-Action Alternative; Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, no short-term increases in turbidity or total suspended solids levels would occur following construction because the project would not be constructed.

Proposed Action

The riverine activities described in Chapter 2 emphasize in-channel excavation and placement of alluvial materials; selective removal of fossilized riparian berms (berms that are anchored by extensive woody vegetation and consolidated sand deposits) and reconnecting the river's floodplain with the river at intermediate flows (between 450 and 6,000 cfs). The riparian berms developed after the TRD was completed as a result of changes in the flow and sediment regimes, particularly loss of scouring associated with peak flows. Modification or reconstruction of these alluvial features at strategic locations will promote the river processes necessary for the restoration and maintenance of Trinity River alternate bars, thereby enhancing salmonid rearing habitat.

Implementing the Proposed Action could increase turbidity and total suspended solids in the river and on the floodplain following construction. Following construction, increases in turbidity levels could occur when newly excavated devegetated areas are exposed to elevated river stages during high river flows. Fine sediments may be suspended in the river for several hours following such exposure and erosion. The extent of downstream sedimentation would be a function of the rainfall intensity and/or instream flow velocity, as well as the particle size of exposed sediments. Lower intensity rainfalls would be unlikely to mobilize fine sediments because the precipitation would be absorbed. If fine sediments are mobilized by streamflow over newly exposed streambank areas, they could be carried several thousand feet downstream of the construction zones, while larger sized sediments such as sands and gravels would tend to drop out of the water column within several feet of the construction zone.

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

Alternative 1

Under Alternative 1, the expansion of activities, particularly at R-1 SO and R-3 DG, would increase the surface area subject to erosional processes by about 17 acres, primarily within the R-3 DG area. Short-term increases in turbidity and suspended solids levels following construction would be a significant impact.

Mitigation Measures

No-Action Alternative

Since no significant impact was identified, no mitigation is required.

Significance after Mitigation

N/A

Proposed Action and Alternative 1

2a Turbidity increases associated with project activities shall not exceed the water quality objectives for turbidity in the Trinity River basin. Turbidity levels are defined in nephelometric turbidity units (NTUs). The current threshold for turbidity levels in the Trinity River, as listed in the Basin Plan for the North Coast Region (2001), is summarized below.

- Turbidity shall not be increased by more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits or waiver thereof.

2b To ensure that turbidity levels do not exceed the threshold listed above following construction, Reclamation or its contractor shall monitor turbidity and total suspended solids during and after representative rainfall events to determine the effect of the project on Trinity River water quality. At a minimum, field turbidity measurements shall be collected whenever a visible increase in turbidity is observed.

- If increases in turbidity and total suspended solids are observed as a result erosion from access roads, then field turbidity measurements shall be collected 50 feet upstream of a point adjacent to the end of the access road and 500 feet downstream.
- If the grab sample results indicate that turbidity levels exceed the established thresholds identified in the Basin Plan, the Regional Water Qulaioty Control Board will be notifed. The need to implement erosion control measures for turbidity that is expected to result from overland river flows (versus surface run-off) will be evaluated with Regional Water Quality Control Board staff to determine if remedation measures are needed.

2c To reduce the potential for the new access roads to continually contribute soil materials to the Trinity River following project construction, thereby increasing turbidity and total suspended solids in the river, the new access roads shall 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.

Significance after Mitigation

Less than significant

Impact 3.5-3: Construction of the project could cause contamination of the Trinity River from hazardous materials spills. ***No Impact for the No-Action Alternative; Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, no construction-related contamination of the Trinity River from spills of hazardous materials would occur because the project would not be constructed.

Proposed Action and Alternative 1

Construction staging activities could result in a spill of hazardous materials (e.g., oil, grease, gasoline, solvents) into the Trinity River. In addition, operation of construction equipment within or adjacent to the river would increase the risk of a spill of hazardous materials into the river (e.g., from leaking of fluids from construction equipment). Spills of hazardous materials into or adjacent to the Trinity River could degrade water quality the Trinity River and have deleterious effects on salmonids of any life stage in close proximity to construction activities. Section 3.15, Hazardous Materials, evaluates potential effects associated with exposing the public to hazards associated with the transportation and use of hazardous materials at the project sites. Construction activities could result in a spill of hazardous material, which would be a significant impact.

Mitigation Measures

No-Action Alternative

Since no significant impact was identified, no mitigation is required.

Significance after Mitigation

N/A

Proposed Action, Alternative 1, and Alternative 2

3a Reclamation shall require that the contractor prepare and implement a spill prevention and containment plan in accordance with applicable federal and state requirements.

3b Reclamation shall include in the construction contract documents a requirement that any construction equipment that would come in contact with the Trinity River will need to 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 must be adequately treated prior to discharge if that is the desired disposal option.

3c Reclamation shall include in the construction contract documents a requirement that hazardous materials, including fuels, oils, and solvents, not be stored or transferred within 150 feet of the active Trinity River channel. Areas for fuel storage, refueling, and servicing will be located at least 150 feet

from the active river channel. In addition, the construction contractor shall be responsible for maintaining spill containment booms 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.

Significance after Mitigation

Less than significant

Impact 3.5-4: Construction of the project could result in increased stormwater runoff and subsequent potential for erosion. ***No Impact for the No-Action Alternative; Less-than-Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, there would be no increases in stormwater runoff and the potential for subsequent erosion because the project would not be constructed.

Proposed Action and Alternative 1

Implementation of the Proposed Action and Alternative 1 would not result in an increase in impervious surface areas (e.g., structures and roadway approaches) that could subsequently generate additional stormwater runoff and potential for erosion. Decompaction and ripping of floodplain areas is expected to eliminate surface runoff during the first year after construction. New roads under these alternatives would be located on gentle terrain and would require minimal grading. The impact associated with runoff and erosion would, therefore, be less than significant.

Mitigation Measures

No-Action Alternative, Proposed Action, and Alternative 1

Since no significant impact was identified, no mitigation is required.

Significance after Mitigation

N/A

Impact 3.5-5: Construction and maintenance of the project could result in the degradation of Trinity River beneficial uses identified in the Basin Plan. ***No Impact for the No-Action Alternative; Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, no degradation of Trinity River beneficial uses would occur because the project would not be constructed.

Proposed Action and Alternative 1

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

- sediment
- turbidity
- suspended material
- toxicity
- settleable material
- chemical constituents

The magnitude of these impacts would be higher for Alternative 1 than for the Proposed Action, primarily due to the expansion of the activities at R-1 SO and R-3 DG. Under either action alternative, the impacts associated with the placement and deconstruction of the low-flow channel crossings (i.e., X-1 and X-2), combined with the construction of new road access to the activity areas, would result in significant impacts.

Mitigation Measures

No-Action Alternative

Since no significant impact was identified, no mitigation is required

Proposed Action and Alternative 1

The significance of impacts related to sediment, settleable materials, suspended materials, turbidity, and increased stormwater runoff and subsequent potential for erosion, as well as mitigation measures that would reduce the significance of these impacts are addressed under Impacts 3.5.1, 3.5.2, and 3.5.4. The significance of and mitigation for chemical constituents and toxicity impacts are addressed under Impact 3.5.3.

Significance after Mitigation

Less than significant

3.6 Fishery Resources

Fishery resources include fish populations, their habitats, and the harvest of those populations. This section discusses the existing environment of the Trinity River basin regionally and in a site-specific context with regard to native anadromous and resident fish and non-native fish.

The USFWS has determined that the lack of sufficient rearing habitat for juvenile salmonids is likely a primary factor in limiting the recovery of salmonid populations in the Trinity River (U.S. Fish and Wildlife Service and Hoopa Valley Tribe 1999). The Proposed Action is specifically designed to increase the abundance of rearing habitat for Trinity River juvenile salmonids by reconnecting the river with its floodplain.

3.6.1 Affected Environment/Environmental Setting

Regional Setting

Native Anadromous Fish Species

The native anadromous salmonid species of interest in the mainstem Trinity River and its tributaries are Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), and steelhead (*Oncorhynchus mykiss irideus)*. Of the three species, there are two spawning races of Chinook salmon (spring- and fall-run) and two spawning races of steelhead (winter- and summer-run). The life histories and fresh water habitat requirements of these species and their distinct spawning populations are described in Appendix G.

All anadromous species begin their life in fresh water, migrate to the ocean to rear and mature, and return to spawn in fresh water. Although the three species have generally similar life histories, they differ in the time of year they migrate and spawn, as well as when egg incubation typically occurs (Figure 3.6-1).

Adequate flows, water temperatures, water depths, and velocities; appropriate spawning and rearing substrates (e.g., riverbed gravels); and availability of instream cover and food are critical for the production of all anadromous salmonids. Spring-run Chinook salmon and summer-run steelhead also need long-term adult holding habitat in which pool size and depth, temperature, cover, and proximity to spawning gravel are important requirements. Newly emerged fry and juveniles of all species require rearing habitat with low velocities, open cobble substrate, and cool water temperatures. The emigration of smolts to the ocean and the immigration of spawning adults require adequately timed flows with the appropriate temperature, depth, and velocity.

Native non-salmonid anadromous species that inhabit the Trinity River basin include green sturgeon (*Acipenser medirostris*), white sturgeon (*Acipenser transmontanus*), and Pacific lamprey (*Lampetra tridentata*). These fish spend their early life stages in fresh water, migrate to the ocean for maturation, and return to their natal streams to spawn. Appendix G provides additional information on these species and their life stages. Information on native non-salmonid anadromous species residing in the Trinity River basin is very limited. However, the Klamath/Trinity River basin is known to contain the largest

spawning population of green sturgeon in California (Moyle 2002). In contrast, only a small run of white sturgeon is thought to occur.

Trinity River Restoration Program Goals

The 1983 EIS for the Trinity River Basin Fish and Wildlife Management Program (U.S. Fish and Wildlife Service 1983) documented the in-river spawner escapement goals and the Trinity River Salmon and Steelhead Hatchery (TRSSH) production goals developed by the CDFG. These spawner escapement goals were subsequently adopted by the TRRP. The in-river goals represent the total number of naturally produced adult spawners (excluding jacks) for the Trinity River basin below Lewiston Dam and exclude fish caught (Table 3.6-1). The hatchery goals represent numbers of adult fish needed by the hatchery, exclusive of fisheries for Chinook and coho salmon. An undefined in-river harvest is included in the restoration program goals for steelhead.

Table 3.6-1. Trinity River Restoration Program Spawner Escapement Goals

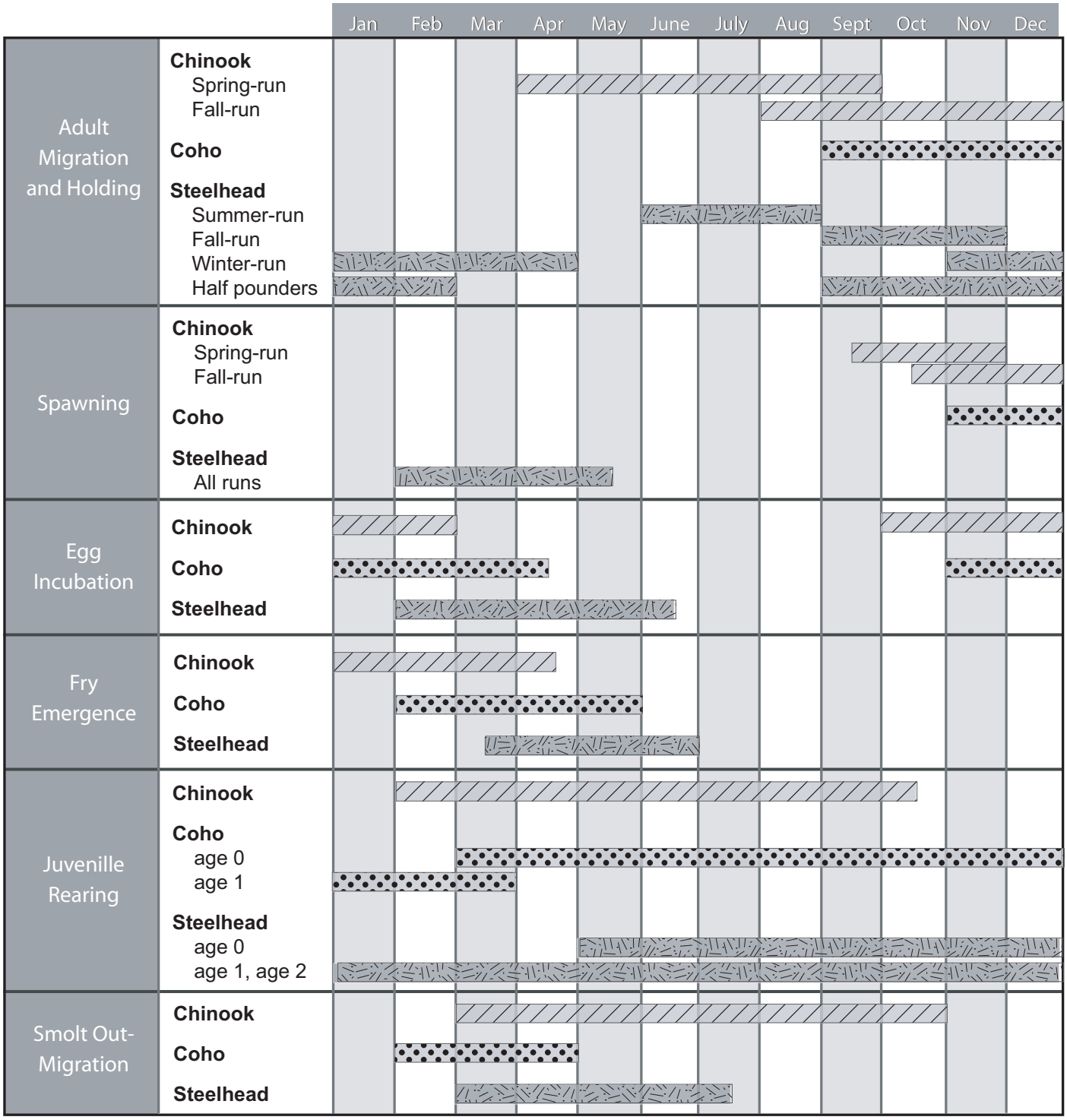
Species	In-river Spawner Goals	Hatchery Goals	Total
Fall-run Chinook	62,000	9,000	71,000
Spring-run Chinook	6,000	3,000	9,000
Coho	1,400	2,100	3,500
Steelhead	40,000	10,000	50,000

Source: U.S. Fish and Wildlife Service et al. 2000

In-river spawner escapement is the number of fish returning to spawning grounds, which consists of two subgroups: naturally produced fish and hatchery-produced fish. However, hatchery-produced fish are not considered to contribute toward the in-river spawner escapement goals of the TRRP, although their offspring do (i.e., if hatchery-produced fish spawn in-river and their offspring survive to return to spawn, these offspring are naturally produced by definition). The best available data indicate that large numbers of hatchery-produced fish spawn in-river. Typically, more fish spawn in-river than are spawned at the hatchery, and fewer emergent fry survive to return as adults. Assuming that hatchery- and naturally produced fish are subject to the same environmental conditions after the hatchery releases its fish (typically as smolts), the relatively low returns of naturally produced fish are indicative of lower survival rates of early fresh water life stages (i.e., eggs, fry, and/or juvenile fish), compared to hatchery-reared fish. This indicates that the quality or availability of rearing habitat is limiting the population.

Fall-Run Chinook Salmon Population

Average in-river escapement of naturally produced fish (Table 3.6-2) was calculated by averaging CDFG's annual in-river spawner escapement above Willow Creek weir (with the exception of spring-run Chinook salmon that were estimated above Junction City weir) for the years of given data (excluding grilse) multiplied by the percentage of that population estimated to be "natural spawners" reported in the Trinity River Mainstem Fishery Restoration EIS/EIR (U.S. Fish and Wildlife Service et al. 2000).



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North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-1
Trinity River Anadromous Salmonid Life History Patterns

Although annual pre-dam escapement data are sporadic, estimates of the number of fall-run Chinook salmon adults in the Trinity River prior to 1964 above the North Fork ranged from 19,000 to 75,600 and averaged 45,600 for the 5 years of available data. Comparisons between pre- and post-dam averages are difficult because (1) few pre-dam estimates exist; (2) pre-dam estimates typically represent fish spawning in the river above the North Fork, while post-dam estimates are above Willow Creek; and (3) post-dam estimates are only for the river below Lewiston Dam and are confounded by large numbers of hatchery-produced fish that spawn in natural areas (recent changes have been enacted to reduce competition of hatchery-produced fish with naturally produced spawners). Comparisons between pre-dam escapements and the TRRP in-river spawner escapement goals are not equitable because the in-river goals represent the numbers of fish that could be produced in the entire Trinity River basin below Lewiston Dam once successful restoration is completed, whereas the pre-dam numbers are sporadic and limited to the Trinity River above the North Fork.

Table 3.6-2. Comparison of TRRP In-river Spawner Escapement Goals to Average Numbers of Naturally Produced Fish

Species	TRRP In-river Spawner Escapement Goals	Average In-river Escapement of Naturally Produced Fish	Years of Available Data	Percent of TRRP Goal Met
Fall-run Chinook	62,000	11,700	1982–2006	19
Spring-run Chinook	6,000	4,115	1982–2004	69
Coho	1,400	304	1982-2004	22
Steelhead	40,000	2,441	1992–1996/ 2002–2004	6

Source: U.S. Fish and Wildlife Service et al. 2000, (Sinnen et al. 2006) and California Department of Fish and Game, unpublished data.

Yearly estimates of fall-run Chinook salmon runs in the Trinity River basin have been made by CDFG since 1978 as a part of the Klamath Basin Fall Chinook Salmon Spawning Escapement Estimate. Post-dam in-river spawner escapement estimates for the Trinity River basin upstream of Willow Creek weir from 1982 through 1997 averaged 34,670 fall Chinook salmon, of which an average of 22,440 fish are hatchery-produced fish. Naturally produced fish have ranged from 10 to 94 percent of in-river spawner escapements, with an average of 47 percent. Applying this proportion to escapement surveys from 1982 through 2005, the Trinity River below Lewiston produced an average of 11,700 naturally produced fall-run Chinook spawners, which is approximately 19 percent of the TRRP goal of 62,000 naturally produced fall-run Chinook salmon (Table 3.6-2).

In September 2002, a large fish die-off occurred in the Klamath River. A conservative estimate of the total number of fish that died during the incident is 34,056, of which approximately 98.4 percent were adult anadromous salmonids. Out of the 33,527 anadromous salmonids estimated to have succumbed during this event, 97.1 percent were fall-run Chinook salmon. The Klamath River Technical Advisory Team (KRTAT) estimated that 21.7 percent of the Chinook were of hatchery origin, with 12.7 percent being of Trinity River Hatchery origin (U.S. Fish and Wildlife Service 2003). The fish die-off

disproportionately affected fall-run Chinook salmon, resulting in subsequent reduced production (CDFG 2004).

Spring-Run Chinook Salmon Populations

Fisheries investigations conducted from 1942 through 1946, which was prior to the construction of the Trinity and Lewiston dams, identified spring-run Chinook salmon populations in the Trinity River above the North Fork Trinity River confluence (Moffett and Smith 1950). In 1955, an in-river spawner escapement estimate of 3,000 spring-run Chinook salmon upstream of Lewiston was reported by CDFG (U.S. Fish and Wildlife Service et al. 2000). Escapement surveys for the years 1982 through 2000 (excluding 1983 and 1995 because surveys were not conducted in those years) indicate that an average of 65 percent of the in-river spawner escapement of Trinity River spring-run Chinook salmon was hatchery produced (Figure 3.6-2). Conversely, only 35 percent were naturally produced. For the years 1982 through 2004 (excluding 1983 and 1995 as noted above), the Trinity River below Lewiston Dam produced an average of 4,115 spring-run Chinook salmon.

Coho Salmon Populations

Trinity River coho salmon populations were historically smaller than Chinook salmon populations. Pre-dam estimates for coho salmon spawning above Lewiston were 5,000 fish (U.S. Fish and Wildlife Service et al. 2000) Coho salmon access to high-quality habitat with year-round cold, clear flows was blocked by construction of the TRD (U.S. Fish and Wildlife Service and Hoopa Valley Tribe 1999). Because coho salmon generally rear for at least one full year in freshwater, seasonally warm water temperatures occurring in much of the mainstem Trinity River during summer prior to TRD construction limited mainstem coho production in downstream reaches (Moffett and Smith 1950). Total run size for Trinity River coho salmon below Lewiston Dam from 1973 through 1980 averaged 3,300 adults (U.S. Fish and Wildlife Service et al. 2000). This estimate includes hatchery production. The most recent estimates for coho salmon spawning in the Trinity River upstream of the Willow Creek weir (1991–1995) indicate that naturally produced coho salmon average 200 fish, ranging from 0 to 14 percent of the total annual escapement (an annual average of 3 percent). Current estimates for coho salmon spawning in the Trinity River upstream of the Willow Creek weir (1982–2004) indicate that naturally produced coho salmon average about 304 fish, which is approximately 22 percent of the TRRP goal of 1,400 (Table 3.6-2).

The majority of coho salmon spawning in the Trinity River are produced by the hatchery, and, based on the levels of in-river naturally-produced coho salmon, NMFS has concluded that (1) current coho salmon runs are largely composed of hatchery-produced adults; (2) the remaining naturally produced stocks are, and have been, heavily influenced by hatcheries (such as from occasional inter-basin stock transfers), and virtually all of the naturally spawning coho salmon in the Trinity River, particularly, are first generation hatchery fish; and (3) the remaining natural coho salmon populations in the Klamath/Trinity River system are likely incapable of sustaining themselves (National Marine Fisheries Service 1997).

Between 1997 and 2002, hatchery fish constituted an estimated 89 percent to 97 percent of the fish (adults plus grilse) returning to the Willow Creek weir in the lower Trinity River (Sinnen 2002). Outmigrant trapping conducted on the lower Trinity River indicates that marked TRH fish made up 91 percent, 97

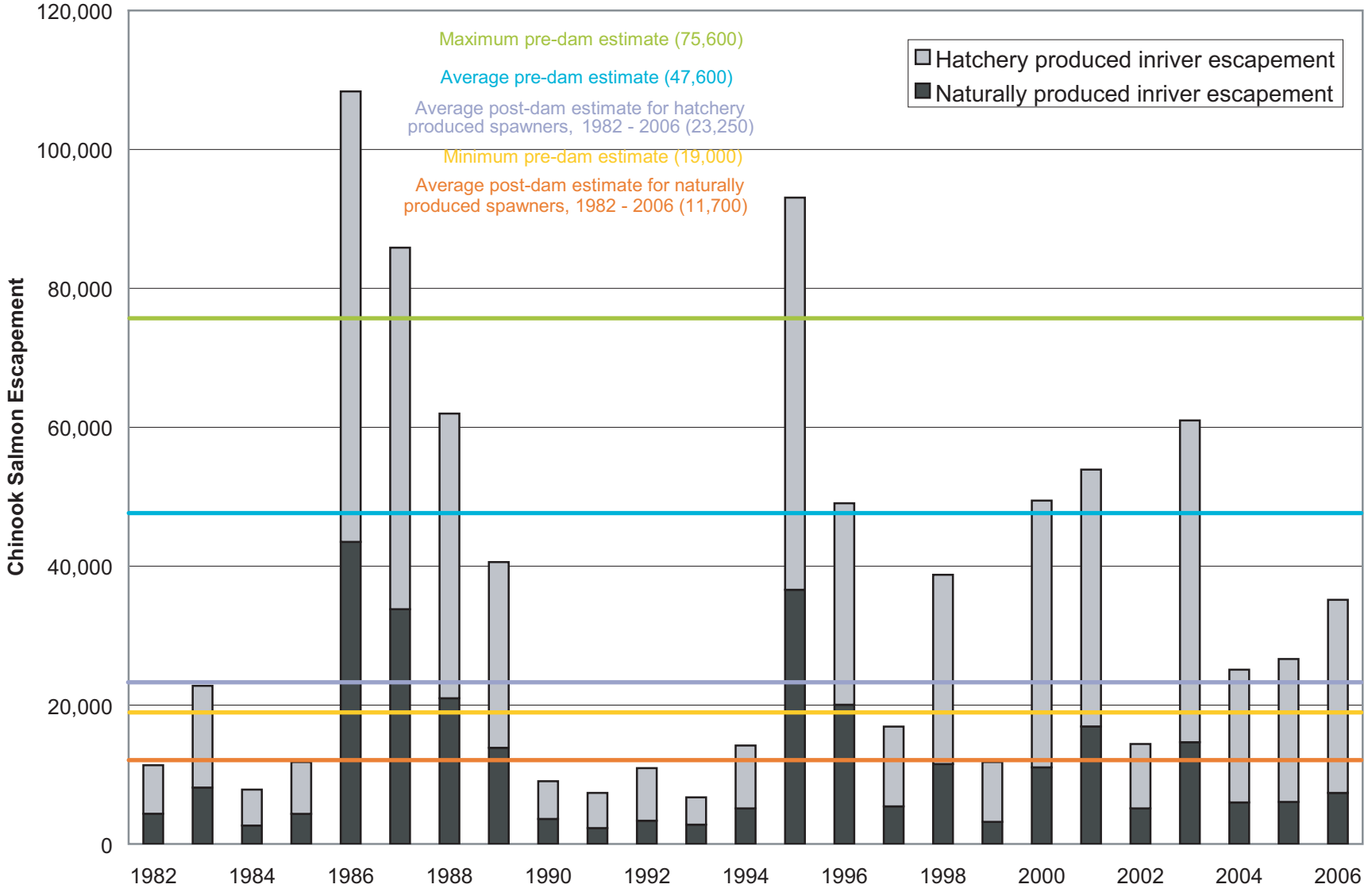

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Figure 3.6-2
Post-TRD Fall-run Chinook Salmon Spawner Escapements
(Source: USFWS et al. 2001; CDFG unpublished data)

percent, and 65 percent of the catch in years 1998, 1999, and 2000, respectively (Yurok Tribal Fisheries Program 2002). Additionally, it appears that a significant fraction of the naturally produced fish is likely the progeny of hatchery strays.

By subtracting the number of hatchery and naturally produced fish returning to TRH from counts at Willow Creek weir, Sinnen (2002) estimated that hatchery fish made up between 76 percent and 96 percent of fish that spawned within the Trinity River system upstream of the weir from 1997 to 2002. The lack of natural production within the Trinity Basin, however, remains a significant concern (Good, Waples, and Adams 2005).

NMFS' updated status review of federally listed west coast salmon and steelhead concluded that none of the new data reviewed contradict conclusions that the Biological Review Team reached previously in 1995 and 1997. Coho salmon populations continued to be depressed relative to historical numbers, and strong indications exist that breeding groups have been lost from a significant percentage of streams within their historical range (Good, Waples, and Adams 2005).

Since 2000, however, run size estimates for coho salmon in the Trinity River have increased in comparison to the depressed estimates through the 1990s. Run size estimates for Trinity River coho salmon upstream of Willow Creek weir were 1.2 times the long-term average of 17,778 (1977–2004) in 2004 (Sinnen et al. 2006). Additionally, average run-size estimates for Trinity River coho salmon between 2000 and 2004 are more than double what they were for the previous 10-year period. Recent increases in coho salmon populations can be attributed to a number of factors, including, but not limited to, favorable ocean conditions, decreased commercial catch, recent water years with average to above average rainfall, and recent habitat improvements and protection.

Coho salmon were also affected by the Klamath fish die-off in 2002, but not nearly to the extent of Chinook salmon. One percent of the adult anadromous salmonids that died in the course of the die-off were coho salmon. Of that one percent, approximately 92 percent were of Trinity River Hatchery origin (U.S. Fish and Wildlife Service 2003).

Steelhead

Adult summer-run steelhead hold primarily in the headwaters of mainstem Trinity tributaries during the summer months and spawn during the following late winter/early spring. Some Trinity River steelhead return to the river 4 to 6 months after first emigrating to the ocean. Upon their return, these fish, known as "half-pounders," feed in the river but do not spawn. They subsequently return to the ocean before returning to spawn. When in the "half-pounder" phase, these fish are not counted as part of the escapement, but they are important to the sport fishery.

Pre-dam winter-run steelhead spawner escapements in the Trinity River and its tributaries upstream of Lewiston have been estimated to range from 6,900 to 24,000 adults. From 1992 through 1996 and again for years 2002 and 2004, the California Department of Fish and Game estimated run sizes for wild and hatchery-produced steelhead upstream of Willow Creek weir. The estimated total steelhead escapement of the naturally produced fall/early-winter portion of the winter run upstream of the Willow Creek weir

averaged 2,441 fish (surveys from fall and early winter period only). This average represents approximately 6 percent of the TRRP in-river spawner escapement goal of 40,000 adult steelhead (Table 3.6-2). Estimates for the remaining winter portion of the escapement are unavailable because winter river flows render fish-counting weirs inoperable.

Pre-dam summer-run steelhead spawner escapements for the Trinity River upstream of Lewiston were estimated to average 8,000 adults annually. Recent (1985–2002) post-dam CDFG/USFS estimates have ranged from 20 to 2,575 adult summer-run steelhead returning to the mainstem Trinity River and tributaries (California Department of Fish and Game 1997, unpublished data; U.S. Forest Service 2002, unpublished data). The TRRP escapement goals do not establish specific targets for summer-run steelhead in the Trinity River, nor does the TRSSH mitigate specifically for summer-run steelhead.

Trinity River Salmon and Steelhead Hatchery

The TRSSH is operated by CDFG and funded by Reclamation to mitigate for the loss of salmonid production above Lewiston Dam resulting from the TRD. Concerns regarding the potential impacts of hatchery operations on naturally produced populations of the Klamath River basin (including the Trinity River) prompted the CDFG to revise hatchery operations in 1996 to minimize future impacts. Additionally, further review of hatchery operations conducted during 1999 and 2000 resulted in recommendations for (1) periodic evaluation of coho salmon production levels required to support recovery of Southern Oregon/Northern California Coast Evolutionarily Significant Unit (SONCC ESU) coho salmon, and (2) evaluation of spawning and brood stock selection practices for maintaining genetic separation of spring- and fall-run Chinook salmon (California Department of Fish and Game and National Marine Fisheries Service 2001).

Fish Harvest

The harvest of Klamath River basin (including the Trinity River basin) fall-run Chinook salmon is managed jointly by the CDFG, Oregon Department of Fish and Wildlife, California Fish and Game Commission, Yurok Tribe, HVT, NMFS, and U.S. Bureau of Indian Affairs (BIA). The Pacific Fishery Management Council (PFMC) and the Klamath Fishery Management Council (KFMC) are allocation forums for the ocean and ocean/in-river fisheries, respectively. The mixed-stock ocean population is harvested by commercial and sport fisheries and the in-river population is harvested by tribal (ceremonial, subsistence, and commercial) and sport fisheries. Chinook salmon harvest (both fall-run and spring-run) includes both naturally produced and hatchery-produced fish. Commercial and sport harvest of coho salmon has been incrementally restricted in California ocean and inland waters since 1994, resulting in statewide harvest prohibitions within the last 5 years, including barbless hooks and "catch and release only." The steelhead is rarely caught in the ocean commercial and sport fisheries, but is harvested by the in-river tribal and sport fisheries. Historically, Klamath/Trinity River Chinook and coho salmon populations have been harvested in the ocean from Santa Barbara County, California, to the Oregon/Washington border. Ocean harvest of naturally-produced salmon may have been sufficient in the late 1970s to cause declines in Klamath River basin (including Trinity River) populations, but, based on the best available data, fall-run Chinook salmon harvest management restrictions implemented since 1986 have decreased harvest impacts to levels believed to be sustainable.

Habitat Conditions

Construction and operation of the TRD, combined with watershed erosion, large-scale gold dredging, and other human-caused disturbances, have resulted in major changes in habitat conditions in the Trinity River. Factors that have resulted in adverse effects on fish habitat include:

- obstruction to river reaches upstream of the TRD (Lewiston Dam);
- changes to quantity and timing of flows;
- changes in channel geomorphology;
- changes in substrate composition caused by the addition of fine sediments and restriction of gravel recruitment; and
- changes in water temperature.

These factors are addressed in other sections of this EA/Draft EIR, specifically Section 3.3, Geology, Fluvial Geomorphology, and Soils; Section 3.4, Water Resources; and Section 3.5, Water Quality. The relationship between these factors and fish are summarized in the following paragraphs.

The TRD dams blocked access to 59 miles of Chinook salmon habitat, 109 miles of steelhead habitat, and an undetermined amount of coho salmon habitat (U.S. Fish and Wildlife Service 1994). Much of this habitat is thought to have been prime spawning and rearing habitat. In the case of the Chinook salmon, it represented about 50 percent of the suitable spawning habitat in the upper Trinity River basin. As early as 1980, the overall decline in spawning habitat was estimated at 80 to 90 percent (U.S. Fish and Wildlife Service 1980). Furthermore, the blocking of salmon access to upstream reaches greatly reduced the diversity of habitats available to salmon in the Trinity River.

For the first 21 years of TRD operations (1964 to 1985), Lewiston Dam releases to the Trinity River averaged only 21 percent of the natural river inflow. The reduction in flows led to a reduction in habitat and declining quality in the remaining habitat. For example, spawning habitat losses in the mainstem Trinity River below the Grass Valley Creek confluence have been estimated to be 80 percent in the first 2 miles and up to 50 percent overall in the 6 miles downstream of that confluence (U.S. Fish and Wildlife Service 1994).

The altered patterns of fluvial geomorphic processes in the upper Trinity River have resulted in a reduction in the number of alternate gravel bar sequences with a resultant change in substrate quality. Important salmonid habitats associated with alternate bars include pools that provide cover from predators and cool resting places for juveniles and adults; gravelly riffles where adults typically spawn; open gravel/cobble bars that create shallow, low-velocity zones important for emerging fry; and slack-water habitats for rearing juveniles.

Changes in substrate composition occur in conjunction with upland and riverine processes. The construction and operation of the TRD have modified the sediment regime of the Trinity River below Lewiston Dam. Fine sediment fills in spaces between gravels and cobbles, which impedes water percolation through the river substrates, degrading and reducing available spawning habitats. Sedimentation of spawning areas can impede intragravel flow (which is important for delivering oxygen

and carrying away metabolic waste products) to incubating eggs, as well as create an impenetrable barrier that prevents the emergence of salmon sac-fry from their gravel nest. Accumulation of fine sediments can also decrease the amount of space between gravel and cobble, thereby decreasing the amount of available habitat for over wintering juvenile coho salmon and steelhead that "burrow" into the substrate. Sedimentation may also decrease aquatic invertebrate production and diversity, thereby limiting a primary food source for juvenile salmonids.

The thermal environment of the Trinity River has also changed as a combined result of the construction and operation of the TRD and the subsequently altered geomorphic patterns of the river downstream. The dams blocked access to the upstream river reaches that are dominated by snowmelt runoff and remain cool throughout the year. Prior to the dam, these areas provided important juvenile rearing and adult holding habitats for salmonids when the majority of the lower mainstem habitats (i.e., below Lewiston Dam) had likely become too warm. The upstream tributaries contributed snowmelt runoff and cool temperatures throughout the spring and early summer that aided smolt emigration through much of the mainstem. Because the habitat in the upper river is now blocked by the TRD and much of the snowmelt is retained in the TRD reservoirs, it is necessary to maintain artificially cooler temperatures below the dam than existed prior to the dam. In other words, the mainstem below the dam must now function thermally like the upstream reaches and tributaries for anadromous salmonids.

Habitat Restoration Projects

Since the early 1980s, the Trinity River Basin Fish and Wildlife Restoration Program has conducted a variety of restoration activities in the mainstem Trinity River and its tributaries. These activities include watershed rehabilitation and habitat enhancement work within the tributaries, and dam construction and channel dredging in Grass Valley Creek to decrease the amount of fine sediment entering the mainstem Trinity River. Restoration activities in the mainstem Trinity River have included coarse sediment (spawning gravel) supplementation, pool dredging to remove fine sediment and restore valuable holding habitat and construction of several channel rehabilitation projects (side channels and bank rehabilitation of point bars). In late fall 2005, the TRRP completed the Hocker Flat demonstration project, which was the first mechanical channel rehabilitation project stemming from the TRRP ROD. Construction on the Canyon Creek Suite of Rehabilitation Sites (which includes the sites named Conner Creek, Valdor Gulch, Elkhorn, and Pear Tree Gulch) was completed in late summer/autumn 2006, and construction for the Indian Creek Restoration Site began in July 2007.

Completion of the Trinity and Lewiston cams in 1964 blocked migratory fish access to aquatic habitat upstream of Lewiston Dam and eliminated coarse sediment transport from over 700 square miles of the upper watershed. The lack of coarse sediment transport reduced the quantity and quality of gravel-sized material available for salmonid spawning and rearing in the mainstem Trinity River. The Preferred Alternative in the 2000 ROD included a sediment management component that called for gravel supplementation in the Trinity River. The FEIS identified two sites that would require immediate coarse sediment augmentation for spawning purposes. The two sites include a 1,500-foot reach immediately downstream of Lewiston Dam (approximately 0.2 mile up-river of SO activity areas) and a 750-foot reach immediately upstream of the USGS cableway (CW activity areas) at Lewiston (U.S. Fish and Wildlife

Service et al. 1999). In summer 2003, 3,000 tons of ½- to 5-inch diameter gravel was placed at the cableway. In summer 2006, 2,500 tons of ½- to 5-inch diameter gravel was placed downstream of the TRSSH. The purpose of these projects was to supplement coarse sediment in the Lewiston Dam reach. The work also included channel manipulations to about 1,800 linear feet of the mainstem Trinity River, beginning 400 feet downstream of Lewiston Dam, in accordance with the design concepts developed by the University of California, Davis, and approved by the TMC.

During summer 2007 (August–September 15, 2007), an additional 6,500 tons of 3/8- to 4-inch diameter gravel were added within the 1,800 linear feet downstream of the Lewiston Dam. Addition of this material completed the 2006 STNF Hatchery Coarse Sediment Project. Approximately 2,500 tons of gravel has been stockpiled at the diversion pool (C-3 SO for placement at IC-3 SO), and 1,000 tons has been placed at the Sawmill site (FG activity area for placement at IC-13 FG). This clean gravel is available for introduction into the channel during spring 2008 high flows..

From 1990 through 1993, the Trinity River Basin Fish and Wildlife Restoration Program constructed 29 channel rehabilitation projects on the mainstem Trinity River between Lewiston Dam and the North Fork: 20 side-channel projects and nine bank rehabilitation projects (also known as feathered-edge projects). Monitoring of the previous channel rehabilitation projects has documented Chinook salmon spawning within the constructed side-channels and along some "feathered-edge" sites (U.S. Fish and Wildlife Service unpublished data; Chamberlain, pers. comm. 2004). The nine bank rehabilitation projects between Lewiston Dam and the North Fork were constructed by physically removing vegetated sand berms along the bank to restore the channel to a "pre-dam configuration." Channel rehabilitation sites are significantly wider and shallower than corresponding control sites at intermediate and high flows. An evaluation of the monitoring results associated with early restoration efforts concluded that "when properly constructed, bank rehabilitation can effectively increase the amount of salmonid fry rearing habitat in the Trinity River" (U.S. Fish and Wildlife Service and Hoopa Valley Tribe 1999).

Resident Native and Non-Native Fish Species

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

Non-native fish species found in the Trinity and Klamath River basins include striped bass (*Morone saxatilus*), American shad (*Alosa sapidissima*), brown bullhead (*Ameiurus nebulosus*), green sunfish (*Lepomis cyanellus*), brown trout (*Salmo trutta*), and brook trout (*Salvelinus fontinalis*) (USFWS unpublished data). Striped bass have only recently been reported to occur in the Trinity and Klamath River basins, and reports of their occurrence are rare. American shad are known to occur in the lowermost portions of the Trinity River basin, but are primarily found in the lower Klamath River basin.

Anadromous brown trout were propagated in the TRSSH until 1977, when this practice was discontinued because of the small numbers and the lack of anadromous characteristics of fish entering the hatchery. Currently, brown trout are largely limited to the upper portions of the river, although some brown trout exhibit anadromous characteristics. Brook trout provide a significant sport fishery in the tributary streams and high-elevation lakes of the Trinity River basin. Its life cycle and habitat requirements are similar to those of brown trout.

The structure and abundance of populations of these species in the Trinity and lower Klamath River basins are unknown. Factors that affect their abundance in the Trinity and lower Klamath River basins have not been studied and also remain unknown.

Special-Status Fish Species

For the purposes of this evaluation, special-status fish species include species that are (1) listed as threatened or endangered by the state or federal governments under the ESA or the CESA; or (2) are proposed or petitioned for federal listing as threatened or endangered; and/or (3) are state or federal candidates for listing as threatened or endangered. "Other" special-status fish species are identified by the USFWS as Species of Concern and/or are identified by CDFG as Species of Special Concern and/or California Fully Protected Species. A list of special-status fish species that were considered during the environmental analysis is included in Appendix I. This list was compiled by performing a search of the California Natural Diversity Database (CNDDB); informal consultations with the CDFG, USFWS, and NMFS; and a review of applicable biological literature.

The SONCC ESU of coho salmon was listed as threatened pursuant to the federal ESA on April 25, 1997. This listing includes coho salmon from the Trinity River and Klamath River basins. A review of the listing status of the SONCC ESU coho salmon was initiated during 2002 in response to a petition to de-list the species in the Klamath River basin (67 Federal Register 40679-40680). This status review included evaluation of both natural and hatchery components of the ESU according to the recently proposed policy on the consideration of hatchery-origin fish in federal ESA listing determinations for Pacific salmon and steelhead (69 Federal Register 31354-31359). NMFS recently concluded and proposed that the SONCC ESU coho salmon should remain listed under the ESA as a threatened species (69 Federal Register 33102-33179).

Critical habitat for the SONCC ESU coho salmon was designated on May 5, 1999. Critical habitat is designated to include all river reaches accessible to the listed coho salmon between Cape Blanco and Punta Gorda. Excluded are areas above specific dams or above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). In the Trinity River basin, designated critical habitat for the SONCC ESU coho salmon consists of the water, substrate, and adjacent riparian zone of those estuarine and riverine reaches (including off-channel habitats and accessible tributaries) downstream of Lewiston Dam (CFR Vol. 64, No. 86, May 5, 1999).

The 2000 Biological Opinion on the FEIS found that the program "*is not likely to jeopardize the continued existence of the [SONCC ESU] coho salmon*", and "*is not likely to destroy or adversely modify critical habitat for the [SONCC ESU] coho salmon*."

This Biological Opinion included an incidental take statement authorizing the alternative actions described in this EA/Draft EIR, which envisioned some potential "take" of the listed coho salmon related to the channel rehabilitation component of the TRRP. The Biological Opinion states:

> "*The NMFS does anticipate that SONCC coho salmon habitat adjacent to and downstream of the 47 channel rehabilitation projects may be temporarily degraded due to localized turbidity and potential fine sedimentation of channel substrate during construction activities. However, the amount of habitat temporarily degraded due to these localized effects is negligible compared to the long-term creation of additional suitable habitat along approximately 40 miles of the Trinity River.*"

The 2000 Biological Opinion includes several terms and conditions discussed in Chapter 1 of this EA/Draft EIR that serve to avoid and minimize "take" of the listed species during implementation of channel rehabilitation projects.

Both the 2000 Biological Assessment and the subsequent 2000 Biological Opinion explicitly acknowledged that construction at channel rehabilitation projects would not occur "within the wetted channel." However, work in-river would occur during direct placement of gravel for coarse sediment additions. After considerable restoration planning and design work by TRRP staff, NMFS, with support from the TMC, now considers in-river channel work a necessary component to successfully carry out and achieve program goals and objectives as detailed in the ROD. Authorization to perform in-channel and riverine activities, as well as crossing the Trinity River for access to work sites, would create conditions conducive for sediment (gravel) routing as well as needed construction flexibility to maximize long-term benefits for Trinity River salmonid populations.

The TRRP concluded that reinitiation of formal consultation under Section 7 of the Endangered Species Act is not warranted because effects to SONCC coho salmon are not likely to rise above those that were considered in the original 2000 Biological Opinion. In May 2006, NMFS concurred that reinitiation of formal consultation is not warranted if bank rehabilitation activities are authorized within the wetted channel (National Marine Fisheries Service 2006). The Amendment to the 2000 Biological Opinion states:

> *"Coho salmon primarily utilize tributary habitat for spawning and rearing and therefore, large numbers of coho salmon are not expected to be rearing within the mainstem Trinity River during the summer and fall period. Any increase in turbidity level arising from instream construction activities will likely affect the small population of juvenile coho salmon via the same mechanism as previously considered, that is, forcing fish to move downstream to escape turbid conditions. How the effect differs under the new regime is that more fish will relocate a farther distance downstream considered to the greatest spatial extent of turbid water. However, NMFS expects that all displaced*

juvenile fish, including coho salmon, will find suitable habitat within river reaches downstream of the project, since juvenile rearing habitat within the Trinity River mainstem is likely under-saturated during summer and fall months. For these reasons, NMFS believes the proposed change to allow instream construction activities at future Trinity River Bank Rehabilitation sites is unlikely to cause additional effects to listed coho salmon above those that were considered within the original 2000 Biological Opinion."

In 2000, the California Fish and Game Commission (Commission) received a petition to list coho salmon north of San Francisco as an endangered species under provisions of the CESA. The Commission required that a comprehensive, state-wide coho salmon recovery strategy and plan be developed while they considered the petition. The coho recovery plan was adopted by the Commission in February 2004 (California Department of Fish and Game 2004). The Commission declined to list the coho under CESA in June 2004 on a split vote. On August 5, 2004, the Commission made the decision to list the California portion of the SONCC ESU coho as threatened north of Punta Gorda.

The green sturgeon was petitioned for listing in 2001. After a lengthy review, NMFS determined that the species does not warrant listing in a status review published on January 29, 2003. In April 2005, NMFS proposed to list North American green sturgeon south of the Eel River (the southern distinct population segment, or DPS); because of concerns over the uncertainty and availability of data, the northern DPS was placed on NMFS' Species of Concern List and its status will be reassessed within 5 years if information warrants. There is no evidence to suggest that this species is present in the Trinity River above Burnt Ranch Falls.

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

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

Similarly, in a 1998 status review of all west coast Chinook salmon stocks (Myers et al. 1998), the upper Klamath-Trinity Rivers ESU Chinook salmon was determined to not warrant listing as a threatened or endangered species. However, spring-run Chinook salmon within the Klamath-Trinity basin is a California Species of Special Concern (Moyle et al. 1995). The 2005 NMFS status review did not reveal new information that would warrant listing of the upper Klamath-Trinity ESU Chinook salmon (Good et al. 2005).

Local Setting

Native Anadromous Fish Species

All three species of native anadromous salmonids (i.e., spring- and fall-run Chinook salmon, coho salmon, and summer/fall- and winter-run steelhead) may be expected to occur within the project boundaries. All freshwater life stages of these species (i.e., adult, egg, fry, and juvenile/smolt) may be expected to use habitats within the project boundaries. The anadromous Pacific lamprey may also be expected to occur in each of its freshwater life stages (i.e., adult, egg, larval ammocoete, metamorphosed and emigrating juvenile) within these reaches.

Adult spring-run Chinook salmon use the mainstem Trinity River for holding and spawning habitat. Adult spring-run Chinook are likely to hold in the deeper pool habitats, especially from late April through August. These fish commence spawning about the second week of September and spawn through mid-October. Fry and juvenile spring-run Chinook salmon would be expected in suitable habitats throughout the site from late December through October. Outmigration of spring-run smolts would occur from late October through June.

Adult fall-run Chinook salmon migrate to, and are expected to spawn within and near, the project reach in all suitable habitats, typically from late September through mid-December. Fry and juveniles are expected in suitable rearing habitats from January through June (Manje pers. comm.). Sub-yearling fall Chinook smolts generally outmigrate from April through June (Leidy and Leidy 1984; Moyle 2002).

Aquatic Habitat Conditions

The aquatic environment in the general vicinity of the Lewiston–Dark Gulch sites is characterized by a sequence of riverine habitat types (i.e., riffles, runs, and pools). Each of these habitat types consists of distinctive combinations of depth, water velocity, water temperature, cover, substrate composition (i.e., bedrock, cobble, gravel, sand, silt, etc.), and adjacent riparian vegetation.

Figures 3.6-3a, 3.6-3b, and 3.6-3c illustrate aquatic mesohabitat as defined by the USFWS for the Lewiston and Dark Gulch sites. Riparian vegetation directly adjacent to the river is referred to as shaded riverine aquatic (SRA) habitat and is included as a component of designated critical habitat for coho salmon, as well as a component of essential fish habitat (EFH) for both coho and Chinook salmon.

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) defines EFH as those waters and substrates necessary for spawning, breeding, feeding, or growth to maturity. As defined, the term "waters" includes aquatic areas (and their associated physical, chemical, and biological properties) that are used by fish or, where appropriate, have historically been used by fish. The term "substrate" includes sediment, hard-bottom, structures underlying the waters, and associated biological communities. "Necessary" means the habitat required for a sustainable fishery and the managed species' contribution to a healthy ecosystem. Finally, "spawning, breeding, feeding, or growth to maturity" refers to a species' full life cycle.

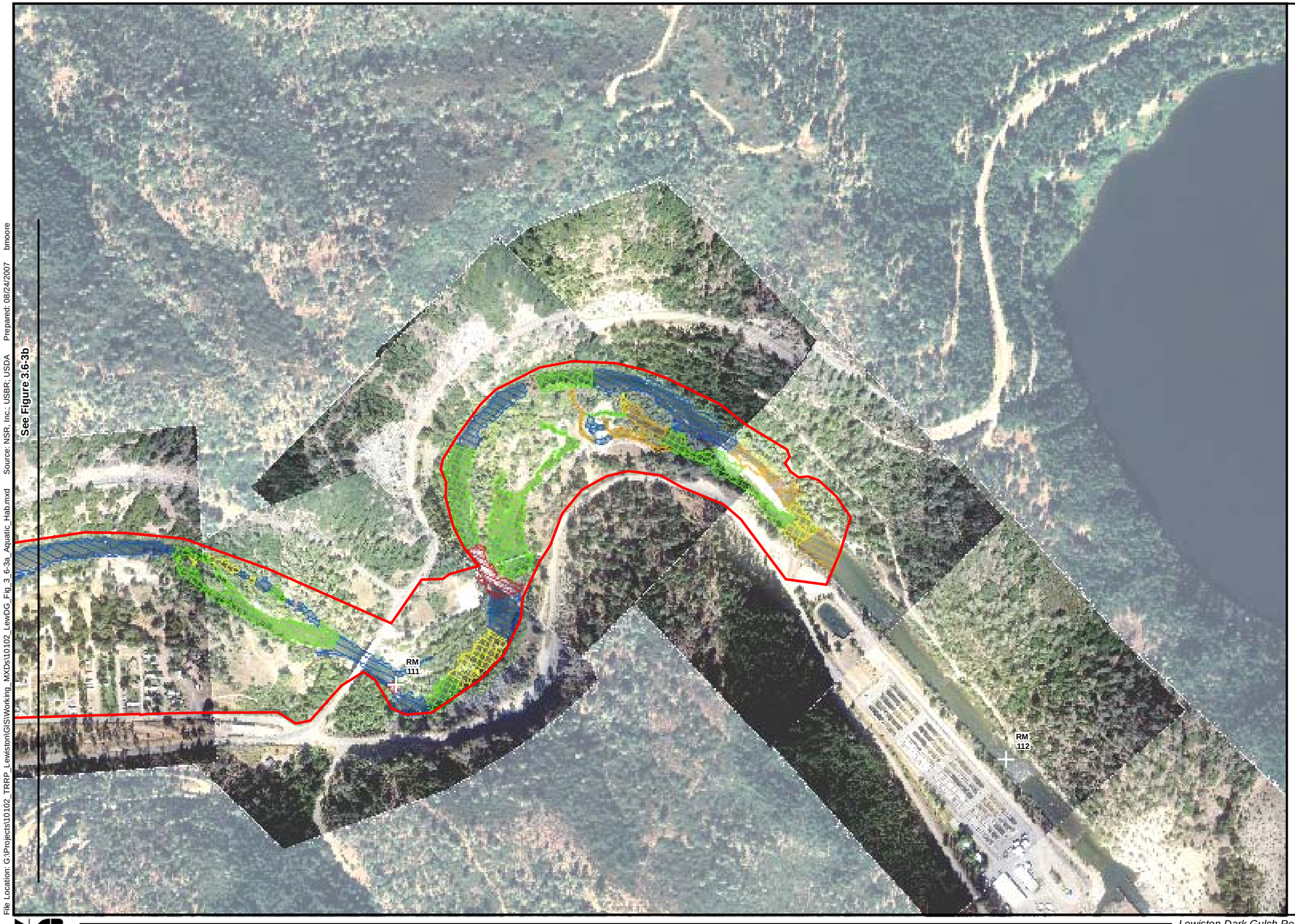
Freshwater EFH for salmon consists of four major components: spawning and incubation habitat; juvenile rearing habitat; juvenile migration corridors; and adult migration corridors, including adult holding habitat (Pacific Fisheries Management Council 2000). Important components of EFH for spawning, rearing, and migration include adequate substrate composition; water quality (e.g., dissolved oxygen, nutrients, temperature); water quantity, depth, and velocity; channel gradient and stability; food; cover and habitat complexity (e.g., large woody debris, pools, channel complexity, aquatic vegetation); space; access and passage; and floodplain and habitat connectivity (Pacific Fisheries Management Council 2000). The Lewiston and Dark Gulch sites provide all four major components of EFH as defined by the Pacific Fisheries Management Council.

The Lewiston and Dark Gulch sites provide spawning habitat for all anadromous salmonids. Suitable spawning habitat occurs in all of the riffles, particularly in the low-gradient riffles and tail-outs of pools and deep run/glide habitats. A majority of the fall- and spring-run Chinook salmon and coho are reported to spawn in these riffles (C. Chamberlain, U.S. Fish and Wildlife Service–Arcata, unpublished data, and (Sinnen et al. 2006). Salmon spawner surveys in the upper Trinity River conducted annually by the CDFG (in cooperation with the Yurok Tribe, USFWS, and USFS) report that the greatest concentration of Chinook and coho salmon spawning occurs in the upper survey sections (Sections 1 and 2), which range from Lewiston Dam to Old Lewiston Bridge and Old Lewiston Bridge to Bucktail Bridge, respectively. The Lewiston and Dark Gulch sites fall within the upper survey sections. The principal year-over-year spawning areas within the project sites are depicted in Figures 3.6-4a-c (Sinnen et al. 2006; Chamberlain, Goodman, and Martin 2007). This redd distribution pattern has been similar from 2000-2005 (Sinnen et al. 2006).

The Lewiston and Dark Gulch sites provide suitable habitat for salmonid rearing. Large cobbles and boulders dominate the river bottom in these habitats, providing suitable cover and refuge for rearing salmonids. Overhanging riparian and aquatic vegetation contributes shade and physical cover to highly suitable salmonid rearing habitat in the project reach. Chinook fry habitat is limited to the stream edges in the low-gradient riffles and on point bars. Additional Chinook fry rearing habitat exists at the tail outs of the pool habitats.

Although juvenile coho rearing habitat is considered to be limited in the general vicinity of these sites, juveniles are expected in suitable habitats year-round throughout the mainstem from the North Fork Trinity River confluence upstream to Lewiston Dam (Glase J. pers. comm.). Pool habitat associated with boulders and large woody debris (LWD) is particularly preferred habitat by rearing coho salmon (Hassler 1987; Sandercock 1991; Moyle 2002). Additionally, Brown et al. (1994) reported pool habitats greater than 1 meter in depth were preferred by juvenile coho salmon.

In 2006, CDFG biologists snorkeled during the summer low flow period (450 cfs) to enumerate juvenile coho salmon in the reach between Lewiston Dam and Steelbridge. Geographically, the greatest numbers of juvenile coho salmon found during the course of this particular survey were in proximity to the BLM/Rush Creek fishing access, the Cemetery side-channel complex, and immediately upstream of Salt

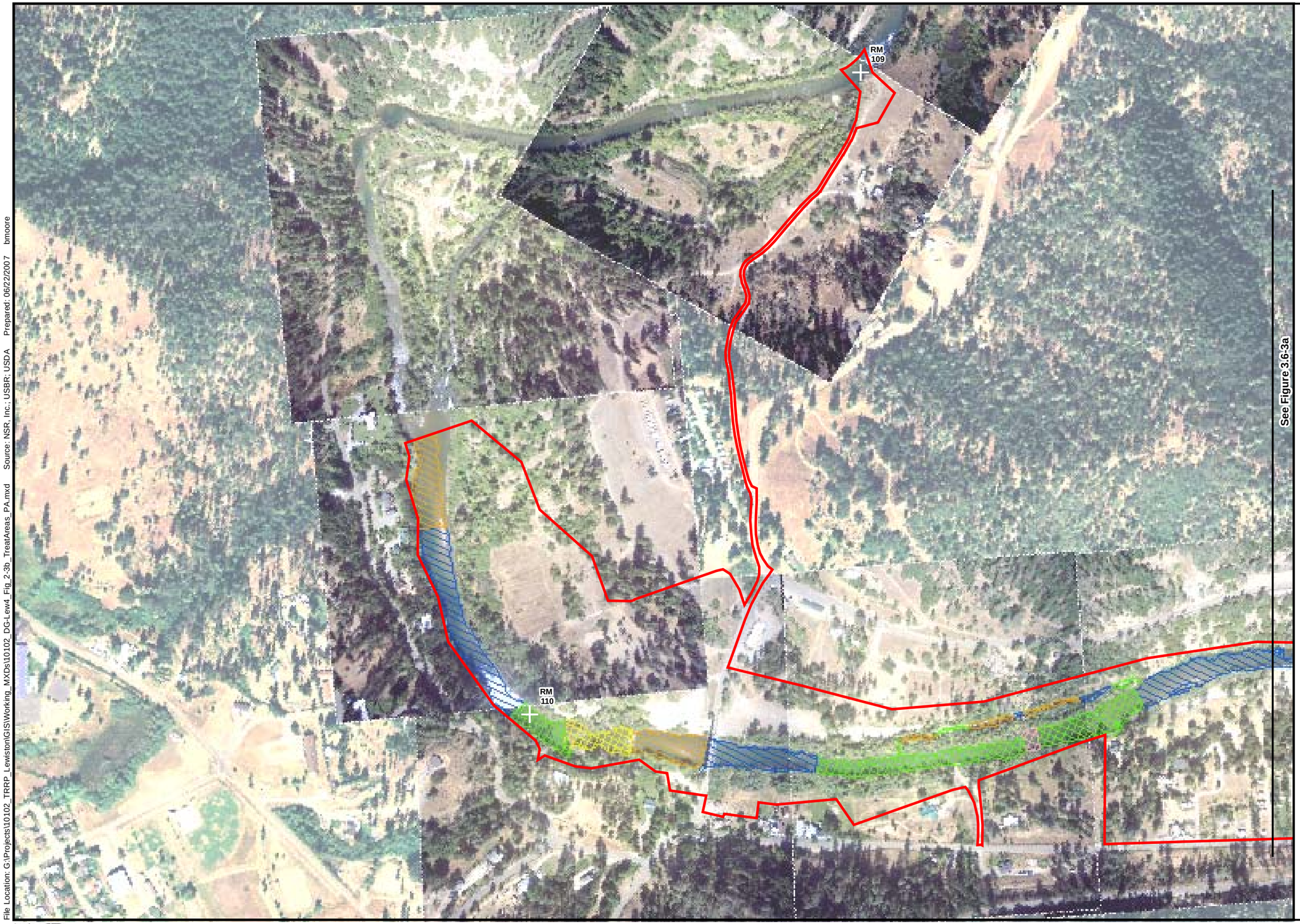


File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_LewDG_Fig_3_6-3a_Aquatic_Hab.mxd Source: NSR, Inc.; USBR; USDA Prepared: 08/24/2007 bmoore

North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-3a
Aquatic Habitat

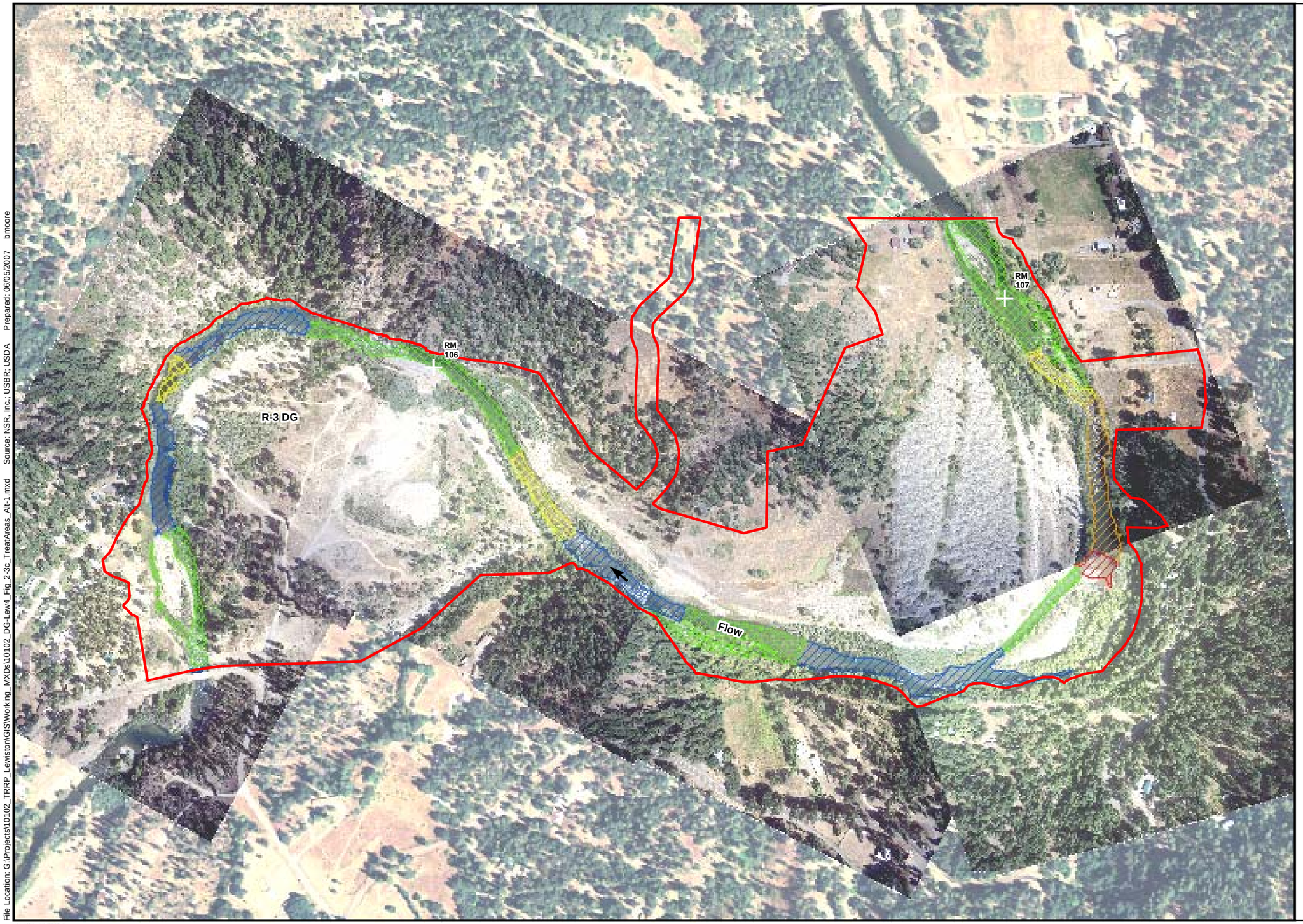


File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_DG-Lew4_Fig_2-3b_TreatAreas_PA.mxd Source: NSR, Inc.; USBR; USDA Prepared: 06/22/2007 bmoore

North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-3b
Aquatic Habitat



Site Boundary (152 acres)

River Mile (RM)

Habitat Type

- Pool
- Low Slope
- Run
- Mod Slope
- Steep Slope

N

1:5,400

450 0 450

Feet

Aerial photography:
2005
2006

File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_DG-Lew4_Fig_2-3c_TreatAreas_Alt-1.mxd Source: NSR, Inc.; USBR; USDA Prepared: 06/05/2007 bmoore

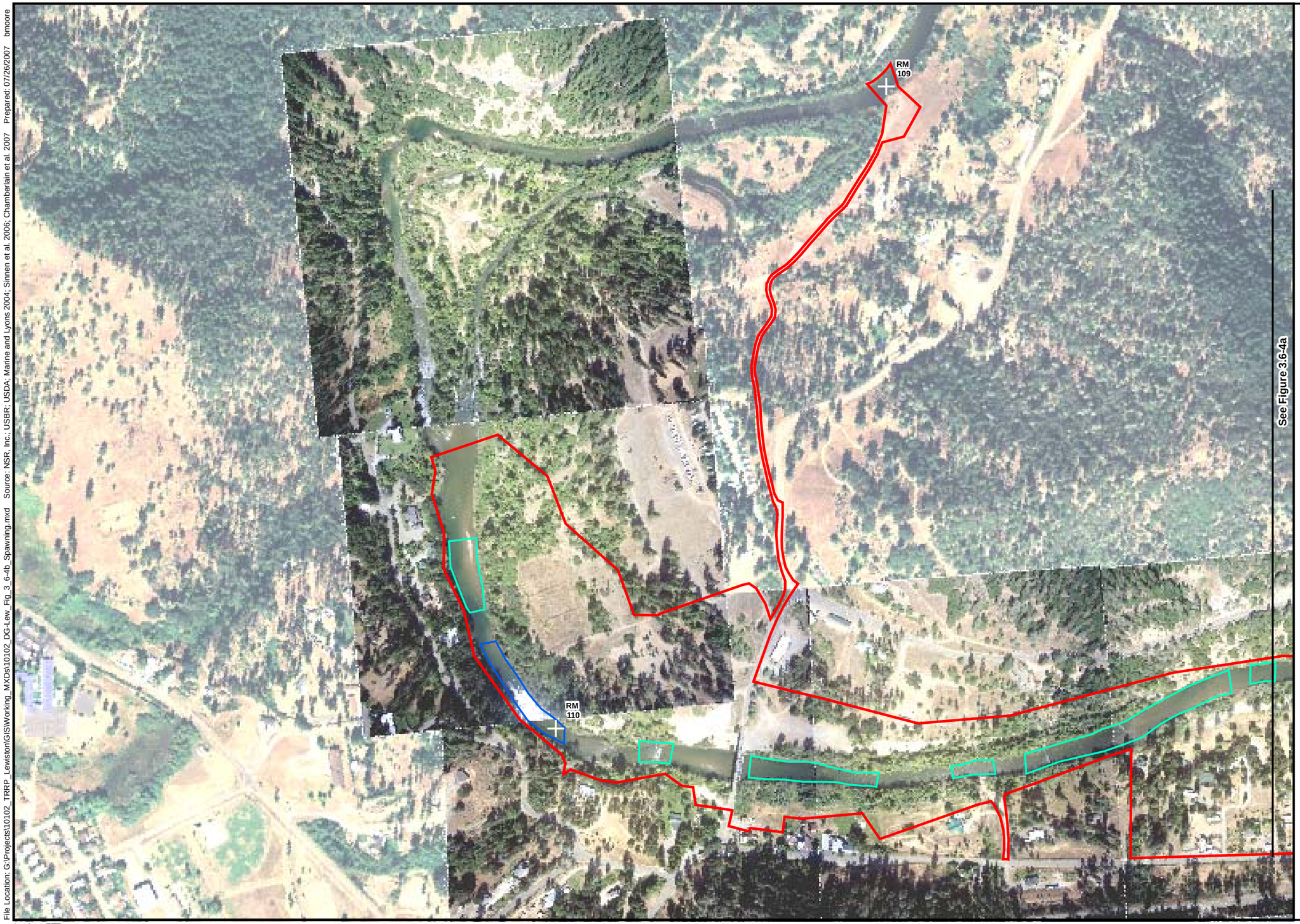
Figure 3.6-3c
Aquatic Habitat

File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_DG-Lew_Fig_3_6-4a_Spawning.mxd Source: NSR, Inc.; USBR; USDA; Marine and Lyons 2004; Sinnen et al. 2006; Chamberlain et al. 2007 Prepared: 07/26/2007 bmoore

North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-4a
Principal Year-Over-Year Spawning Locations and Spring-run Chinook Salmon Holding Habitat in the Trinity River within the Project Site

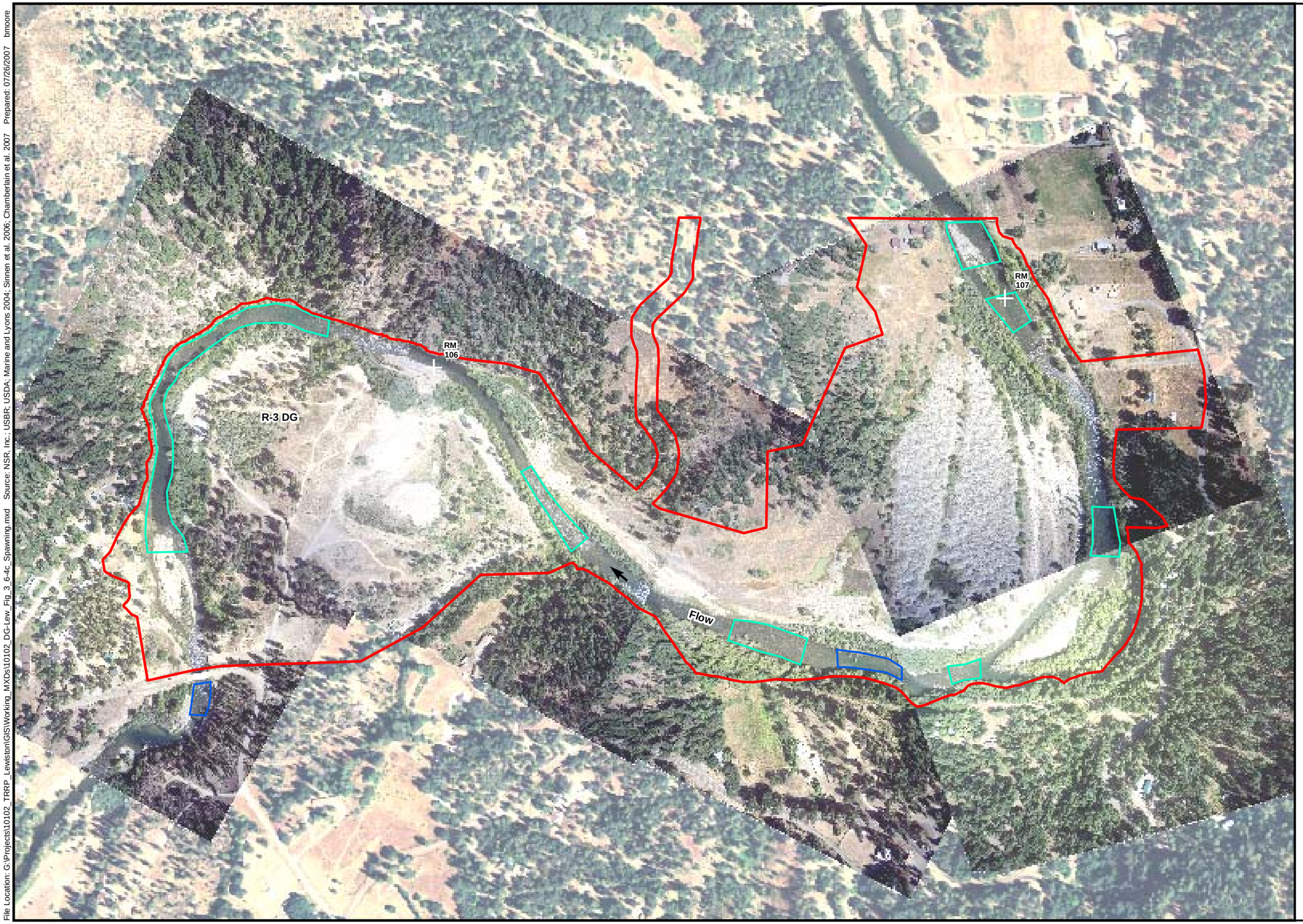


File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_DG-Lew_Fig_3_6-4b_Spawning.mxd Source: NSR, Inc.; USBR; USDA; Marine and Lyons 2004; Sinnen et al. 2006; Chamberlain et al. 2007 Prepared: 07/26/2007 bmoore

North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-4b
Principal Year-Over-Year Spawning Locations and
Spring-run Chinook Salmon Holding Habitat in the Trinity River within the Project Site



Site Boundary (152 acres)

River Mile (RM)

Spawning Locations

Holding Habitat

N

1:5,400

450 0 450

Feet

Aerial photography:
2005
2006

File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_DG-Lew_Fig_3_6-4c_Spawning.mxd Source: NSR, Inc.; USBR; USDA; Marine and Lyons 2004; Sinnen et al. 2006; Chamberlain et al. 2007 Prepared: 07/26/2007 bmoore

North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-4c
Principal Year-Over-Year Spawning Locations and Spring-run Chinook Salmon Holding Habitat in the Trinity River within the Project Site

Flat Bridge (Garrison 2007). Juvenile coho salmon were predominantly found in four mesohabitat types: side-channels (38.73%), glides (28.72%), backwaters (16.58%), and runs (10.55%). Juvenile coho salmon were found in close proximity to the bank (mean 2.16 feet) and to both object (mean 1.08 feet) and overhead cover (mean 2.16 feet). The dominant object cover type used by juvenile coho salmon was non-emergent rooted aquatic vegetation (55.74 percent of observations), while the second most popular object cover type was small woody debris (26.12 percent) (Garrison 2007). This survey documents that suitable juvenile coho salmon rearing habitat exists within the Lewiston and Dark Gulch sites.

In 2003, North State Resources, Inc., conducted a radio-telemetry study of migration and behavioral thermoregulation of adult spring-run Chinook salmon in the upper Trinity River for the TRRP (Marine and Lyons 2004). The greatest numbers of over-summering radio-tagged fish were observed between Evans Bar and Dutton Creek and between Lewiston Dam and Bucktail. Fish also resided for the longest times in these reaches. These tagged fish used available run and glide habitats that were typically large (surface area) and deep (maximum depth of 4 feet). These habitats held fish for longer periods of time than other portions of the study reach. Exceptionally large, deep glides in the vicinity of Carr Creek, Indian Creek, and Rush Creek were highly used as holding habitat for adult Chinook. Pool habitat ranging in depth from 3–17 feet was the used for the longest period of time during the study period.

In the Lewiston to Dark Gulch reach, there are five pool and deep run-glide habitat units that were used as holding habitat for radio-tagged spring-run Chinook salmon during the 2003 study. Habitat locations where radio tagged spring-run Chinook salmon were observed holding in 2003 are shown in Figure 3.6-4a-c. The relatively high number of observations of spring-run Chinook salmon holding in this reach compared to other nearby areas suggests that this reach has a high over-summering habitat value for spring-run Chinook salmon. Spring-run Chinook salmon also used habitat downstream of the project sites between Bucktail Bridge and Steelbridge and holding habitat between the Lewiston and Dark Gulch sites at river miles 107.0, 107.8, 108.8, 109.1, Rush Creek, and the Lewiston Pool below the dam, above the SO activity area.

Adult summer/fall-run steelhead migrate to and hold in the deeper pools and runs in the general vicinity of the project sites from April through January (Leidy and Leidy 1984, Moyle 2002). These fish typically feed actively throughout the salmon spawning season, and migrate to the upper-most river reaches and into tributaries to spawn from February through April. Winter-run steelhead migrate to spawning grounds from November through April and spawn during the same time as the summer/fall run. Suitable steelhead spawning habitat occurs in the riffles within the project reach. Fry and juvenile steelhead of both runs may be expected in the riffle and run/pool habitats year-round, especially those associated with large cobble and boulder cover as well as overhanging riparian vegetation and large woody debris (Hampton 1988; Moyle 2002). Suitable juvenile steelhead rearing habitat occurs throughout the project reach.

Adult Pacific lampreys migrate to spawn in the upper Trinity River and tributaries during the spring and early summer, although they are documented to occur in the river near Lewiston through August (Moffett and Smith 1950; Moyle 2002). Suitable lamprey spawning habitat occurs in the low-gradient riffles and in the run/pool tail outs throughout the site. Based on juvenile outmigrant trapping data, larval lampreys and juveniles are expected to be abundant year-round in the upper Trinity River (Glase, pers. comm.

2002). Juveniles require areas of relatively slow currents and mud- and sand-bottomed backwaters and pools, where they burrow and filter feed on detritus and algae (Moyle 2002). Based on this habitat preference, lamprey ammocoetes may be expected in the mud and sand sediments of the pool and run/edgewater habitats throughout the project reach.

Rush Creek, Grass Valley Creek, Deadwood Creek and Hoadley Gulch provide spawning and rearing habitat for runs of steelhead, coho salmon, and Chinook salmon, are designated critical habitat for SONCC ESU coho salmon, and are considered EFH for coho and Chinook salmon. Coho salmon spawn in Rush Creek, Deadwood Creek, and Hoadley Gulch, as well as in Grass Valley Creek, although no recent surveys have been completed to document spawning. A partial barrier to anadromous fish exists on Deadwood Creek approximately 0.75 mile upstream from the Trinity River (Barrier ID 705982) (CalFish 2007) and a waterfall marks the upstream limit of anadromy at approximately 2.4 miles (Garrison 2005). Due to the proximity of these tributaries to the TRSSH, a significant proportion of the anadromous fish spawning in these tributaries is of hatchery origin (Everest pers. comm.; Sinnen pers. comm.).

Resident Native and Non-Native Fish Species

Site-specific information on the occurrence of resident fish species is not available for the Lewiston and Dark Gulch sites. This EA/Draft EIR evaluates the potential for resident fish species to occur in or near the project reach based on habitat characteristics observed and professional knowledge of the habitat requirements and general geographic distributions of species known to inhabit the Trinity River. Species that can be expected to occur include speckled dace, Klamath smallscale sucker, three-spined stickleback, coast range sculpin, and marbled sculpin, although the latter species is considered uncommon in the Trinity River (Moyle 2002). All of these species may occur as adults and juveniles within the project reaches. They may be found in the pools, runs, and riffles during the spring and summer months, but retreat to the pools and slow edgewater areas during the winter months and higher flows. It is not known if these species spawn in the general vicinity of the project reach.

Brown trout (all life stages) are established within the Trinity River downstream of the TRD. Resident populations of this non-native species are frequently caught by fishermen upstream of Grass Valley Creek. Significant numbers of brown trout are also captured each year in the CDFG upstream migrant trap at Junction City (Currier pers. comm.). Whether these fish are anadromous migrants or simply moving within the river is not certain, although brown trout are known to exhibit anadromy in other streams where they occur. Suitable habitat for brown trout exists within the boundaries of the Lewiston and Dark Gulch sites, and this species has been observed in the project reach.

3.6.2 Regulatory Setting

This section lists specific environmental review and consultation requirements and identifies permits and approvals that must be obtained from local, state, and federal agencies before implementation of the rehabilitation activities.

Federal

National Marine Fisheries Service

Federal Endangered Species Act

The ESA defines "take" (Section 9) and generally prohibits the "taking" of a species that is listed as endangered or threatened (16 USC. 1532, 50 CFR 17.3). Under the ESA, the "take" of a federally listed species is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The term "harm" includes intentional or negligent acts or omissions that actually kill or injure wildlife. Such acts may include significant habitat modification or degradation when it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Section 7 of the ESA requires federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of designated critical habitat for these species. Reclamation, one of the federal lead agencies for the Proposed Action, is required to consult with NMFS concerning effects to SONCC ESU of coho salmon pursuant to Section 7 of the ESA. The 2000 Biological Opinion (as amended) and Incidental Take Statement on the Mainstem Fisheries Restoration Program EIS/EIR provide ESA Section 7 coverage for the Proposed Action.

Magnuson-Stevens Fishery Conservation and Management Act

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for species regulated under a federal fisheries management plan.

The MSA requires federal agencies to consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agencies, that may adversely affect EFH (MSA Section 305[b][2]). A component of this consultation process is the preparation and submittal of an Essential Fish Habitat Assessment (EFHA). The length of EFHAs varies based on the complexity and magnitude of potential impacts to EFH, but all EFHAs must include the following information: (1) a description of the proposed action; (2) an analysis of the effects, including cumulative effects, of the proposed action on EFH, the managed species, and associated species, such as major prey species, including affected life history stages; (3) the federal agency's views regarding the effects of the proposed action on EFH; and (4) proposed mitigation, if applicable. In instances where MSA and ESA issues overlap, NMFS encourages an integrated approach to consultation.

The EFH mandate applies to all species managed under a federal fishery management plan (FMP). For the Pacific coast (excluding Alaska), there are three FMPs covering groundfish, coastal pelagic species, and Pacific salmon. As a federal lead agency, Reclamation will need to consider the impact of the Proposed Action on EFH for coho and Chinook salmon in the Trinity River pursuant to the Pacific Coast Salmon FMP.

State

California Endangered Species Act

Under the CESA, CDFG is responsible for maintaining a list of endangered and threatened species (California Fish and Game Code 2070). The CDFG also maintains a list of "candidate species," which are species that the CDFG formally notices as being under review for addition to the list of endangered or threatened species. In addition, the CDFG maintains lists of "species of special concern," which serve as species "watch lists." Pursuant to the requirements of the CESA, any local or state agency reviewing a proposed project within its jurisdiction must determine whether any species that is state listed as endangered or threatened may be present in the project study area and determine whether the proposed project will have a potentially significant impact on any of these species. In addition, the CDFG encourages informal consultation on any proposed project that may affect a candidate species.

Project-related impacts to species listed as endangered or threatened under CESA would be considered significant. State-listed species are fully protected under the mandates of CESA. "Take" of protected species incidental to otherwise lawful management activities may be authorized under Section 2081 of the Fish and Game Code of California. Authorization from CDFG would be in the form of an Incidental Take Permit. For the Proposed Action, the TCRCD, as the CEQA lead agency, would need to obtain an incidental take permit if the activities described in this EA/Draft EIR could result in the take of a state-listed species (i.e., coho salmon). Under CESA, and upon concurrence from CDFG that the NMFS Biological Opinion and incidental take statement for "take" of listed SONCC ESU coho salmon are adequate (pursuant to CESA), the TCRCD may request a CESA Consistency Determination from the Director of the CDFG, pursuant to Section 2080.1 of the California Fish and Game Code. Within 30 days after receipt of the notification, the Director of the CDFG shall determine whether the federal incidental take statement is consistent with CESA. If it is determined to be consistent with CESA, no further authorization or approval is necessary under CESA. If the Director of the CDFG determines that the federal Incidental Take Statement is not consistent, then the TCRCD will be required to obtain a take permit pursuant to California Fish and Game Code Section 2081(b).

"Fully Protected" Fish Species

California law (Fish and Game Code, Section 5515) also identifies 10 "fully protected fish" that cannot lawfully be "taken," even with an incidental take permit. None of these species is present in the Trinity River or its tributaries.

Local

Trinity County General Plan Goals and Objectives

The Trinity County General Plan contains goals and policies designed to guide the future physical development of the county, based on current conditions. The following goals and policies related to fishery resource issues described in this EA/Draft EIR were taken from the applicable elements of the General Plan (Trinity County 2001), including the Lewiston Community Plan (Trinity County 1986).

County Wide Goals and Objectives

Environmental

To strive to conserve those resources of the County that are important to its character and economic well-being

- by assuring that developments occurring on these lands are compatible with the resources;
- by strongly supporting the County as "lead agency" or as an integral participant in any state or federal project within the County so that all agencies are made aware of local desires and all plans are coordinated;
- by utilizing a sound resource-related planning process in decision-making; and
- by protecting not only rare and endangered species, but also required habitat for more plentiful species.

Lewiston Community Plan Goals and Objectives

This plan includes the area centered on the Trinity River from Lewiston Lake to slightly downstream of the confluence of Grass Valley Creek and the Trinity River.

Natural Resources

Goal: To protect areas of special habitat considerations within the Plan area.

- Encourage retention of riparian habitat areas.
- Work with property owners adjacent to the Trinity River to retain existing riparian vegetation.

Goal: To protect and improve fish habitat within the Plan area.

- Encourage the development of stream restoration projects within the Plan area.

Goal: To encourage the sound use of mineral resources, especially sand and gravel operations, which reduce sedimentation of the river.

Project Consistency with the Trinity County General Plan

This section compares the goals and objectives of the Proposed Action to the relevant local planning policies (i.e., Trinity County General Plan, Lewiston Community Plan) to determine if there are any inconsistencies.

The goals and objectives described in Chapter 1 are generally compatible with the applicable General Plan goals and policies summarized above. The overall goal of the Proposed Action is to rehabilitate the site so that it functions in a manner that is closer to historic conditions (e.g., pre-Lewiston Dam).

3.6.3 Environmental Consequences/Impacts and Mitigation Measures

Methodology

The following section provides a brief overview of the analytic methods used to assess potential impacts of the Proposed Action on fisheries resources. These methods include a comprehensive literature search and focused field surveys.

Evaluation of the presence of special-status fish species and sensitive habitats within the project boundary established for the Proposed Action was conducted by performing a database search of the CNDDB, informally consulting with resource agencies (i.e., CDFG, NMFS, USFWS), and reviewing environmental documents and technical studies prepared for projects in the vicinity. Representatives from the USACE, CDFG, NMFS, USFWS, and the Hoopa Valley and Yurok Tribes were contacted to discuss specific biological resource issues associated with the Proposed Action, including potential impacts and suggested mitigation measures.

Aquatic habitat within the Lewiston and Dark Gulch sites was identified, reviewed, and characterized based on the USFWS mesohabitat delineations map, reconnaissance-level site visits in January 2007, consultation with local fishery biologists, and review of pertinent literature and data. These efforts were conducted to characterize the aquatic habitats and potential suitable spawning, holding, and rearing habitat present within the site boundaries.

Significance Criteria

Significance criteria used to assess the potential impacts of the Proposed Action on fisheries resources are based on the current scientific understanding of biological requirements and ecological status of the species of interest, and the regulatory standards of county, state, and federal agencies, including the CEQA Guidelines. A significant impact on anadromous salmonids and other native fish would occur if the project would result in any of the following:

- potential to substantially reduce the number or restrict the range of an endangered or threatened native fish species or a native fish species that is a candidate for state listing or proposed for federal listing as endangered or threatened;
- potential for substantial reductions in the habitat of any native fish species other than those that are listed as endangered or threatened or are candidates or proposed for endangered or threatened status;
- potential for causing a native fish population to drop below self-sustaining levels;
- substantial adverse effect, either directly or through habitat modifications, on any native anadromous species identified as a sensitive or special-status fish species in local or regional plans, policies, or regulations;
- substantial interference with the movement of any native anadromous or resident fish species;
- a conflict with, or violation of, the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan relating to the protection of native anadromous species or resident fish species;

- mortality of state- or federally listed fish species, or species that are candidates for listing or proposed for listing;
- reductions in the size of the population of a native fish species sufficient to jeopardize its long-term persistence;
- temporary impacts to habitats such that native fish species suffer increased mortality or lowered reproductive success that jeopardizes the long-term persistence of those local populations;
- permanent loss of designated critical habitat and/or essential habitat of a listed species or special-status native fish species; or
- reduction in the quantity or quality of habitats in which native fish species populations occur sufficient to reduce the long-term abundance and productivity of local populations.

Impacts and Mitigation Measures

The following sections provide detailed descriptions of the potential impacts to fishery resources and mitigation measures for each alternative evaluated in the EA/Draft EIR. To reduce redundancy and improve readability, the impacts to the federally and state-listed SONCC coho salmon, other special-status species (i.e., "species of special concern" for CEQA, and "species of concern" for NEPA), and non-listed fish species are described together under each alternative action. Because the threshold for "significance" of an impact is lower (i.e., more restrictive) for threatened and endangered species, impacts are described separately when they differ among species. The effects have been evaluated for the principal species of interest and address the full range of potential impacts to anadromous and resident riverine fishes within the project boundary. The nature of the Proposed Action requires recognition that temporary impacts to salmonids and other riverine species would occur, but the ultimate goal of the project is to improve fish habitat suitability and availability over the long term.

Table 3.6-3 summarizes the potential fishery resource impacts that would result from implementation of the project.

Table 3.6-3. Summary of Fishery Resource Impacts for the No-Action Alternative, Proposed Action, and Alternative 1

No-Action Alternative	Proposed Action	Alternative 1	Proposed Action with Mitigation	Alternative 1 with Mitigation
Impact 3.6-1.	Implementation of the project could result in effects on potential spawning and rearing habitat for anadromous fishes, including the federally and state-listed coho salmon.			
NI	S	S	LS/B	LS/B
Impact 3.6-2.	Implementation of the project could result in increased erosion and sedimentation that could adversely affect fishes, including the federally and state-listed coho salmon.			
NI	S	S	LS	LS

Table 3.6-3. Summary of Fishery Resource Impacts for the No-Action Alternative, Proposed Action, and Alternative 1

No-Action Alternative	Proposed Action	Alternative 1	Proposed Action with Mitigation	Alternative 1 with Mitigation
Impact 3.6-3.	Construction activities associated with the project could potentially result in the accidental spill of hazardous materials that could adversely affect fishes, including the federally and state-listed coho salmon.			
NI	S	S	LS	LS
Impact 3.6-4.	Construction activities associated with the project could result in the mortality of rearing fishes, including the federally and state-listed coho salmon.			
NI	S	S	LS	LS
Impact 3.6-5.	Implementation of the project would result in the permanent or temporary loss of shaded riverine aquatic habitat for anadromous salmonids.			
NI	S	S	LS	LS
Impact 3.6-6:	Implementation of the project would result in fish passage being temporarily impaired during the in-stream construction phase.			
NI	S	S	LS	LS

Notes:
LS = Less than Significant S = Significant SU = Significant Unavoidable
NI = No Impact B = Beneficial N/A = Not Applicable

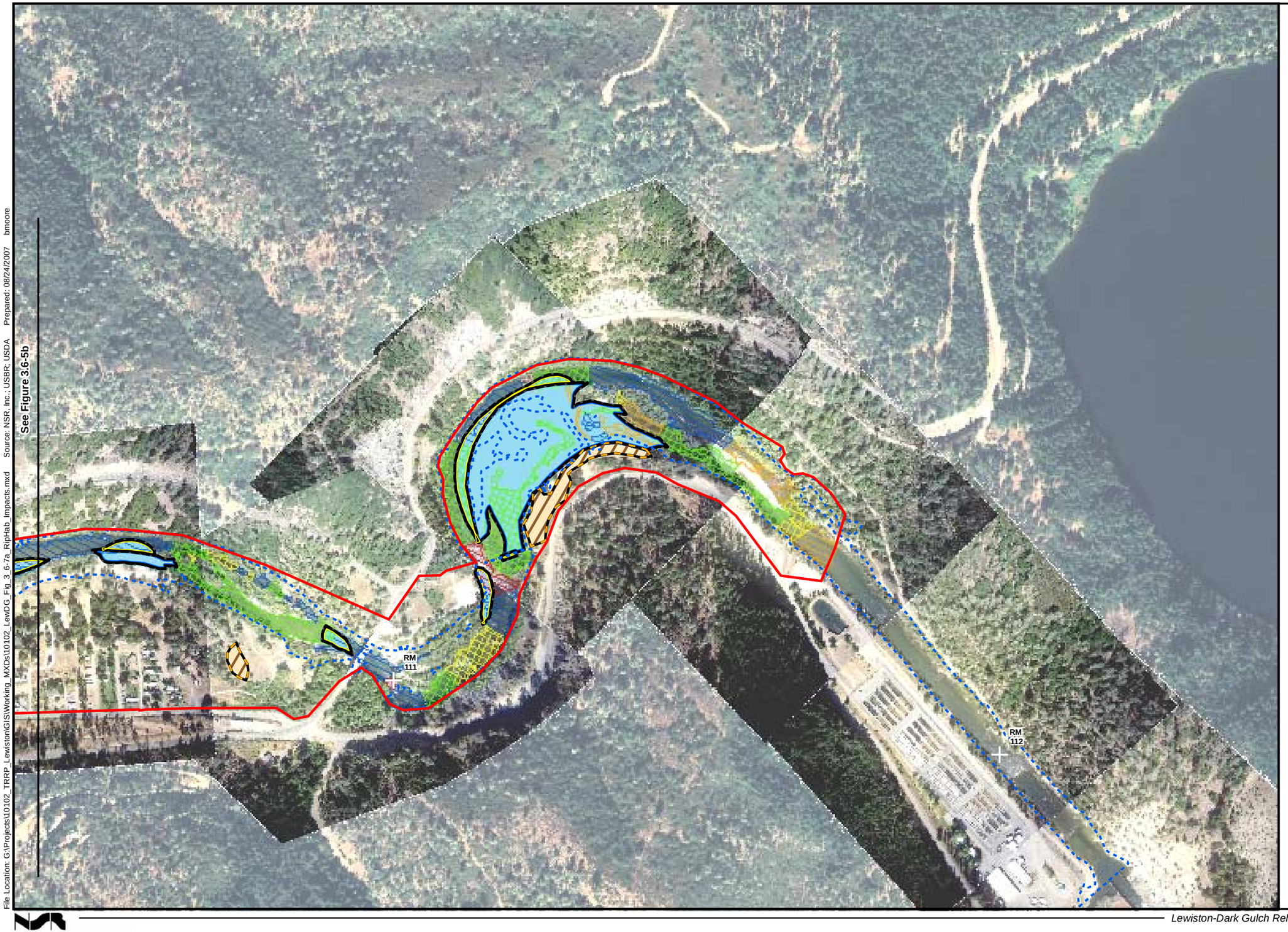
Impact 3.6-1: Implementation of the project could result in effects on potential spawning and rearing habitat for anadromous fishes, including the federally and state-listed coho salmon. ***No Impact for the No-Action Alternative; Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, there would be no effects on spawning and rearing habitat other than those associated with current ongoing actions because the project would not be constructed.

Proposed Action

Coho Salmon. No permanent adverse effects to spawning habitat for coho salmon within the project boundaries would occur. Figures 3.6-5a, 3.6-5b, and 3.6-5c illustrate the extent of the grading, excavating, and addition of coarse sediment that would occur below the Ordinary High Water Mark in riverine (blue areas) under the Proposed Action. The long-term design objective is that implementation of the Proposed Action along with the flow management regime implemented by the TRRP would reactivate channel migration across the floodplain within the boundaries of the project sites. This dynamic fluvial channel would result in a net increase in point bar surface area through coarse sediment deposition, thereby increasing riffle-spawning habitat within the project boundary. The addition of coarse sediment



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North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-5a
Impacts of Proposed Action on Aquatic Habitats

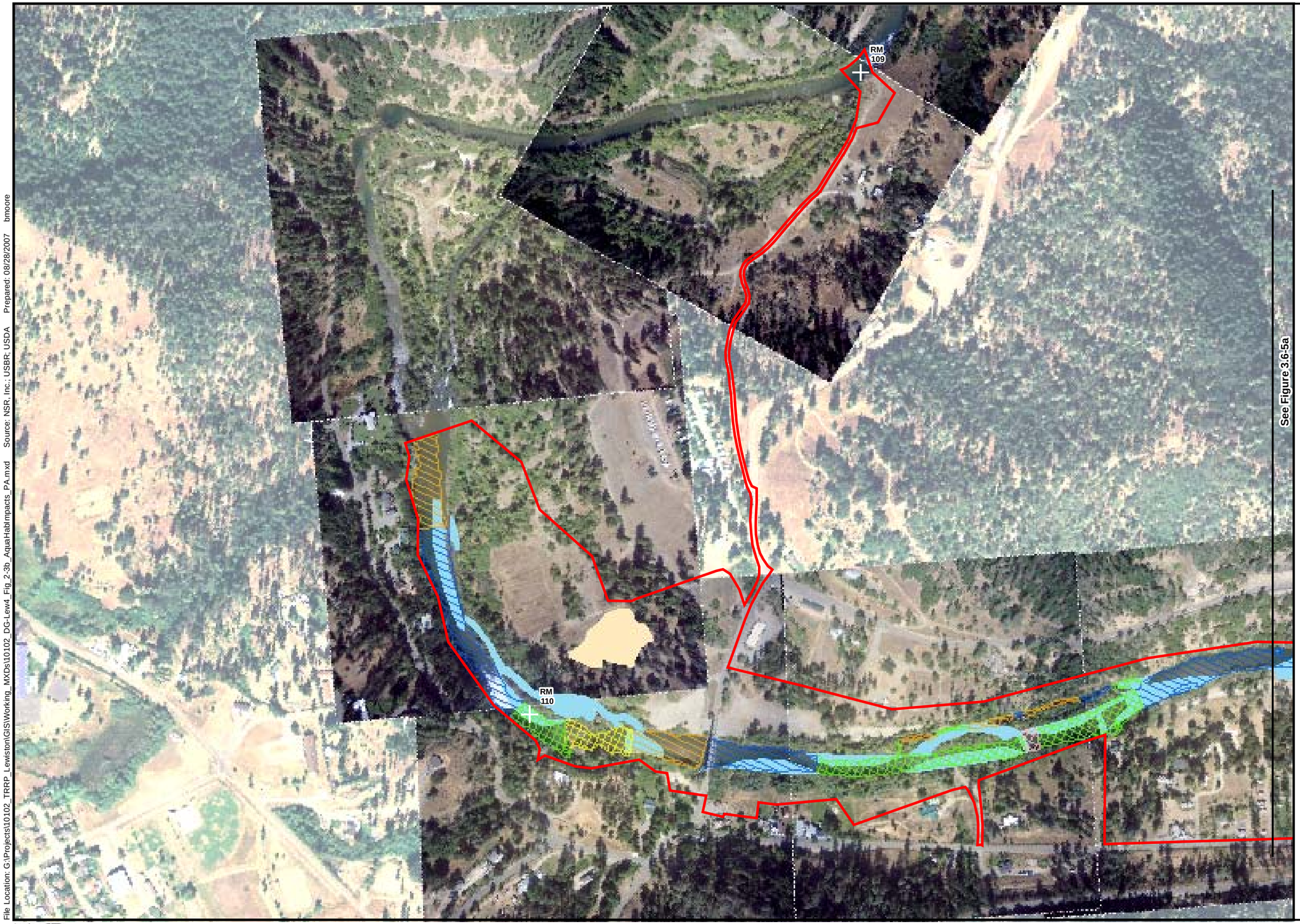

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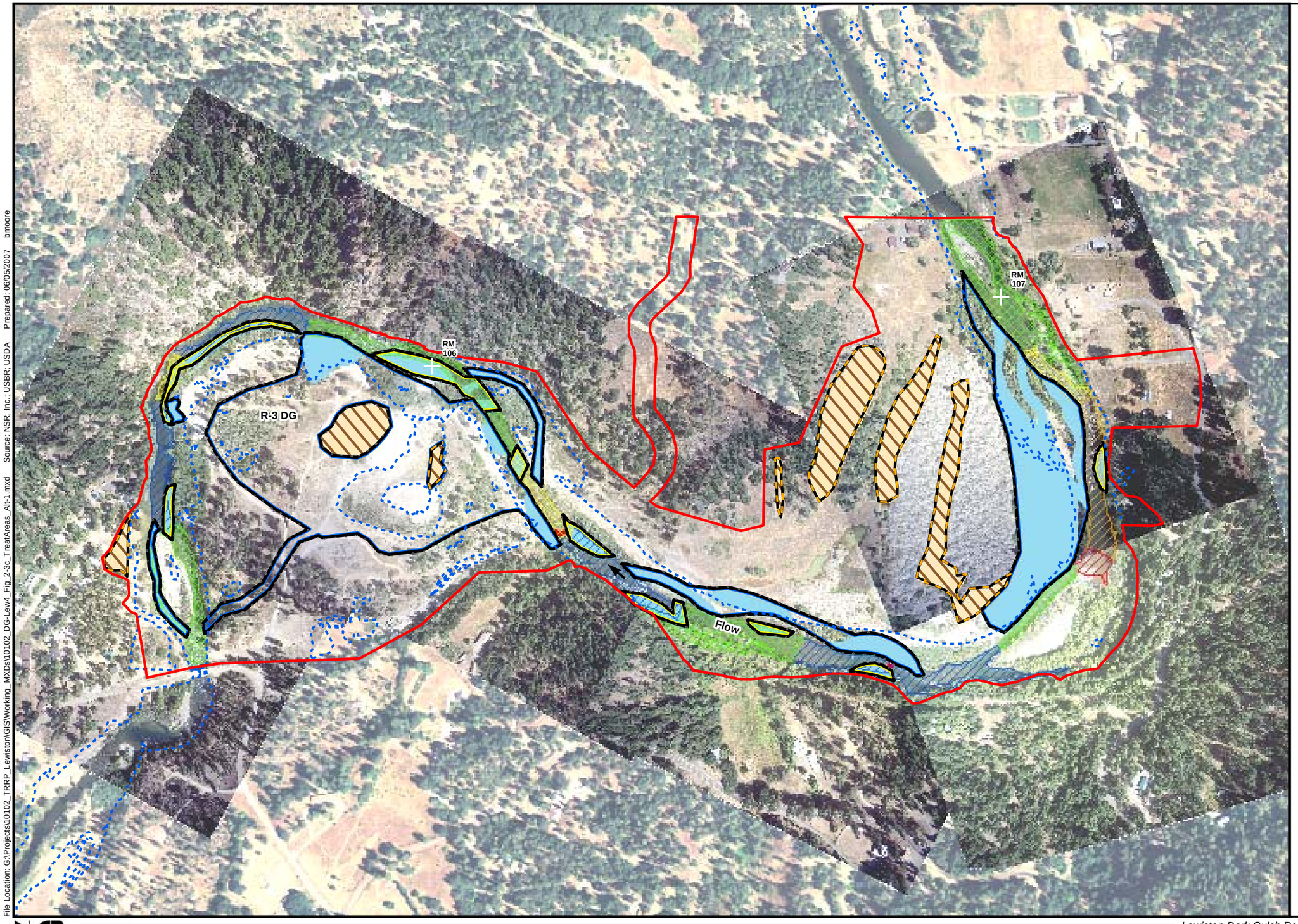
Figure 3.6-5b
Impacts of Proposed Action on Aquatic Habitats



Site Boundary (152 acres)

River Mile (RM)

Ordinary High Water Mark (6,000 cfs)

Habitat Type

Pool

Low Slope

Run

Mod Slope

Steep Slope

Activity Area

In Channel (IC)

Riverine (R)

Upland (U)

Aquatic Impact

Riverine (R) (15.03 acres)

Upland (U) (8.86 acres)

Crossing (X) (0.05 acres)

N

1:5,400

450 0 450

Feet

Aerial photography:
2005
2006

File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_DG-Lew4_Fig_2-3c_TreatAreas_Alt-1.mxd Source: NSR, Inc.; USBR; USDA Prepared: 06/05/2007 bmoore

North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-5c
Impacts of Proposed Action on Aquatic Habitats

(including spawning sized gravels) to the Trinity River at select IC activity areas will immediately provide suitable sized spawning gravels available to coho and other salmonids.

Effects on spawning habitat associated with construction of the Proposed Action are expected to be limited to short-term, localized sedimentation caused by settling of silt disturbed by bank-side excavation activities, the removal of existing grade control structures, and the addition of coarse sediment material including contouring and grading in the low-flow channel. Any salmon redds on or near the existing grade control structures or coarse sediment addition sites could be destroyed or disturbed by these construction activities. Silt suspended by these activities may be dispersed and re-settle on downstream suitable spawning areas near these construction areas. However, excavation of grade control structures would be conducted during late-summer (July 15-September 15) low-flow conditions, as authorized by NMFS and CDFG, to avoid impacts to spawning anadromous salmonids. The addition of coarse sediment at various IC activity areas would occur during the channel maintenance flows released from the TRD during the spring. While the volume of material introduced to the channel may vary by water year type, the timing would be based on the transport capacity of these flows.

Suitable rearing habitat for juvenile coho salmon and other salmonids occurs within the project boundary. Some temporary effects on the quality of juvenile salmonid rearing habitat will occur through removal of riparian vegetation that contributes to SRA habitat in the project reaches. Temporary effects to the quality of juvenile salmonid rearing habitat will also occur during excavation of the existing grade control structures and coarse sediment addition. The principal effects on fish include displacement of rearing salmonid fishes from their habitat, and an increased predation risk or reduced feeding efficiency through the loss of the cover function provided by the SRA habitat (Michney and Hampton 1984; Michney and Deibel1986). The potential direct and indirect effects to fish resulting from increased suspended sediment and turbidity levels are addressed under Impact 3.6-2.

The limited and localized temporary impacts on rearing habitat are expected to be offset in the long term by beneficial increases in and improved suitability of physical rearing habitat associated with implementing the Proposed Action. These benefits will accrue from: 1) the engineered floodplain habitat improvements, 2) overall reconnection of the floodplain to the river at low flows, 3) potential channel migration through the upper elevation floodplain, and 4) revegetation of the rehabilitated floodplain with native plant species that will contribute shade and large wood to the river channel. Improved river connection with the floodplain during high spring-time flows is expected to increase areas of slow, shallow-water habitat preferred by salmonid fry. The process of channel migration through the floodplain may also create new shallow point bars, further increasing the availability of this preferred habitat. The channel migration process and engineered side channel and alcove habitats will collectively increase the relative abundance of this preferred salmon fry rearing habitat, compared to the existing condition within the project boundaries. The Proposed Action will include construction of 6.2 acres of 300 cfs side-channel, 0.52 acre of 1,000 cfs side-channel, 0.55 acre of alcove habitat, and the addition of 77,445 tons (51,630 cubic yards) of coarse sediment, which will contribute to the quantity and quality of aquatic habitat in this reach of the Trinity River.

Ultimately, the collective changes in channel morphology as a result of the Proposed Action together with the planned future bank rehabilitation projects throughout the upper Trinity River will improve rearing habitat diversity for all anadromous salmonids (U.S. Fish and Wildlife Service and Hoopa Valley Tribe 1999). LWD will be strategically placed in restored side-channels and floodplain areas. The addition of LWD will provide complex physical habitat that will have important effects on juvenile and adult fish in the Trinity River, in that they will create spawning and rearing habitat, increase nutrient and organic matter retention (which increases food production in the system), and provide refuge from predators and cover during high winter flows (Bustard and Narver 1975; Cederholm et al. 1997; Hicks et al. 1991; Lestelle 1978; Lestelle and Cederholm 1982) as cited in (Cederholm et al. 1997). Although the impacts to coho salmon would be temporary and localized, they are significant under the Proposed Action.

Chinook Salmon. Potential impacts and benefits to Upper Klamath-Trinity Rivers ESU Chinook salmon populations in the Trinity River resulting from implementation of the Proposed Action would be generally similar to those previously described for coho salmon. Spring- and fall-run salmon are known to spawn and rear within the project boundary. Spring-run Chinook salmon juveniles can be expected to rear year-round within the project boundaries and may be displaced by in-river work activities. Additionally, adult spring-run salmon over summer in the deeper run and pool habitats within the project boundaries prior to spawning. No permanent adverse impacts to spring-run Chinook salmon holding habitat will occur. The Proposed Action does not include activities that will directly fill, modify, or otherwise affect the quality or quantity of spring-run holding habitat in the Trinity River. Temporary effects on spring-run holding habitat associated with construction of the Proposed Action are expected to be limited to short-term, localized increases in transient turbidity caused by bank-side excavation activities, the removal of existing grade control structures, and the addition of coarse sediment material including contouring and grading in the low flow channel. The potential effects of increased suspended sediment and turbidity to holding adult spring-run Chinook salmon are addressed under Impact 3.5-2.

Steelhead. Potential impacts and benefits to the KMP ESU steelhead populations in the Trinity River resulting from implementation of the Proposed Action would be generally similar to those previously described for coho and Chinook salmon. Summer, fall, and winter runs of KMP ESU steelhead are known to migrate and stage and may spawn (as adults) and rear (as juveniles) within the project boundaries established for the Proposed Action.

Pacific Lamprey. Potential impacts and benefits to Pacific lamprey populations in the Trinity River resulting from implementation the Proposed Action would be similar to those previously described for coho salmon and other anadromous salmonids. Adult Pacific lampreys migrate upstream to spawn from spring through early summer and again in the fall. The removal of riparian vegetation that contributes to SRA habitat within the project boundary could also have a temporary impact on adult Pacific lamprey by reducing holding and hiding habitat, which is particularly important for upstream migrant adults. However, the implementation of the revegetation plan will alleviate this impact over the longer term.

Alternative 1

Coho Salmon. Rehabilitation activities at the Lewiston and Dark Gulch sites under Alternative 1 would be similar to those described for the Proposed Action. Alternative 1 would result in temporary and permanent construction-related impacts to riverine habitats below the Ordinary High Water Mark (blue areas) similar to those described for the Proposed Action (Figures 3.6-6a, 3.6-6b, and 3.6-6c), with the following exceptions: 1) grade control structure at IC-2 SO would be removed, 2) treatment at R-4CW would be limited to removal of vegetation, 3) only the 300 cfs side-channel would be constructed at R-1 DG; and 4) a 300 cfs side-channel through the point bar at R-3 DG would be constructed and the alluvial materials in that riverine area would be used as a source for coarse sediment and floodplain restoration. Similar to the Proposed Action, Alternative 1 would include coarse sediment injection sites at IC-3 SO and IC-13 FG that would be used to stockpile and inject gravel for mobilization at high flows. Introduction of the gravel would take place during spring for distribution by the river during high flows or delivered to the mid-channel during high flows using mechanized equipment.

The potential for short-term and localized direct impacts associated with the removal of the grade control structure at IC-2 SO would increase under Alternative 1 due to an increased amount of in-channel disturbance. The additional construction associated with the 300 cfs floodplain through the point bar at R-3 DG would not result in short-term and localized direct impacts those impacts to coho spawning and rearing habitat identified above for the Proposed Action. The alluvium and remnant tailings materials would be extracted from area R-3 DG and the floodplain would be restored to a more functional elevation and a side-channel would be created to flow through the area. All of the expected benefits of the Proposed Action would also occur under this alternative. Although Alternative 1 would provide benefits to coho salmon, the temporary and localized impacts to spawning and rearing habitat would be significant.

Chinook Salmon. Alternative 1 would result in temporary and permanent construction-related impacts to spawning, holding, and rearing habitat for Upper Klamath-Trinity Rivers ESU Chinook salmon generally similar to those associated with the Proposed Action, except for an increase in the potential for the short-term and localized impacts associated with the removal of the grade control structure at IC-2 SO. All of the expected benefits of the Proposed Action would also occur under this alternative.

Steelhead. Alternative 1 would result in temporary and permanent construction-related impacts to spawning and rearing habitat for KMP ESU steelhead generally similar to those associated with the Proposed Action, except for an increase in the potential for the short-term and localized impacts associated with the removal of the grade control structure at IC-2 SO. All of the expected benefits of the Proposed Action would also occur under this alternative.

Pacific Lamprey. Alternative 1 would result in temporary and permanent construction-related impacts to spawning and rearing habitat for Pacific lampreys similar to those associated with the Proposed Action. All of the expected benefits of the Proposed Action would also occur under this alternative.

Mitigation Measures

No-Action Alternative

Since no significant impacts were identified, no mitigation is required.

Significance after Mitigation

N/A

Proposed Action and Alternative 1

1a Because the proposed construction schedule includes in-river work that could affect spawning spring- and fall-run Chinook salmon, coho salmon, and steelhead or their eggs once in the gravel, prior to the start of project construction, Reclamation or its contractor shall retain a qualified fisheries biologist to conduct a survey for active redds and potential spawning habitat 200 feet upstream and downstream of the proposed in-river construction activities if in-river work activities will be conducted outside of the late-summer, low-flow conditions (e.g., July 15–September 15).

1b 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 and will be free of contaminants, such as petroleum products. Washed gravel will pass Caltrans cleanliness test #227 with a value of 85 or greater.

Significance after Mitigation

Less than significant/beneficial

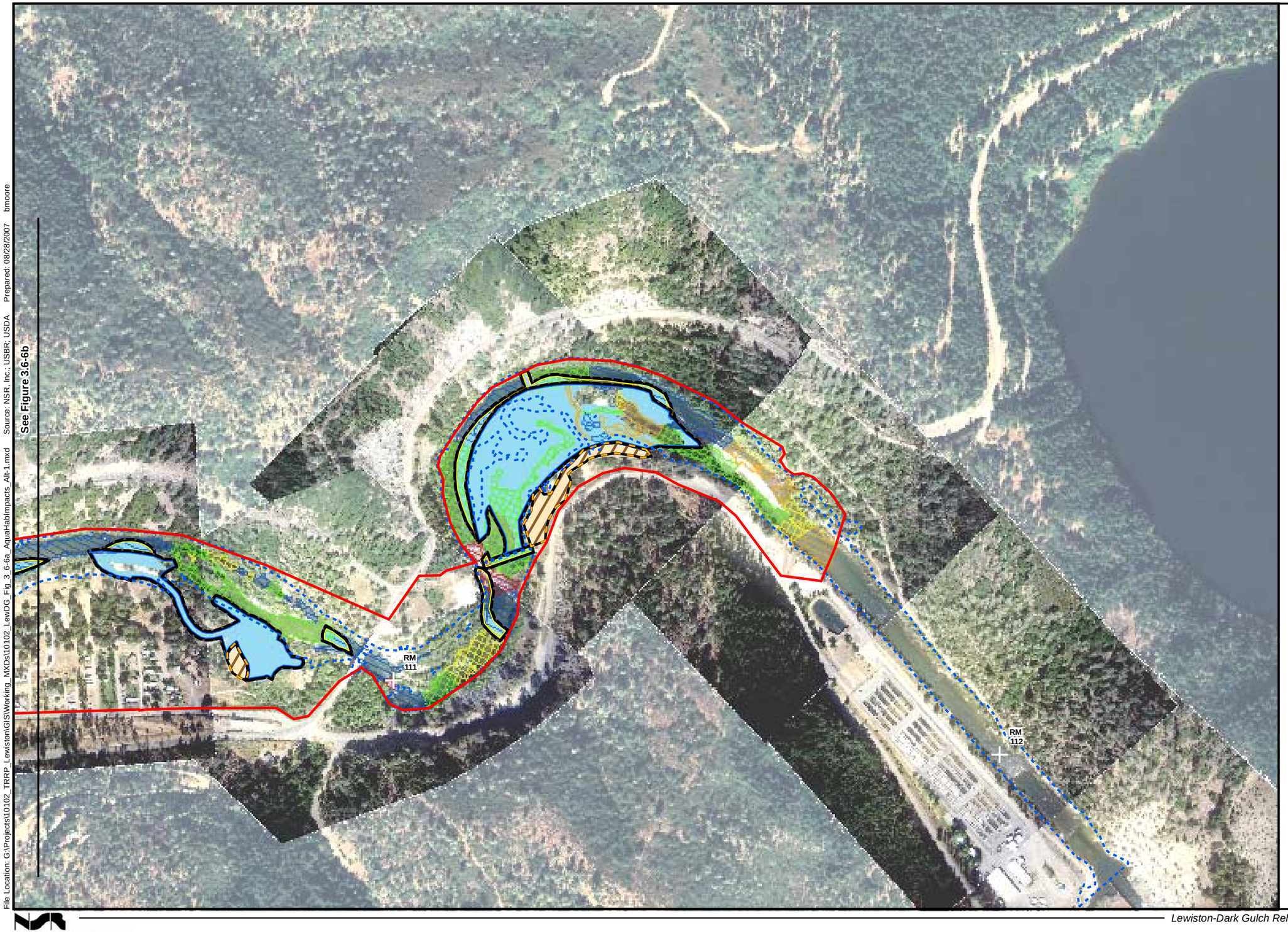
Impact 3.6-2: Implementation of the project could result in increased erosion and sedimentation levels that could adversely affect fishes, including the federally and state-listed coho salmon. ***No Impact for the No-Action Alternative; Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, there would be no increase in erosion or sedimentation levels that could adversely affect fish species because the project would not be constructed.

Proposed Action

Coho Salmon. Activities related to implementation of the Proposed Action would result in the localized loss of vegetation and general disturbance to the bed and banks of the Trinity River. Removal of vegetation and soil could accelerate erosion processes within the boundaries of the project sites and increase the potential for sediment delivery to the Trinity River. The turbidity of a water body is related to the concentration of suspended solids. Suspended solids and turbidity generally do not acutely affect aquatic organisms unless they reach extremely high levels (i.e., levels of suspended solids reaching 25 mg/L). At these high levels, suspended solids can adversely affect the physiology and behavior of aquatic



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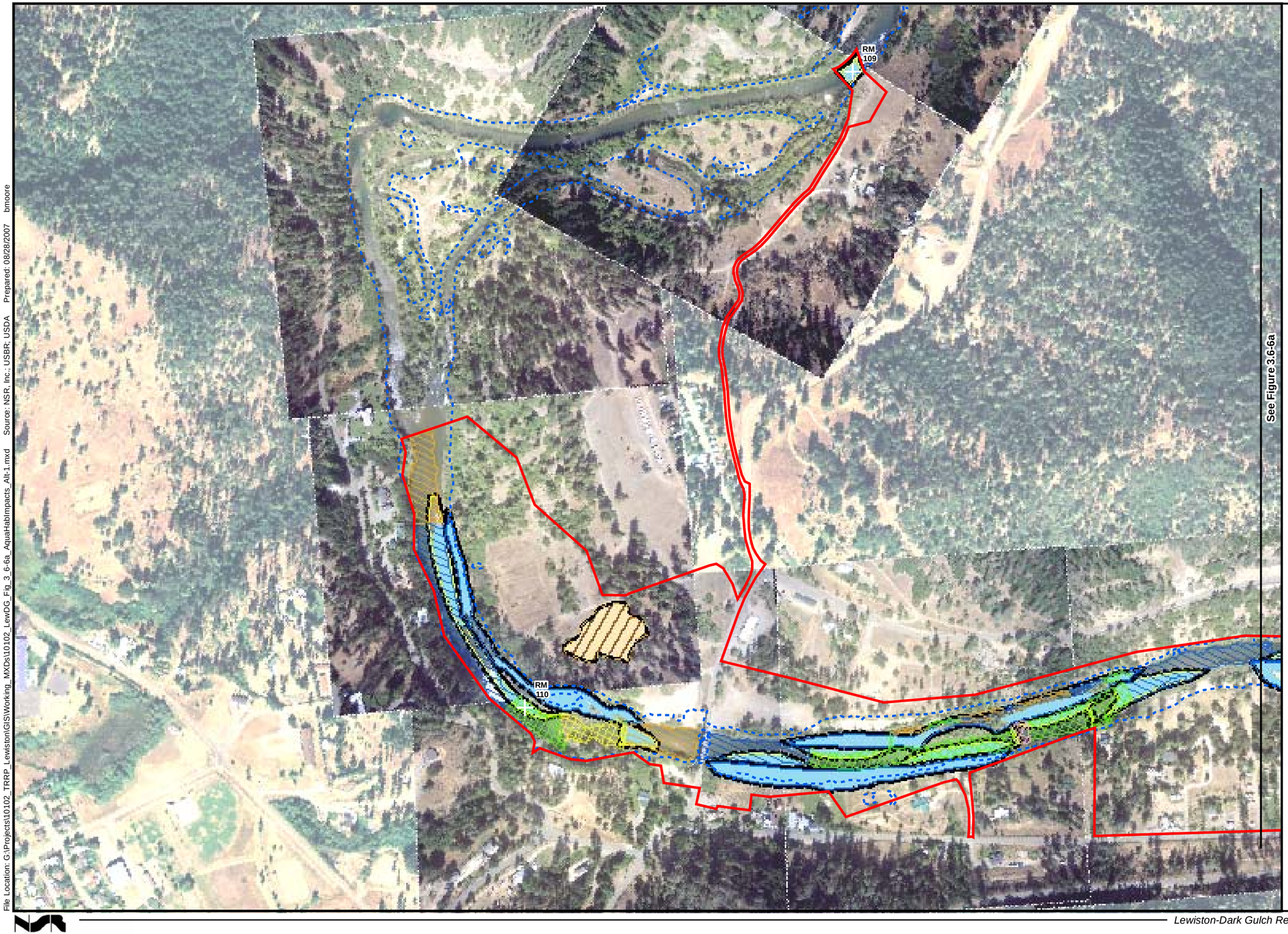
North State Resources, Inc.

Figure 3.6-6a
Impacts of Alternative 1 on Aquatic Habitats



Site Boundary (131.5 acres)

River Mile (RM)

Ordinary High Water Mark (6,000 cfs)

Habitat Type

Pool

Low Slope

Run

Mod Slope

Steep Slope

Step

Activity Area

In Channel (IC)

Riverine (R)

Upland (U)

Aquatic Impact

Riverine (R) (24.01 acres)

Upland (U) (3.2 acres)

N

1:5,400

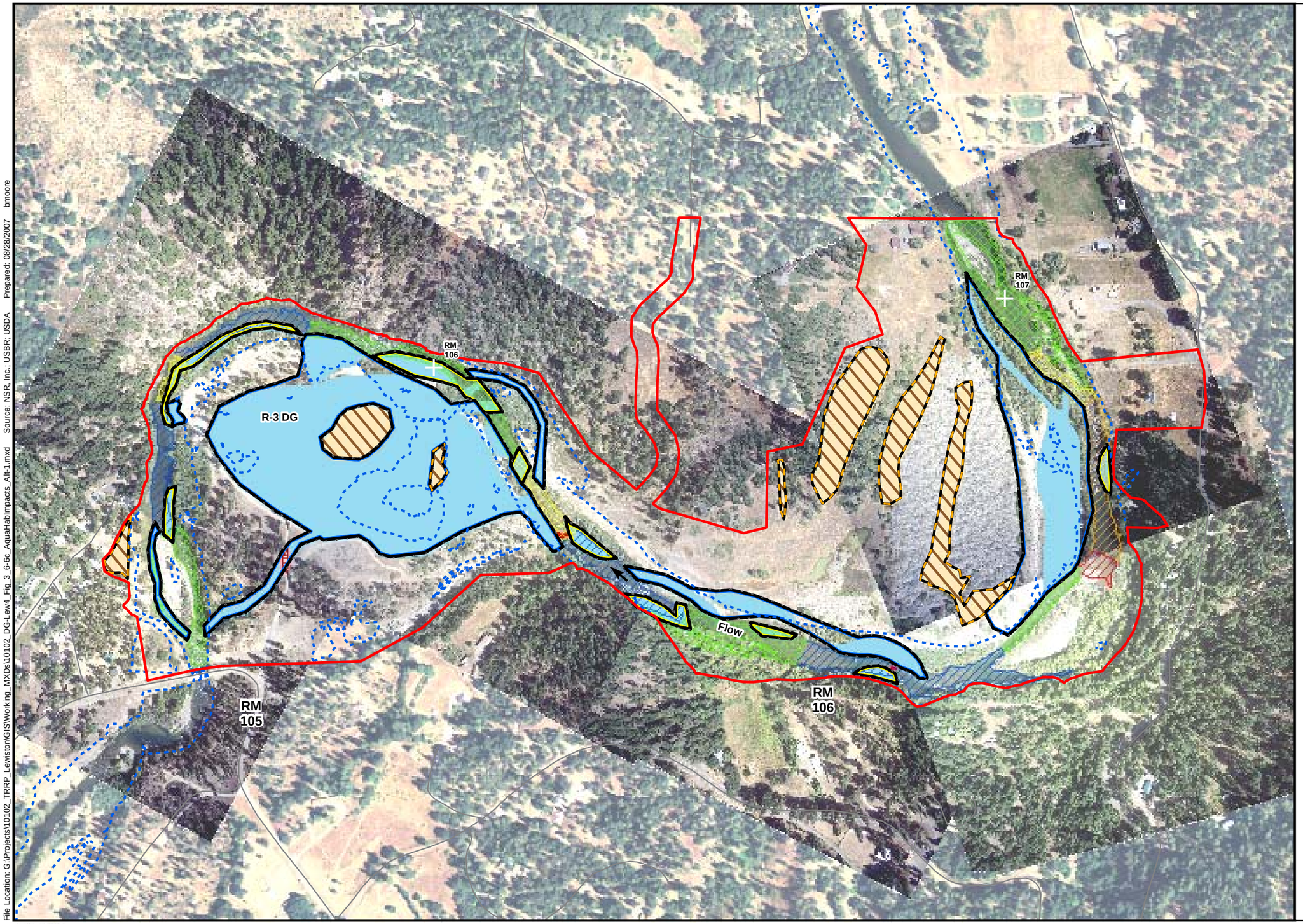
450 0 450

Feet

Aerial photography:
2005
2006

File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_LewDG_Fig_3_6-6a_AquaHabImpacts_Alt-1.mxd Source: NSR, Inc.; USBR; USDA Prepared: 08/28/2007 bmoore

Figure 3.6-6b
Impacts of Alternative 1 on Aquatic Habitats



Site Boundary (152 acres)

River Mile (RM)

Ordinary High Water Mark (6,000 cfs)

Habitat Type

Pool

Low Slope

Run

Mod Slope

Steep Slope

Activity Area

In Channel (IC)

Riverine (R)

Upland (U)

Aquatic Impact

Riverine (R) (34.15 acres)

Upland (U) (8.86 acres)

Crossing (X) (0.09 acres)

N

1:5,400

450 0 450

Feet

Aerial photography:
2005
2006

File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_DG-Lew4_Fig_3_6-6c_AquaHabImpacts_Alt-1.mxd Source: NSR, Inc.; USBR; USDA Prepared: 08/28/2007 bmoore

North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-6c
Impacts of Alternative 1 on Aquatic Habitats

organisms and may suppress photosynthetic activity at the base of food webs, affecting aquatic organisms either directly or indirectly (Alabaster and Lloyd 1980).

In-channel and riverine activities would disturb the alluvial materials that constitute the bed and banks of the Trinity River. Exposed soils on the upland and staging areas are susceptible to mobilization from rainfall during early season runoff events. In-river excavation is planned as part of the Proposed Action; therefore, it is expected that excavation and operation of heavy equipment will resuspend silt and sand, which will result in localized and temporary increases of suspended sediment and turbidity.

Approximately, 0.53 acre of mainstem Trinity River main channel habitat would be temporarily affected during the excavation and removal of existing grade control structures at the various in-channel activity areas. Additionally, 19.85 acres of mainstem Trinity River habitat would be temporarily affected during the construction of floodplain habitat and coarse sediment additions. Operation of heavy equipment in the active channel during these activities will likely resuspend streambed sediments but are not likely to add silt material to the river. Use of washed, spawning-sized gravels and the cleaning of vehicle wheels prior to crossing the channel will minimize the effects of this action on fish habitat. Any juvenile coho salmon rearing in the area during gravel placement or vehicle crossings may be temporarily displaced or their social behavior may be temporarily disrupted by turbidity created during this activity.

Erosion and deposition of fine sediments associated with implementation of the Proposed Action are expected to be localized and temporary. Some fine-textured materials may settle near or on known spawning habitats located downstream of riverine rehabilitation areas, but these materials are not expected to impair redd excavation or spawning. Excavation, grading, and coarse sediment addition within the channel would occur only during low-flow conditions between July 15 and September 15, 2008, minimizing the potential for adverse effects on all life stages of coho salmon. Any juvenile coho salmon rearing in the area during this timeframe could be temporarily displaced or their social behavior could be temporarily disrupted by an increase in turbidity. Behavioral disruption, even temporarily, could result in some increased vulnerability to competitive interactions or predation for juvenile coho salmon (Berg and Northcote 1985). These temporary impacts were anticipated and addressed in the 2000 Biological Opinion and associated incidental take statement for the ROD and amended BO for in-river work. While the Proposed Action is intended to increase aquatic habitat, the short-term impacts associated with construction activities would be considered significant.

Chinook Salmon. Potential impacts to Upper Klamath-Trinity Rivers ESU Chinook salmon populations in the Trinity River resulting from implementation of the Proposed Action would be generally similar to those described for coho salmon. Consequently, re-suspension of fine-textured sediment, potential erosion and sediment runoff, and elevated turbidity for short distances downstream could occur during the migration, spawning, and rearing seasons. Spring- and fall-run Chinook salmon are known to spawn in suitable habitats encompassed by the project boundary. Construction activities are proposed during the spawning period, and in-river construction may temporarily displace holding adult salmonids. Some fine-textured materials may settle near or on known spawning habitats located downstream of riverine rehabilitation areas, but these materials are not expected to impair redd excavation or spawning. Spring-run Chinook juveniles are expected to rear throughout the year within the project boundaries and transient

increases in turbidity and re-suspension of sediments would be likely to have similar effects on juvenile Chinook salmon as on coho salmon. Adult spring-run Chinook salmon using holding habitat during the summer months may be displaced to other holding habitats either upstream or downstream by transient turbidity and sediment plumes created by construction activity.

Steelhead. Potential impacts to the KMP ESU steelhead populations in the Trinity River resulting from implementation of the Proposed Action would be similar to those previously described for coho and Chinook salmon. Summer, fall, and winter runs of KMP ESU steelhead are known to migrate, stage (as adults), and rear (as juveniles) within the project boundaries throughout the proposed construction season. All three runs generally spawn during the winter.

Pacific Lamprey. Potential impacts to Pacific lamprey populations in the Trinity River resulting from implementation of the Proposed Action would be similar to those previously described for coho salmon and other anadromous salmonids. Adult Pacific lampreys migrate upstream to spawn from spring through early summer and again in the fall. Larval lampreys inhabit the river year-round. Siltation of nests that may be built in suitable habitats (i.e., low-gradient riffles) could occur. Filter feeding by larval lampreys could be disrupted by an increase in suspended sediments caused by construction-related erosion, although this impact would be very localized and temporary.

Alternative 1

Coho Salmon. Alternative 1 would result in temporary effects on coho salmon from erosion, sedimentation, and turbidity generally similar to those described for the Proposed Action, except for the potential increase in the short-term and localized sediment and turbidity impacts associated with the removal of the grade control structure at IC-2 SO. All of the expected benefits of the Proposed Action would also occur under this alternative. While Alternative 1 is intended to increase aquatic habitat, the short-term impacts associated with construction activities would be considered significant.

Chinook Salmon. Alternative 1 would result in erosion, sedimentation, and turbidity impacts to Upper Klamath-Trinity Rivers ESU Chinook salmon similar to those previously described for coho salmon.

Steelhead. Alternative 1 would result in temporary effects on KMP ESU steelhead from erosion and sedimentation similar to those previously described for coho and Chinook salmon.

Pacific Lamprey. Alternative 1 would result in temporary effects on Pacific lampreys from erosion and sedimentation similar to those previously described for coho, Chinook, and steelhead.

Mitigation Measures

No-Action Alternative

Since no significant impacts were identified, no mitigation is required.

Significance after Mitigation

N/A

Proposed Action and Alternative 1

2a Turbidity increases associated with project construction activities shall not exceed the Regional Water Board water quality objectives for turbidity in the Trinity River basin. Turbidity levels are defined in nephelometric turbidity units (NTUs). The current threshold for turbidity levels in the Trinity River, as listed in the Basin Plan for the North Coast Region (2001), is summarized below.

- Turbidity shall not be increased by more than 20 percent above naturally occurring background levels. Allowable zones of dilution within which higher percentages can be tolerated may be defined for specific discharges upon the issuance of discharge permits.

2b To ensure that turbidity levels do not exceed the threshold listed above during project construction activities, Reclamation or its contractor shall monitor turbidity levels 50 feet upstream and 500 feet downstream of construction activities. At a minimum, field turbidity measurements shall be collected on a daily basis during in-water and river's edge construction (within 10 feet of the water line). Whenever a visible increase in turbidity is observed, monitoring frequency shall be a minimum of every 2 hours.

- If the grab sample results indicate that turbidity levels exceed the established thresholds identified in the Basin Plan, actions shall be implemented immediately to reduce and maintain turbidity at or below the thresholds. Potential remedial actions include temporarily halting in-channel construction activities and implementation of additional Best Management Practices (BMPs) until turbidity is at or below the thresholds.

2c Proper implementation of erosion and sediment containment devices during and after construction shall be adequate to minimize sediment inputs into the Trinity River. Decompaction and ripping of floodplain areas is expected to eliminate surface runoff during the first year post-construction.

Because shoreline construction activities must be able to take place during the fall and potentially during the winter (after October 15 and before April 15), temporary erosion and sediment control structures must be in place and operational at the end of each construction day. Measures for erosion control will be prioritized based on proximity to the river.

Spoil sites shall be located such that they do not drain directly into a surface water feature, if possible. If a spoil site drains into a surface water feature, catch basins shall be constructed to intercept sediment before it reaches the feature. Spoil sites shall be graded and vegetated to reduce the potential for erosion.

2d Reclamation or its contractor shall prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) that describes Best Management Practices (BMPs) for the project. Ripping of all riparian areas to create furrows parallel to the river is expected to stop delivery of storm water to the river; however, BMPs, including silt fences, sediment filters, and routine monitoring to verify effectiveness, may be necessary. Proper implementation of erosion and sediment controls and dewatering activities shall be adequate to minimize sediment inputs into the Trinity River until construction ends. All sediment containment devices and erosion control devices will be inspected daily during the construction period to ensure that the devices are functioning properly.

Any erosion control devices found to be nonfunctional must be repaired or replaced following their discovery or by the end of the work day if rain is imminent or if a greater than 50 percent possibility of rain has been forecast within the following 24 hours by the National Weather Service. In those cases where, for safety reasons, repairs cannot be made immediately, they should be completed as soon as the work can safely be performed. Excavated and stored materials will be kept in upland sites with erosion control properly installed and maintained. Excavated and stored materials will be staged in stable upland sites. All applicable erosion control standards will be required during stockpiling of materials.

Significance after Mitigation

Less than significant

Impact 3.6-3: Construction activities associated with the project could potentially result in the accidental spill of hazardous materials that could adversely affect fishes, including the federally and state-listed coho salmon. ***No Impact for the No-Action Alternative; Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, there would be no risk of accidental spills of hazardous material because the project would not be constructed.

Proposed Action

Coho Salmon. Construction activities typically include the refueling of construction equipment on location. As a result, minor fuel and oil spills could occur, and there would be a risk of larger releases. Without rapid containment and clean up, these materials could be toxic, depending on the location of the spill in proximity to surface water features, including the Trinity River. Oils, fuels, and other contaminants could have deleterious effects on all salmonid life stages within close proximity to construction activities. These impacts, while short-term, are considered significant.

Chinook Salmon. Potential impacts to Upper Klamath-Trinity Rivers ESU Chinook salmon populations in the Trinity River resulting from the accidental spill of hazardous materials would be similar to those previously described for coho salmon.

Steelhead. Potential impacts to KMP ESU steelhead populations in the Trinity River resulting from accidental spill of hazardous materials would be similar to those previously described for coho salmon.

Pacific Lamprey. Potential impacts to Pacific lamprey populations in the Trinity River resulting from accidental spill of hazardous materials would be similar to those previously described for coho salmon.

Alternative 1

The risk of, and impacts resulting from, construction-related accidental spills of hazardous materials associated with Alternative 1 would be similar to those associated with the Proposed Action for all anadromous fish species. These impacts would be significant.

Mitigation Measures

No-Action Alternative

Since no significant impacts were identified, no mitigation is required.

Significance after Mitigation

N/A

Proposed Action and Alternative 1

Construction specifications shall include the following measures to reduce potential impacts associated with accidental spills of pollutants (fuel, oil, grease, etc.) to vegetation and aquatic habitat resources within the project boundary:

3a Equipment and materials shall be stored away from wetland and surface water features.

3b Vehicles and equipment used during construction shall receive proper and timely maintenance to reduce the potential for mechanical breakdowns leading to a spill of materials. Maintenance and fueling shall be conducted in an area at least 150 feet away from waters of the Trinity River or within an adequate fueling containment area.

3c The contractor will develop and implement site-specific Best Management Practices (BMPs), a water pollution control plan, and emergency spill control plan. The contractor will be responsible for immediate containment and removal of any toxins released.

Section 3.5, Water Quality, and Section 3.15, Hazards and Hazardous Materials, provide additional details on mitigation measures developed for water quality standards, hazards, and hazardous materials.

Significance after Mitigation

Less than significant

Impact 3.6-4: Construction activities associated with the project could result in the mortality of rearing fishes, including the federally and state-listed coho salmon. ***No Impact for the No-Action Alternative; Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, construction-related mortality to rearing salmonids would not occur because the project would not be constructed.

Proposed Action

Coho Salmon. Coho salmon are known to occur throughout the Trinity River. Suitable coho salmon rearing habitat exists within the boundaries of the project sites, and juvenile coho salmon may be expected to rear within these boundaries year-round. Adult coho migrate through the boundaries and use suitable spawning habitat throughout the reach. Direct injury to, or mortality of, coho salmon could occur during in-river construction activities, including excavation of existing grade control structures, coarse sediment addition including grading, and use of river crossings X-1 DG and X-2 DG planned under the Proposed Action. Excavation of the existing grade control structures, coarse sediment addition and associated grading would be conducted only during late-summer, low-flow conditions (e.g., July 15 – September 15), minimizing the potential for direct mortality to rearing coho, since this period corresponds to a time of the year when the fewest number of juvenile coho salmon are known to occur in the project reach.

NMFS expects that all displaced juvenile fish, including coho salmon, will find suitable habitat within river reaches downstream of the project, since juvenile rearing habitat within the mainstem Trinity River is likely under-saturated during summer and fall months (National Marine Fisheries Service 2006). The construction period identified above would completely avoid the spawning period for coho salmon; therefore, direct impacts to adult coho salmon or their eggs/alevins would not occur. However, direct impacts to juvenile coho salmon could occur during the annual, long-term addition of coarse sediment at stream-side injection sites during spring flow events (planned at IC-3 SO and IC-13 FG). Coarse sediment would be injected by positioning the material bankside for distribution by the river at high flows, or by delivering the material to the mid-channel via mechanized equipment. This could result in injury to, or mortality of, juvenile coho salmon if they are present, which would be a significant impact.

A small, temporary, but uncertain level of stranding of coho salmon fry could occur on the newly excavated floodplains and side channels during rapidly receding flood-flow periods during the winter and early spring when fry are emerging. Additionally, construction of side channel features could result in stranding conditions as flows recede, particularly if the downstream end fills with fine sediments, potentially stranding coho salmon fry. Although stranding of fry under such receding flood conditions occurs on naturally shallow floodplains and in flood bypasses (Sommer 2001), the constructed features could increase this process to varying degrees. All of the floodplain designs incorporate a downstream slope equal to that of the river channel and would drain in a downstream direction that would be guided toward the river channel by earthwork contours to minimize the potential for stranding. As fluvial channel migration occurs through the floodplain, the potential for fry stranding on the floodplain is expected to equilibrate to that of a natural stranding risk. While the activities included in the Proposed Action are intended to benefit coho salmon, the short-term construction impacts would be significant.

Chinook Salmon. Potential impacts to Upper Klamath-Trinity Rivers ESU Chinook salmon populations in the Trinity River resulting from implementation of the Proposed Action would be similar to those previously described for coho salmon. Physical construction within and directly adjacent to the river channel could disturb holding spring-run Chinook salmon. The principal effect to spring-run is that they would be forced to relocate. The Proposed Action would not impair migration, and spring-run Chinook

salmon would be able to locate and use suitable holding habitat outside of the disturbed areas. Water temperatures are the coolest in the reach of the Trinity River encompassed by the project boundaries and physiological effects, or ultimately death, are not expected, as temperatures in this reach of the Trinity River (13-15°C) are below the threshold observed where spring run can accumulate stresses. Based on the proximity of the project boundary to holding habitat observed in 2003/2004, and ongoing studies on temperature tolerance, temperatures in this section of the Trinity River are sufficiently cool that spring-run Chinook salmon are able to deal with stressors (e.g., relocation) without adverse effect (North State Resources and Colorado State University In Preparation).

Steelhead. Potential impacts to the KMP ESU steelhead populations in the Trinity River resulting from implementation of the Proposed Action would be similar to those previously described for coho and Chinook salmon.

Pacific Lamprey. Potential impacts on Pacific lamprey populations in the Trinity River resulting from implementation of the Proposed Action would be similar to those previously described for coho salmon and other anadromous salmonids.

Alternative 1

Construction-related mortality of adult and juvenile fishes associated with Alternative 1 would be generally similar to that of the Proposed Action, except for an increase in the potential for direct impacts associated with the removal of the grade control structure at IC-2 SO.. While the activities included in Alternative 1 are intended to benefit salmonids and other aquatic organisms, the short-term construction impacts would be significant.

Mitigation Measures

No-Action Alternative

Since no significant impacts were identified, no mitigation is required.

Significance after Mitigation

N/A

Proposed Action and Alternative 1

4a To avoid or minimize potential injury and mortality of fish during riverine activities (removal of grade control structures, channel crossings, addition and grading of coarse sediment), equipment shall be operated slowly and deliberately to alert and scare adult and juvenile salmonids away from the work area.

4b Reclamation or its contractor shall 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.

4c To avoid or minimize potential injury and mortality of fish during excavation and placement of fill materials within the active low-flow channel, equipment shall be operated slowly and deliberately to alert and scare adult and juvenile salmonids away from the work area. The contractor shall be instructed 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 shall be added slowly and deliberately to allow fish to move from the work area.

4d Monitoring of the rehabilitated floodplain sites for salmon fry stranding shall 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., $Q \geq 6{,}000$ cfs) for a period of 3 years following construction. These flows, and associated fry stranding surveys, would occur most frequently between January and May. If substantial stranding is observed, Reclamation will take appropriate measures to return stranded fishes to river habitats and to modify floodplain topography to reduce the likelihood of future occurrences of fry stranding.

Significance after Mitigation: Less than significant

Impact 3.6-5: Implementation of the project would result in the permanent and temporary loss of shaded riverine aquatic habitat (SRA) for anadromous salmonids. ***No Impact for the No-Action Alternative; Significant Impact for the Proposed Action and Alternative 1***

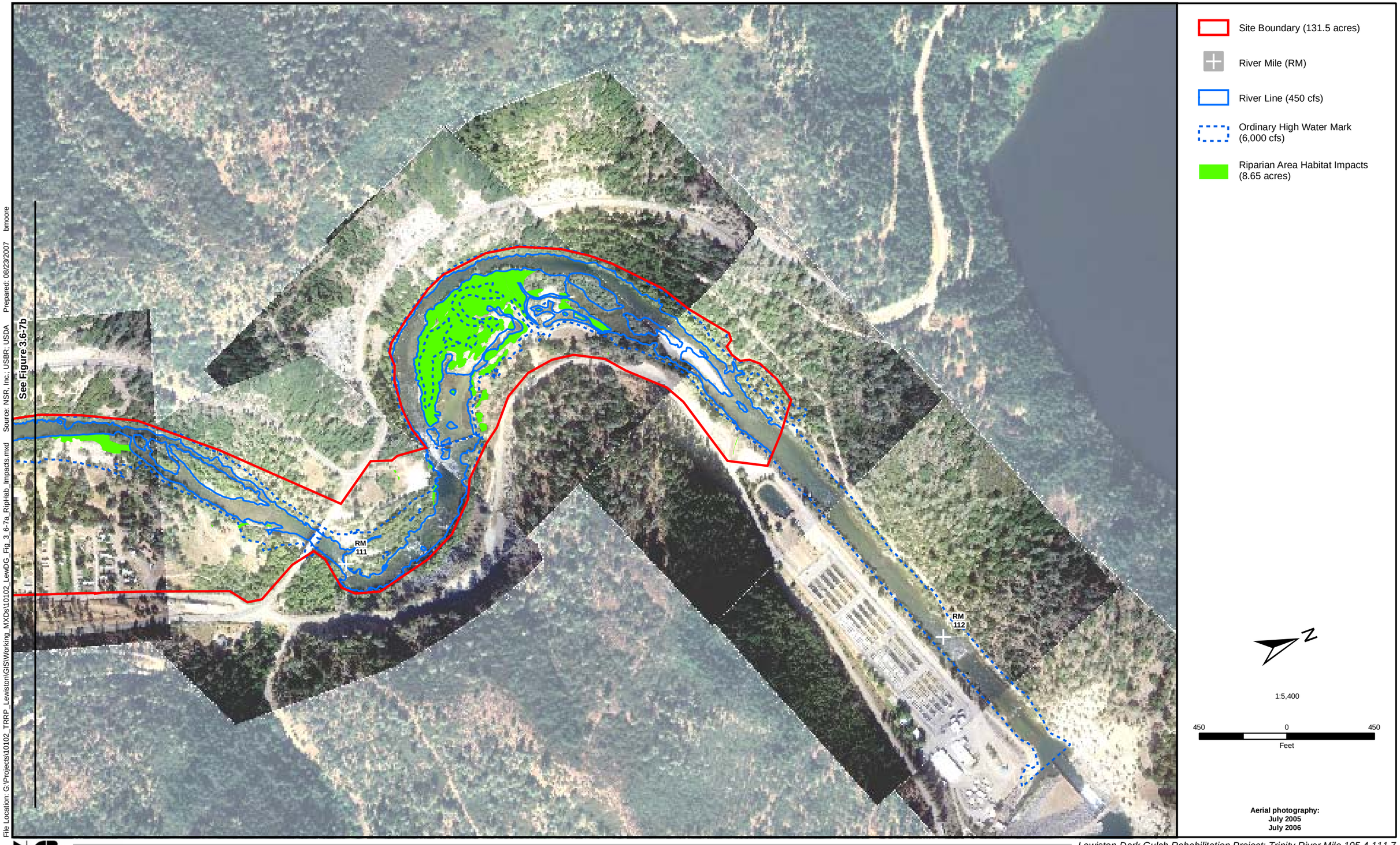
No-Action Alternative

Under the No-Action Alternative, loss of SRA habitat would not occur because the project would not be constructed.

Proposed Action and Alternative 1

For the purposes of this EA/Draft EIR, the term riparian habitat encompasses the range of riparian vegetation conditions within the boundaries of the project sites. It does not have a specific legal description or definition. To illustrate the impacts to this habitat, a set of figures is provided at the end of this section. Figures 3.6-7a-c represent the impacts of the Proposed Action. Figures 3.6-8a-c represent the impacts of Alternative 1.

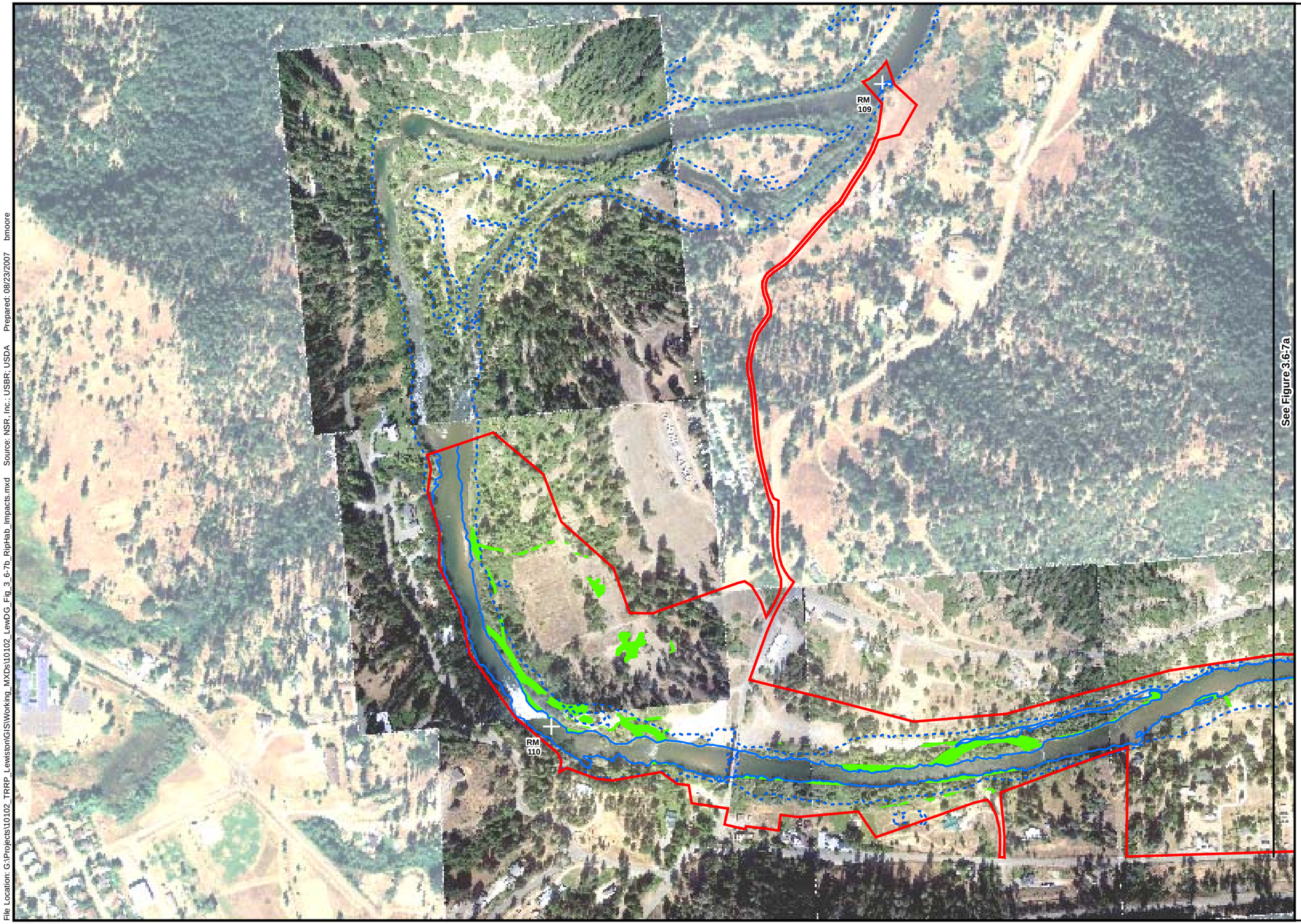
Coho Salmon. Removal of montane riparian wetland vegetation along the banks of the Trinity River could adversely affect the quality of rearing habitats used by salmonids. Riparian vegetation is important to the maintenance of healthy fish habitat. Riparian areas provide shade and temperature benefits, sediment, nutrient and chemical regulation, stream bank stability, and inputs of large woody debris and organic matter to the channel. Riparian vegetation that is adjacent to the river, a component of SRA habitat, is an element of designated critical habitat for the SONCC ESU coho salmon and a component of



File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_LewDG_Fig_3_6-7a_RipHab_Impacts.mxd Source: NSR, Inc.; USBR; USDA Prepared: 08/29/2007 bmoore

North State Resources, Inc.

Figure 3.6-7a
Impacts to Proposed Action Riparian Area Habitat



Site Boundary (131.5 acres)

River Mile (RM)

Ordinary High Water Mark (6,000 cfs)

River Line (450 cfs)

Riparian Area Habitat Impacts (8.65 acres)

N

1:5,400

450 0 450

Feet

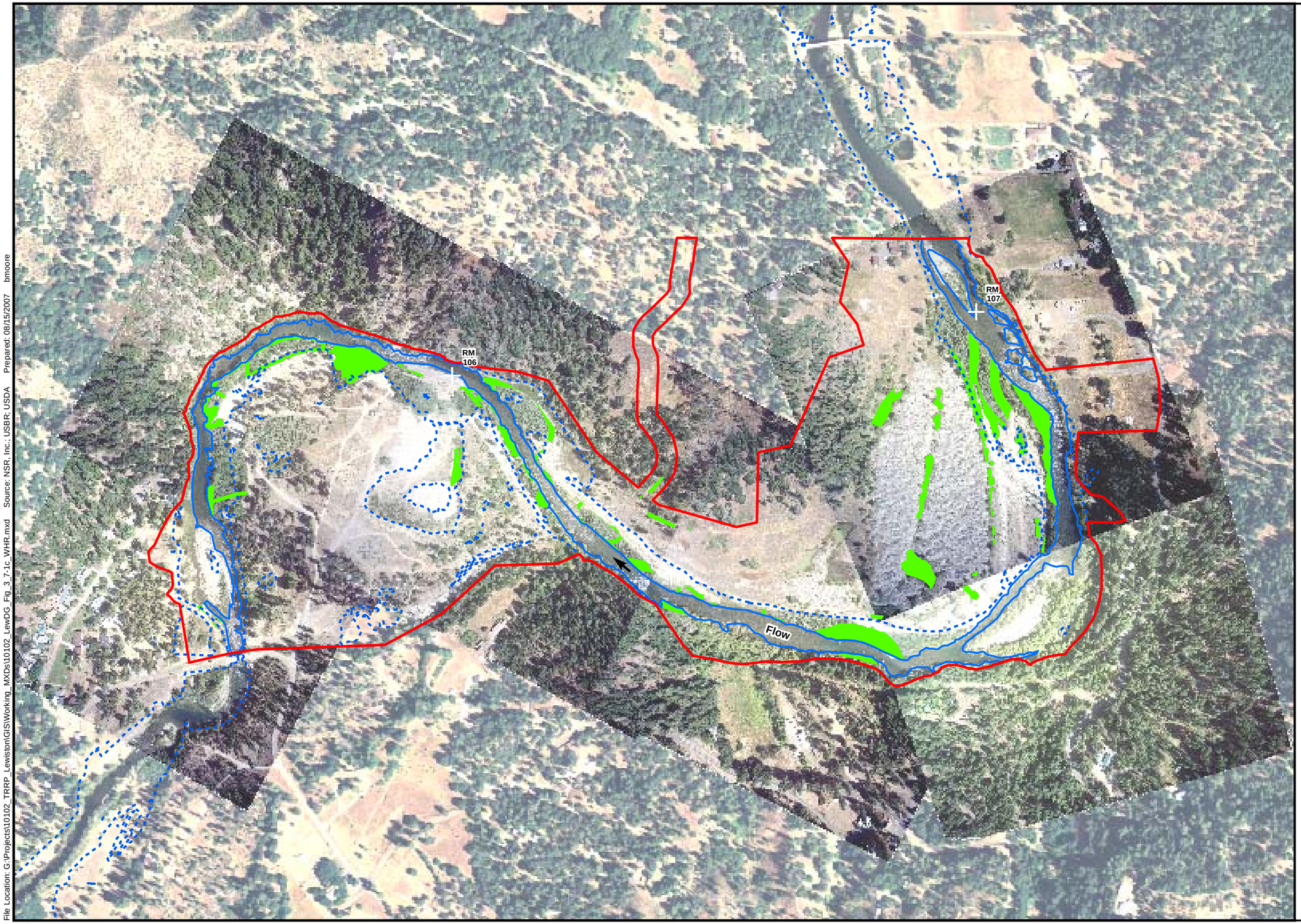
Aerial photography:
2005
2006

File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_LewDG_Fig_3_6-7b_RipHab_Impacts.mxd Source: NSR, Inc.; USBR; USDA Prepared: 08/23/2007 bmoore

North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-7b
Impacts to Proposed Action Riparian Area Habitat



Site Boundary (152 acres)

River Mile (RM)

River Line (450 cfs)

Ordinary High Water Mark (6,000 cfs)

Riparian Area Habitat Impacts (7.08 acres)

N

1:5,893

450 0 450

Feet

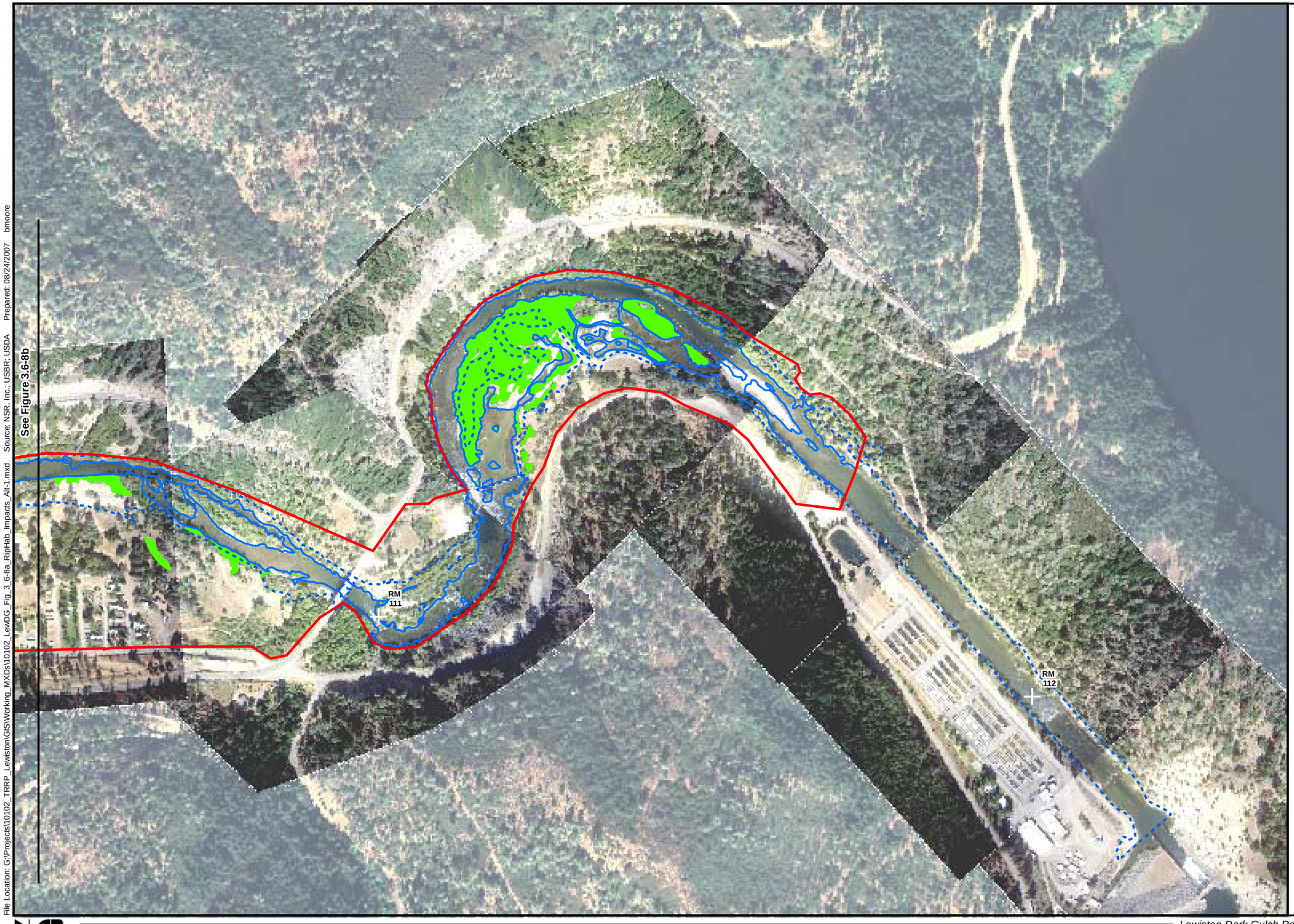
Aerial photography:
July 2005
July 2006

File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_LewDG_Fig_3_7-1c_WHR.mxd Source: NSR, Inc.; USBR; USDA Prepared: 08/15/2007 bmoore

North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-7c
Impacts to Proposed Action Riparian Area Habitat

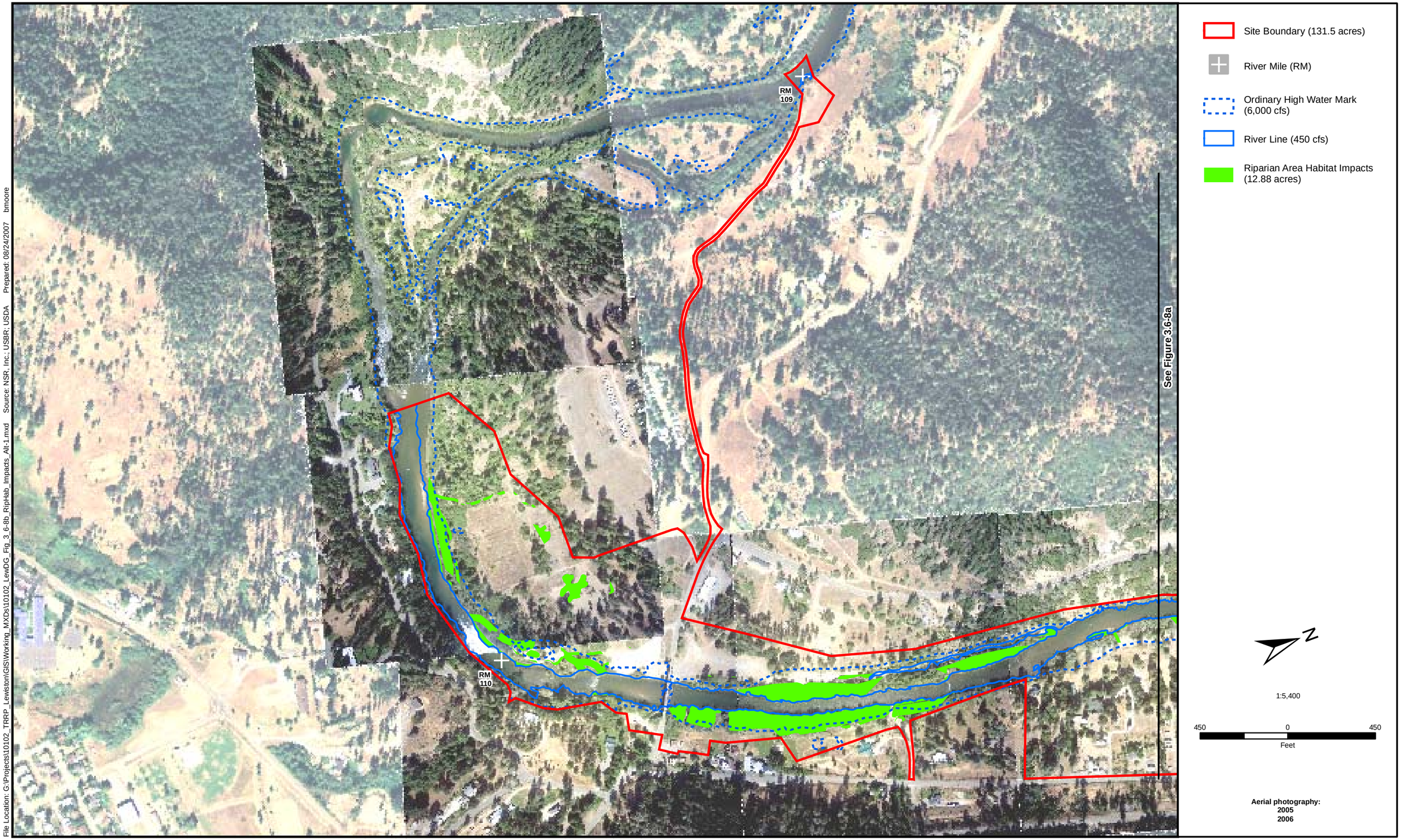


File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_LewDG_Fig_3_6-8a_RipHab_Impacts_Alt-1.mxd Source: NSR, Inc.; USBR; USDA Prepared: 08/24/2007 bmoore

North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-8a
Impacts to Alternative 1 Riparian Area Habitat

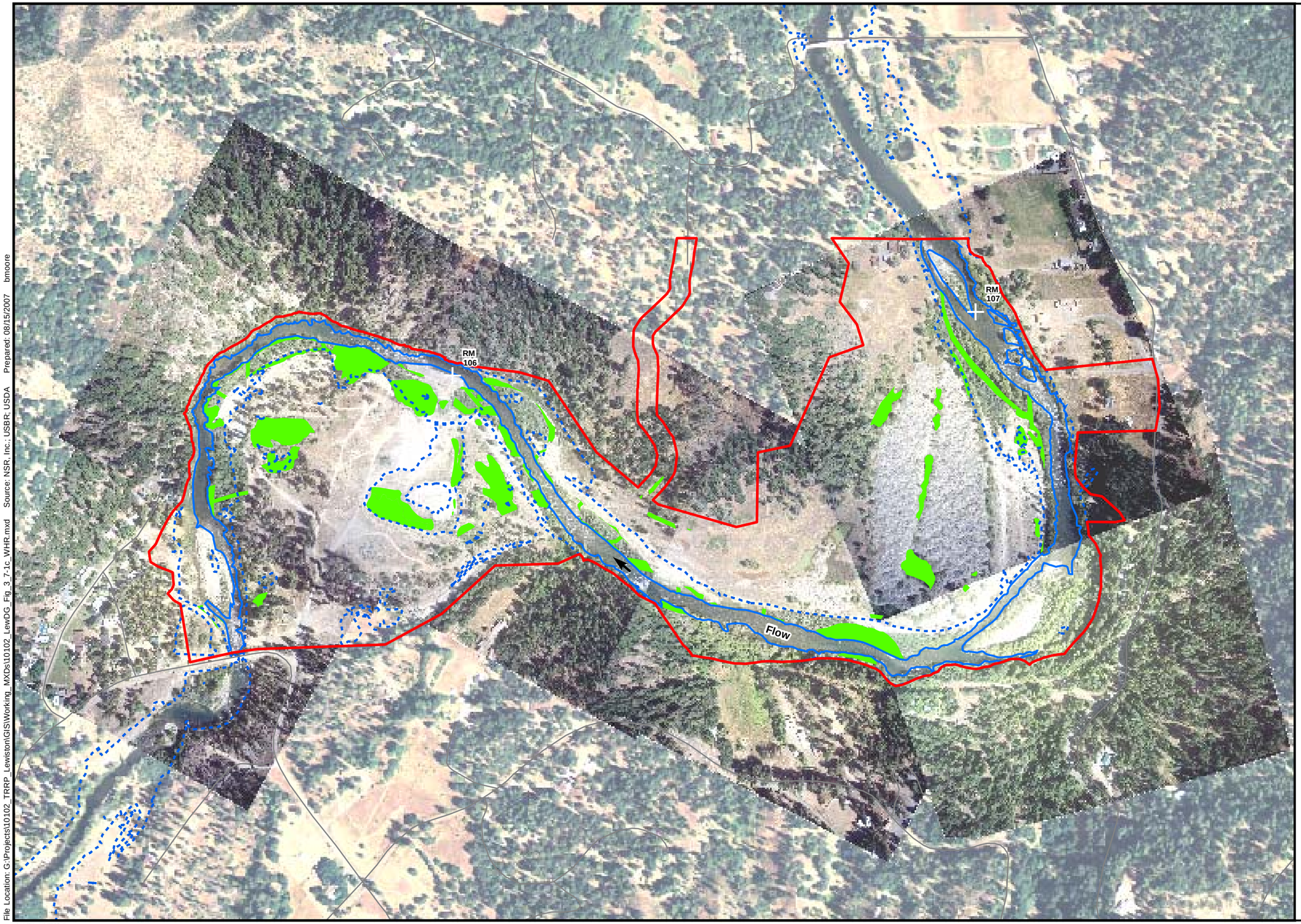


File Location: G:\Projects\10102_TRRP_Lewiston\GIS\Working_MXDs\10102_LewDG_Fig_3_6-8b_RipHab_Impacts_Alt-1.mxd Source: NSR, Inc.; USBR; USDA Prepared: 08/24/2007 bmoore

North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-8b
Impacts to Alternative 1 Riparian Area Habitat



Site Boundary (152 acres)

River Mile (RM)

River Line (450 cfs)

Ordinary High Water Mark (6,000 cfs)

Riparian Area Habitat Impacts (9.83 acres)

N

1:5,893

450 0 450

Feet

Aerial photography:
July 2005
July 2006

File Location: G:\Projects\10102_TRRP_LewistonGIS\Working_MXDs\10102_LewDG_Fig_3_7-1c_WHR.mxd Source: NSR, Inc.; USBR; USDA Prepared: 08/15/2007 bmoore

North State Resources, Inc.

Lewiston-Dark Gulch Rehabilitation Project: Trinity River Mile 105.4-111.7

Figure 3.6-8c
Impacts to Alternative 1 Riparian Area Habitat

EFH for Chinook and coho salmon. However, complexity in the riparian environment is also an important component of fish habitat; such complexity would be increased under the Proposed Action.

Removal of the riparian berm and re-activation of adjacent floodplains within riverine rehabilitation areas would allow for natural revegetation of most of the riparian habitat (mixture of willows, alders, and cottonwoods) that would be lost as a result of berm removal and floodplain contouring. Under the Proposed Action and Alternative 1, large seed trees (willow and cottonwood) and large nesting trees would be left intact. Additionally, riparian habitat removed under the Proposed Action and Alternative 1 would be replaced during the revegetation efforts. While no permanent net loss of SRA features would necessarily occur, the short-term impact of removing riparian vegetation is considered a significant impact.

Mitigation Measures

No-Action Alternative

Since no significant impacts were identified, mitigation is not required.

Significance after Mitigation

N/A

Proposed Action and Alternative 1

To maintain overall SRA habitat values within the project reach, the Proposed Action would be designed to minimize losses of riparian vegetation adjacent to the Trinity River channel, except where necessary to re-activate river access to the floodplain. Boundary markers shall be installed along all riparian areas outside of delineated rehabilitation areas. These markers will prevent construction access so that impacts to riparian vegetation are minimized. To compensate for the loss of riparian vegetation within the project boundaries, Reclamation shall implement the following measures:

5a To mitigate for the loss of riparian habitat, the project will be designed to preserve riparian vegetation within the site boundaries (1) to increase the diversity of native vegetation types and age classes available post-project and (2) to facilitate natural recolonization of constructed surfaces by native vegetation. Prior to the start of construction activities, Reclamation shall identify potential construction access routes that avoid and/or minimize, to the fullest extent, impacts to riparian habitat. In addition, Reclamation shall clearly identify and flag biologically sensitive areas (e.g., jurisdictional waters and riparian habitat) to be protected during construction activities. Each biologically sensitive area to be avoided will be flagged, staked, or otherwise marked to ensure that construction activities do not encroach upon them. Reclamation shall inspect and maintain marked areas regularly throughout the construction phase.

5b Reclamation shall develop a Riparian Revegetation and Monitoring Plan, subject to approval by USACE, the Regional Water Board, and CDFG, prior to implementing the proposed project. The plan shall include measures that ensure that all riparian vegetation removed by the TRRP projects within the 40-mile corridor of the Trinity River downstream of Lewiston Dam will be replaced by

natural recruitment, replanting, or any combination thereof, at an areal ratio of 1:1, within a 5- year time-frame. These measures shall support the TRRP objective to restore the existing homogeneous vegetation pattern with a more diverse assemblage of riparian vegetation, including provisions for incorporation of native species that can resist invasion by noxious plant species. Because the existing Trinity River channel is encroached upon (up to 300 percent) by a homogeneous riparian vegetation community thought to be less suitable for fish and wildlife habitat, the plan need not require strict replacement based on original stem counts and species.

5c Reclamation shall initiate a 5-year mitigation monitoring program following the first growing season after project implementation. After a period of 3 years, Reclamation, in consultation with USACE, the Regional Water Board and CDFG, will determine the need, if any, for additional plantings and will assess and/or remedy any loss of riparian habitat, including jurisdictional wetlands within the site boundaries, defined in the EA/EIR, to ensure that no-net loss of wetlands and riparian habitat occurs within the 5-year monitoring period. Monitoring the response of riparian habitat to the channel rehabilitation project after 3 years into the 5-year vegetation recovery period will allow Reclamation to take any additional necessary actions to meet the goal of no net-loss of riparian habitat within the boundaries of the Lewiston and Dark Gulch sites.

5d Reclamation shall complete a post-project wetland delineation and vegetation habitat evaluation as a basis for comparing pre- and post-project conditions and submit the results to USACE, the Regional Water Board, and CDFG. This post-project vegetation survey will occur approximately 5 years after revegetation is completed. In the event that this delineation identifies a net loss in riparian habitat, Reclamation shall enhance or reestablish riparian vegetation that will function as SRA habitat within the boundaries of the rehabilitation sites. Potential options to accomplish this objective include increasing the density and diversity of riparian vegetation to supplement natural recruitment and introducing riparian plants in locations to expand riparian habitat. In the event that conditions within the boundaries of the Lewiston and Dark Gulch sites preclude adequate onsite mitigation, Reclamation may consider alternate locations for riparian vegetation mitigation within the Trinity River corridor, subject to approval by USACE, the Regional Water Board, and CDFG.

Significance after Mitigation

Less than significant

Impact 3.6-6: Implementation of the project would result in fish passage being temporarily impaired during the in-stream construction phase. ***No Impact for the No-Action Alternative; Significant Impact for the Proposed Action and Alternative 1***

No-Action Alternative

Under the No-Action Alternative, temporary impairment of fish passage would not occur because the project would not be constructed.

Proposed Action

Coho Salmon. Construction activities associated with the Proposed Action would require temporary placement of low-flow channel crossings, consisting of gravel fill materials, at X-1 and X-2 DG. The crossings will be constructed to maintain adequate water depths and velocities for fish passage. The low water crossings would be used to move heavy equipment across the low-flow channels to access activity areas on opposite banks of the Trinity River. Construction activities could require service vehicles to cross up to several times per week; otherwise, vehicle crossing traffic would be kept to a minimum. Use of the channel crossing X-1 DG would occur to support work at IC-2 DG, and channel crossing X-2 DG would be used as an alternative access to the river right activity areas at the Dark Gulch site. This alternative access for heavy equipment and service vehicles could be required in the event that small private access roads with small turning radiuses (e.g., through the Salt Flat community) are impassable by construction equipment. Temporary gravel fill work ramps and low-flow channel crossings X-1 and X-2 DG would be constructed to extend across the width of the low-flow channel (41.9 feet long and 0.019 acre and 73.3 feet long and 0.032 acre, respectively) and are expected to be in place long enough to complete work in these activity areas. Construction in and near the active low-flow channel is planned to occur during the summer and autumn months (between July and December 2008); however, access in and out of the sites could be required during other low-flow times as well. Construction of the crossings would only be conducted during late-summer, low-flow conditions (e.g., July 15–September 15). However, river crossings at X-1 and X-2 low-flow conditions during other months (e.g., October - December) could also be required. Consequently, it is likely that some of this work would occur during the coho salmon spawning period.

Use of river crossings X-1 and X-2 could occur during the onset of the fall coho smolt emigration, depending on seasonal conditions (flow, temperatures, etc.) and would occur during the coho adult migration and spawning period. Upon completion of work in riverine areas requiring use of low-flow channel crossings, the low-flow channel crossings would be dismantled and materials would be contoured to the river bottom. Fill materials would consist of appropriately sized spawning gravel.

Fish passage design is normally based on the weakest species or life stage present that requires upstream access and should accommodate the weakest individual within that group. For the Proposed Action, low-flow channel crossings would need to meet velocity criteria for upstream migrating juvenile salmonids and depth criteria for migrating adult salmonids, including the federally threatened coho salmon. Maximum velocities and minimum depths are adopted from NMFS *Guidelines for Salmonid* ***Passage at Stream Crossings*** (National Marine Fisheries Service 2001) and *Part IX Fish Passage Evaluation at Stream Crossings* of CDFG's *California Salmonid Stream Habitat Restoration Manual* (California Department of Fish and Game 2003).

Although the construction period could extend into the smolt emigration and coho salmon spawning season, the effect of the low-water crossings on fish passage is expected to be temporary and minimal. Adult anadromous fish generally expend approximately 80 percent of their stored energy reserve during normal upstream migration to suitable spawning areas. Undue exertion or delay at stream-road crossings due to unsuccessful passage attempts at inadequate (blocking) structures can lead to reduced spawning

success and pre-spawning mortality (Robison, Mirati, and Allen 1999). Adequate depth and velocities over the crossing will allow both juvenile and adult passage. While long-term beneficial changes to physical rearing habitat associated with implementing the Proposed Action are anticipated, the temporary impacts on fish passage are considered significant.

Chinook Salmon. Potential impacts to Upper Klamath-Trinity Rivers ESU Chinook salmon populations in the Trinity River resulting from implementation of the Proposed Action would be similar to those previously described for coho salmon. However, adult migrants from the spring and fall runs of Chinook salmon would be expected to pass through, stage, and/or spawn within the project boundaries during the construction season. The temporary placement of gravel fill at low-flow channel crossings would not preclude fish passage since adequate depths and velocities will be maintained over the crossings.

Steelhead. Potential impacts to the KMP ESU steelhead populations in the Trinity River resulting from implementation of the Proposed Action would be similar to those previously described for coho and Chinook salmon.

Pacific Lamprey. Potential fish passage impacts to Pacific lamprey populations in the Trinity River resulting from implementation of the Proposed Action would be similar to those previously described for coho and Chinook salmon and steelhead.

Alternative 1

Coho Salmon. Potential fish passage impacts to coho salmon would be the same under Alternative 1 as described under the Proposed Action, although a bridge over the side channel within R-3 DG would be constructed under this alternative. Construction of this bridge would not require any footings or piers within the constructed side channel and fish passage would not be impeded once the side channel is functional. The constructed low-flow crossings described for the Proposed Action could result in short-term impacts, which would be considered significant.

Chinook Salmon. Potential impacts to Upper Klamath-Trinity Rivers ESU Chinook salmon populations in the Trinity River resulting from implementation of Alternative 1 would be similar to those previously described for coho salmon.

Steelhead. Potential impacts to the KMP ESU steelhead populations in the Trinity River resulting from implementation of Alternative 1 would be similar to those previously described for coho and Chinook salmon.

Pacific Lamprey. Potential fish passage impacts to Pacific lamprey populations in the Trinity River resulting from implementation of Alternative 1 would be similar to those previously described for coho and Chinook salmon and steelhead.

Mitigation Measures

No-Action Alternative

Since no significant impacts were identified, mitigation is not required.

Significance after Mitigation

N/A

Proposed Action and Alternative 1

6a Fill gravels used on the low water crossings, streambeds, and stream banks will be composed of washed, spawning-sized gravels from a local Trinity Basin source. Gravel will be washed to remove any silts, sand, clay, and organic matter and will be free of contaminants such as petroleum products. Washed gravel will pass Caltrans cleanliness test #227 with a value of 85 or greater.

6b Reclamation or its contractor shall construct the low-flow channel crossings to allow adequate depth and velocity for adult and juvenile salmonids to safely pass. Flows associated with storm events are not considered critical as 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 low-flow channel crossings at base flows, velocities shall not exceed 2 fps to allow for juvenile fish passage. Minimum water depth at low flow shall not be less than 12 inches in two-thirds of the river channel to provide adequate depth for adult salmon and steelhead passage.

6c The number of vehicle and equipment crossings of the Trinity River will be minimized.

Significance after Mitigation

Less than significant