3 Affected Environment and Environmental Consequences

Section 3.1. Introduction

All Environmental Consequences/Impacts and Mitigation Measures sections in Chapter 3 of this SEA/RPDEIR are new. For ease of reading, this new text is not underlined. Further, revised tables in these sections are not reproduced in their entirety. Only the new columns (those pertaining to Alternative 3) are provided.

Section 3.2. Land Use

Revisions to Section 3.2 consist only of adding an analysis of the impacts of Alternative 3 Section 3.2.3, pages 3.2-12 to 3.2-16. The impact analysis for Alternative 3 is provided below.

Revised Table 3.2-1
Summary of Potential Land Use Impacts for Alternative 3

ALTERNATIVE 3	ALTERNATIVE 3 WITH MITIGATION
Impact 3.2-1. Implementation of the project could disrupt existing land uses adjacent to the project site.	
LS	NA[1]
Impact 3.2-2. Implementation of the project may be inconsistent with the goals, policies, and objectives of the Trinity County General Plan, as well as local community plans, policies, and ordinances.	
LS	NA[1]
Impact 3.2-3. Implementation of the project may affect the availability of a locally important mineral resource recovery site.	
LS	NA[1]

LS = Less than Significant
N/A = Not Applicable
[1]Because this potential impact is less than significant, no mitigation is required.

Impact 3.2-1: Implementation of the project could disrupt existing land uses adjacent to the project site. ***Less than Significant Impact for Alternative 3***

Alternative 3

In general, long-term and temporary land use impacts that could be produced by the project under Alternative 3 would be similar to those under the Proposed Action. There would be no long-term land use impacts under Alternative 3.

Mitigation Measures

Alternative 3

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

Significance after Mitigation: N/A

Impact 3.2-2 Implementation of the project may be inconsistent with the goals, policies, and objectives of the Trinity County General Plan, as well as local community plans, policies, and ordinances. ***Less-than-Significant Impact for Alternative 3***

Alternative 3

Implementation of restoration activities proposed under Alternative 3 would not introduce land uses that are incompatible with existing or proposed land uses, nor would any action conflict with any land use plan, policy, or ordinance.

In an amendment to the Trinity County Code (Ordinance No. 315-698), the County has adopted a Floodplain Management Ordinance that promotes public health, safety, and general welfare, protection of fish and wildlife resources, and minimization of public and private losses due to flood conditions through a series of specific provisions. Land development standards for development permitted by the County within designated flood hazard zoning districts are summarized in Revised Table 3.2-7. This table also provides an assessment of the consistency of Alternative 3 with these development standards.

Alternative 3 will comply with Conservation Element No. 4, Trinity County General Plan, regarding revegetation and restoration of riverine and upland activity areas.

The extraction and processing of excavated material is consistent with the Douglas City Community Plan goals and objectives, specifically to “encourage the sound use of mineral resources, especially sand and gravel operations, which also reduce sedimentation of the Trinity River.”

In an amendment to the Trinity County Code (Ordinance No. 315-698), Trinity County (County) has adopted a Floodplain Management Ordinance that promotes public health, safety, and general welfare, protection of fish and wildlife resources, and minimization of public and private losses due to flood conditions through a series of specific provisions. Land development standards for development permitted by the County within designated flood hazard zoning districts are summarized in Revised Table 3.2-7. This table also provides an assessment of the consistency of Alternative 3 with these development standards.

Revised Table 3.2-7
Consistency of Alternative 3 with applicable Flood Hazard Overlay Zoning District Land Development Standards

OBJECTIVES	ASSESSMENT OF CONSISTENCY
	ALTERNATIVE 3
Construction Materials and Methods	
All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.	The project does not involve the placement of any permanent new construction or improvement to any existing structures within the floodplain (see Section 3.4, Water Resources). To improve river functions, natural substrates (i.e., cobbles, gravels, and sands) will be redistributed within the project boundary.
Fill and Other Floodplain Encroachments	
All fill and other encroachments shall be certified by a registered professional engineer or architect not to increase the Base Flood Elevation more than 12 inches. Such a certification shall be provided to the Floodplain Administrator.	Implementation of the Proposed Action involves removal of alluvial (fill) materials from the floodplain and will not result in a rise in the base flood elevation.

As noted in Revised Table 3.2-7, Alternative 3 would be consistent with the County's development standards for lands lying within the Flood Hazard Overlay zoning district. Specific to human health and safety, a Safety Element (January 2002) was prepared to accompany the County's General Plan. Although it may overlap with other elements of the County's General Plan (e.g., Land Use, Conservation, Open Space), the Safety Element is designed to identify acceptable risk and determine the level of mitigation that is necessary. Because the project boundary falls within the Douglas City Community Planning Area, directives set forth in the Douglas City Community Plan (1987) are also applicable to the project. Revised Table 3.2-8 summarizes the consistency of the safety elements of both the county's General Plan and the Douglas City Community Plan with Alternative 3.

Revised Table 3.2-8
Consistency of Alternative 3 with the Safety Elements of The Trinity County General Plan and The Douglas City Community Plan in Flood Hazard Overlay Zoning Districts

OBJECTIVES	ASSESSMENT OF CONSISTENCY
Trinity County General Plan Safety Element	
1. Reduce the loss of life and property by establishing development standards for areas subject to flooding: a. 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. b. Require all development to meet the development standards of the National Flood Insurance Act regulations in Title 44 CFR Section 60.3, as implemented through the County Zoning Ordinance section 29.4 c. Prohibit the creation of new parcels that have no building sites outside of the 100-year floodplain, except for the creation of open space parcels. d. The County's Disaster Response Plan should include procedures to protect the public from flooding hazards. e. Maintain or return to Open Space lands subject to flooding.	Alternative 3 meets those objectives and policies that are applicable.
2. Reduce the potential for the loss of life and property from dam failure inundation	Alternative 3 is designed to ensure continued protection of human life and property.
Douglas City Community Plan - Hazards	
1. Insure that future developments do not create flood hazards either to themselves or to downstream developments.	Alternative 3 is designed to ensure continued protection of downstream property.
2. Incorporate Flood Hazard Zoning on those areas of the Plan subject to flooding.	Not applicable to Alternative 3.
3. Review the Poker Bar area for probable areas susceptible to flooding and leaching of effluent into the Trinity River.	Not applicable to Alternative 3.

As noted in Revised Table 3.2-8, Alternative 3 would be consistent with respect to the safety and hazard elements of Trinity County's General Plan and the Douglas City Community Plan.

Rehabilitation activities associated with Alternative 3 would result in use of excavated alluvial deposits, including dredge tailings. This activity is consistent with the Douglas City Community Plan.

Mitigation Measures

Alternative 3

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

Significance after Mitigation: N/A

Impact 3.2-3: Implementation of the project may affect the availability of a locally important mineral resource recovery site. ***Less-than-Significant Impact for Alternative 3***

Alternative 3

Public comments on the EA/DEIR, and the Value Engineering study conducted by Reclamation identified an opportunity to use alluvial material (including dredge tailings) in the vicinity of R-8, R-9, T-1, and T-2. The value of the alluvial material described in this alternative focuses on its use as supplemental spawning gravel for the Trinity River. This material is not recognized as a locally important mineral recovery site as defined by the California Department of Conservation, Division of Mines and Geology. There are no locally important mineral recovery sites located in the project action area nor within 5 river miles of the project boundary; therefore, Alternative 3 would not have a significant effect on mineral extraction activities.

Mitigation Measures

Alternative 3

Since no significant impacts were identified for this alternative, no mitigation is required.

Significance after Mitigation: N/A

Section 3.3. Geology, Fluvial Geomorphology, and Soils

Revisions to Section 3.3 consist only of Revised Figure 3.3-4b and the addition of an Alternative 3 impacts analysis to Section 3.3.3, pages 3.3-16 to 3.3-20. The impact analysis for Alternative 3 is provided below.

Revised Table 3.3-1
Summary of Geology and Soils impacts for Alternative 3

ALTERNATIVE 3	ALTERNATIVE 3 WITH MITIGATION
Impact 3.3-1 Implementation of the project could result in the exposure of structures and people to geologic hazards, including ground shaking and liquefaction.	
NI	N/A[1]
Impact 3.3-2 Construction activities associated with the project could potentially result in increased erosion and short-term sedimentation of the Trinity River.	
S	LS

Revised Table 3.3-1
Summary of Geology and Soils impacts for Alternative 3

ALTERNATIVE 3	ALTERNATIVE 3 WITH MITIGATION
Impact 3.3-3 Implementation of the project would interfere with existing, proposed, or potential development of mineral resources.	
NI	N/A[1]

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

Impact 3.3-1: Implementation of the project could result in the exposure of structures and people to geologic hazards, including ground shaking and liquefaction. ***No Impact for Alternative 3***

Alternative 3

Under Alternative 3, no permanent structures or facilities would be constructed. There would be no new exposure of structures and/or people to geologic hazards.

Mitigation Measures

Alternative 3

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

Significance after Mitigation: N/A

Impact 3.3-2: Construction activities associated with the project could potentially result in increased erosion and short-term sedimentation of the Trinity River. ***Significant Impact for Alternative 3***

Alternative 3

Alternative 3 would temporarily result in soil disturbance, soil compaction within proposed access road and construction staging areas, disruption of soil cohesion and armoring, and increased soil exposure to energetic weather conditions, which would increase the short-term potential for wind and water erosion. Increased wind and water erosion and associated downstream sedimentation within the Trinity River would occur if any soils were left exposed during the later winter and early spring periods of high precipitation. Impacts of turbidity levels specific to water quality degradation are analyzed in Section 3.5, Water Quality, and associated impacts to anadromous fisheries are analyzed in Section 3.6, Fishery Resources.

Susceptibility to erosion is controlled by several factors, including terrain, land use, vegetation, soil type, and local climate. A soil with high erodibility typically experiences more erosion than a soil with low erodibility. However, in the absence of an adverse condition (i.e., rainfall, lack of vegetation), a soil that is classified as highly erodible may not experience significant erosion. In general, significant soil erosion

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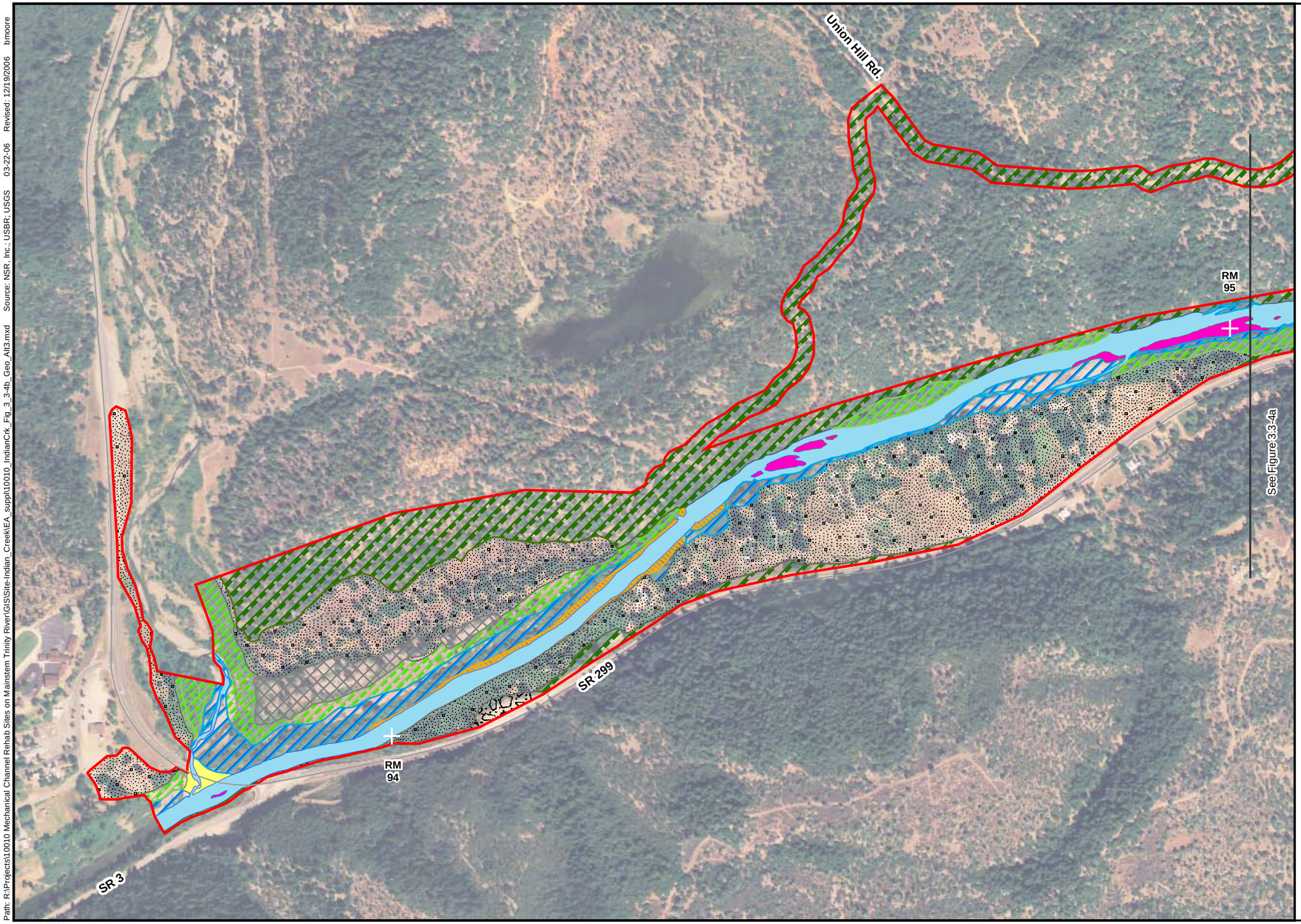


Site Boundary (329.21 acres)

River Mile (RM)

Match Line

Geomorphic Type

- Berm
- Delta
- Floodplain
- Modified Terrace
- Point Bar
- Rip-rap
- Tailings Piles
- Terrace
- Upland Hillslope
- Water

N

1:6,600

550 0 550

Feet

Aerial photography:
July 2005

North State Resources, Inc.

Indian Creek Rehabilitation Site: Trinity River Mile 93.7 to 96.5

Revised Figure 3.3-4b
Geomorphology

would occur only at locations at the margins of constructed features (e.g., feathered edges, side channels, floodplains) where a combination of fine sandy to silty soils occurs.

Revised Table 3.3-2 shows the area and volume of materials that would be excavated (cut) from the treatment areas, the area and volume that would be placed in upland activity areas (fill), and the acreage of staging areas, access roads, and river crossings that would be subject to soil compaction under Alternative 3.

Revised Table 3.3-2
Area and Volume of Soil Disturbance Under Alternative 3

ACTIVITY TYPE	ALTERNATIVE 3
Riverine Treatment Areas (acres) yards^3	(21.0) 140,400
Upland Activity Areas (acres) yards^3	(7.0) 80,150
Staging Areas/Access Roads/River Crossings (acres)	(12.4)
(Total acres) Total yards^3	***(40.4) 220,550***

The potential for increases in soil erosion and sedimentation under Alternative 3 is considered a significant impact. However, soil compaction that would occur as a result of construction staging and access road areas would be similar to the impacts associated with the Proposed Action as described in the EA/DEIR

Mitigation Measures

Alternative 3

Mitigation measures for this impact under Alternative 3 are identical to those described for the action alternatives in the EA/DEIR. Please see page 3-18, 19 of the EA/DEIR for these measures.

Significance after Mitigation: Less than Significant

Impact 3.3-3: Implementation of the project would interfere with existing, proposed, or potential development of mineral resources. ***Less-than-Significant Impact for Alternative 3***

Alternative 3

The excavation and processing of alluvial materials would occur, coincident with rehabilitation activities. There are no current or proposed mining activities operating under either a federally authorized operating plan or through a County SMARA Mining use permit within the vicinity of the rehabilitation site (Hitt. pers. comm. 2006). Therefore, there would be no impacts to mineral activities under this alternative.

Mitigation Measures

Alternative 3

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

Significance after Mitigation: N/A

Section 3.4. Water Resources

The only revisions to Section 3.4 involve the addition of an Alternative 3 impacts analysis to Section 3.4.3, pages 3.4-14 to 3.4-16. The impact analysis for Alternative 3 is provided below.

Revised Table 3.4-2
Summary of water resource impacts for Alternative 3

ALTERNATIVE 3	ALTERNATIVE 3 WITH MITIGATION
Impact 3.4-1. Implementation of the proposed project could result in a temporary or permanent increase in base floodwater surface elevation.	
LS	N/A[1]
Impact 3.4-2. Implementation of the proposed project could result in a permanent decline in groundwater elevations, or permanent change in groundwater quality.	
LS	N/A[1]
Impact 3.4-3. Implementation of the proposed project may expose people or structures to a significant risk of injury, death or loss involving flooding.	
LS	N/A[1]

LS = Less than Significant S = Significant 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 surface elevation. ***Less-than-Significant Impact for Alternative 3***

Alternative 3

Under Alternative 3, the elevation and aerial extent of the floodplain of the Trinity River would be modified through the activities described in Chapter Two. The revised hydraulics analysis (Revised Appendix G) indicates that by removing all the excavated material from the riverine rehabilitation areas and either, placing it above the base flood elevation (BFE) (in upland activity areas), or transporting it to offsite locations, would not increase the Federal Emergency Management Agency (FEMA) BFE. Additionally, the Location Hydraulic Study (Revised Appendix G) indicates that the BFE will be lowered in some locations, particularly in the R-5 vicinity. This impact is similar to that described in the Proposed Action.

Mitigation Measures

Alternative 3

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. ***Less-than-Significant Impact for Alternative 3***

Alternative 3

If Alternative 3 is implemented, the displacement of channel and floodplain materials has a minimal potential to change the groundwater hydraulics within the site boundary. 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

Alternative 3

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

Significance after Mitigation: N/A

Impact 3.4-3: Implementation of the proposed project may expose people or structures to a significant risk of injury, death, or loss involving flooding. ***Less-than-Significant Impact for Alternative 3***

Alternative 3

Implementation of Alternative 3 would not increase the BFE. According to analysis provided in Revised Appendix G, the BFE will actually decrease in a number of areas, similar to the Proposed Action. This alternative is 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

Alternative 3

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

Significance after Mitigation: N/A

Section 3.5. Water Quality

Revisions to Section 3.5 consist only of adding an analysis of the impacts of Alternative 3 impacts analysis to Section 3.5.3, pages 3.3-11 to 3.3-19. The impact analysis for Alternative 3 is provided below.

Revised Table 3.5-4
Summary of water quality impacts for Alternative 3

ALTERNATIVE 3	ALTERNATIVE 3 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.	
S	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.	
S	LS
Impact 3.5-3. Construction of the project could potentially cause contamination of the Trinity River from hazardous materials spills.	
S	LS
Impact 3.5-4. Construction and maintenance of the project could result in increased stormwater runoff and subsequent potential for erosion.	
LS	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.	
S	LS

LS = Less than Significant S = Significant 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. ***Significant Impact for Alternative 3***

Alternative 3

Temporary increases in turbidity or total suspended solids levels associated with construction of Alternative 3 would likely be similar to those under the Proposed Action. The primary difference between the Proposed Action and Alternative 3 involves the use of an alternative access route (including Weaver Creek Crossing, X-3) to activity areas on the left bank of the river (R-8, R-9, R-10, U-3, T-1, and T-2).

Similar to the Proposed Action, riverine activities under Alternative 3 would be staged to minimize potential turbidity effects. These activities could, however, 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. In addition, Alternative 3 includes reductions of in-stream activity planned under the Proposed Action, including the reduction of activity at R-3, exclusion of activity at R-5, and reduction of activity at R-9. Short-term increases in turbidity and suspended solids levels during construction would be a significant impact.

Mitigation Measures

Alternative 3

Mitigation measures for this impact under Alternative 3 are identical to those described for the action alternatives in the EA/DEIR. Please see page 3.5-13, 14 of the EA/DEIR for these measures.

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. ***Significant Impact for Alternative 3***

Alternative 3

The riverine activities described in Chapter 2 of the EA/DEIR emphasize 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). These riparian berms developed after the TRD was completed as a result of the loss of scouring associated with peak flows. Removing the berms and vegetation 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 Alternative 3 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 rainsplash erosion and runoff, or erosion by elevated river stages when flows increase in the river. 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 less likely to mobilize fine sediments. Similarly, 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 like 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.

Mitigation Measures

Alternative 3

Mitigation measures for this impact under Alternative 3 are identical to those described for the action alternatives in the EA/DEIR. Please see page 3.5-16, 17 of the EA/DEIR for these measures.

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. ***Significant Impact for Alternative 3***

Alternative 3

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 in the Trinity River and have deleterious effects on salmonids of any life stage in close proximity to construction activities. Section 3.15 of the EA/DEIR and this SEA/RPDEIR evaluates potential effects associated with exposing the public to hazards associated with the transportation and use of hazardous materials at the site. Construction activities could result in a spill of hazardous material, which would be a significant impact.

Mitigation Measures

Alternative 3

Mitigation measures for this impact under Alternative 3 are identical to those described for the action alternatives in the EA/DEIR. Please see page 3.5-17, 18 of the EA/DEIR for these measures.

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. ***Less-than-Significant Impact for Alternative 3***

Alternative 3

Implementation of Alternative 3 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. 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

Alternative 3

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

Significance after Mitigation: Less than Significant

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. ***Significant Impact for Alternative 3***

Alternative 3

Under Alternative 3, significant impacts to beneficial uses of the Trinity River could occur for the following categories of water quality objectives listed in the Basin Plan:

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

Under Alternative 3, the impacts would be associated with the placement and deconstruction of the low-flow channel crossings (i.e., X-1 and X-3).

Mitigation Measures

Alternative 3

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

Section 3.6. Fishery Resources

Revisions to Section 3.6 consist only of adding an analysis of the impacts of Alternative 3 to Section 3.6.3, pages 3.6-25 to 3.6-53. The impact analysis for Alternative 3 is provided below.

Revised Table3.6-1
Summary of Fishery Resource Impacts for Alternative 3

ALTERNATIVE 3	ALTERNATIVE 3 WITH MITGIATION
Impact 3.6-1. Implementation of the project could result in effects on potential spawning and rearing habitat for anadromous fishes, including federally listed coho salmon.	
S	LS/B

Revised Table3.6-1
Summary of Fishery Resource Impacts for Alternative 3

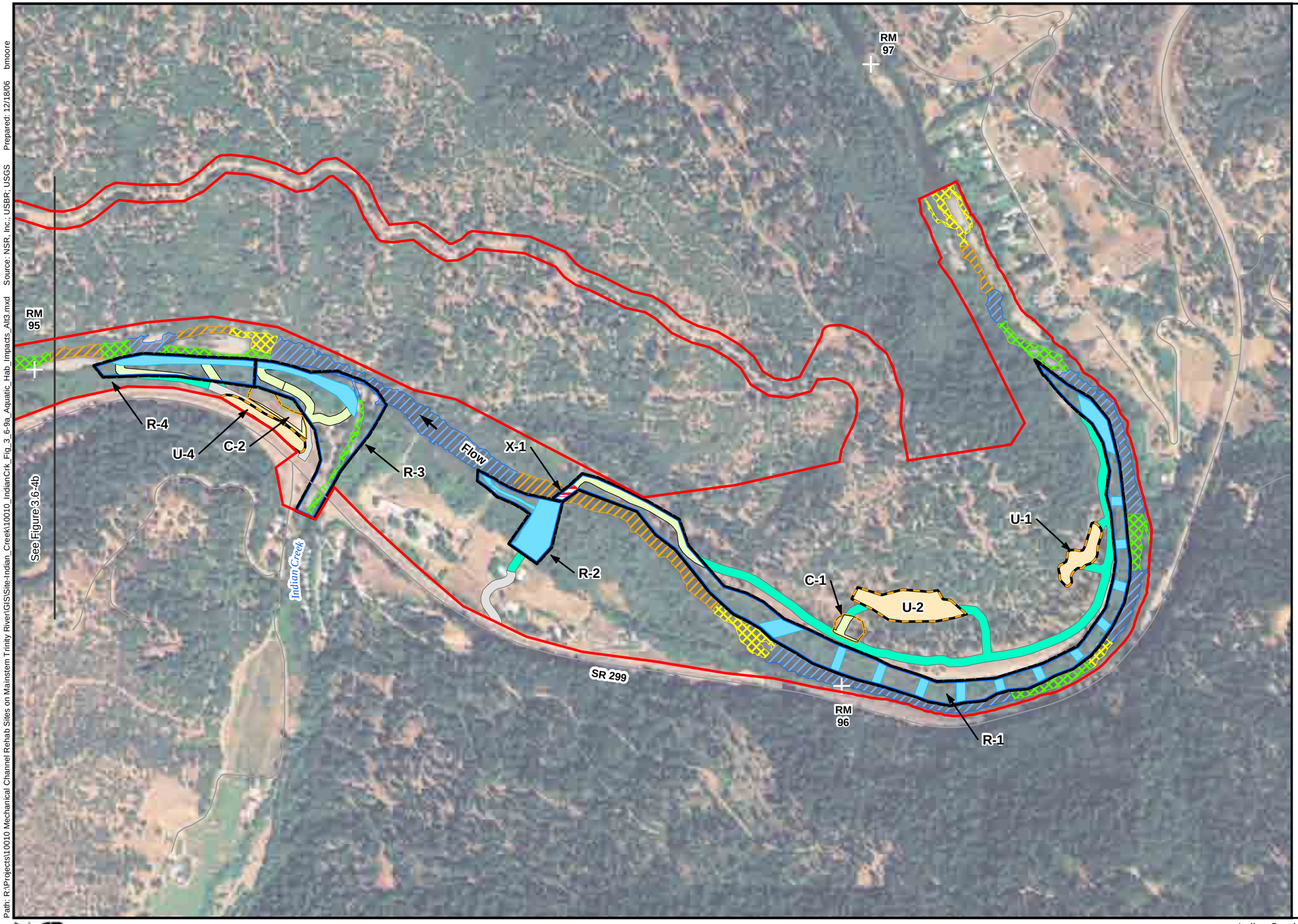
ALTERNATIVE 3	ALTERNATIVE 3 WITH MITGIATION
Impact 3.6-2. Implementation of the project could result in increased erosion and sedimentation that could adversely affect fishes, including federally listed coho salmon.	
S	LS
Impact 3.6-3. Construction activities associated with the project could potentially result in the accidental spill of hazardous materials that could adversely affect fishes, including federally listed coho salmon.	
S	LS
Impact 3.6-4. Construction activities associated with the project could result in the mortality of rearing fishes, including federally listed coho salmon.	
S	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.	
S	LS
Impact 3.6-6. Implementation of the project would result in fish passage being temporarily impaired during the in-stream construction phase.	
S	LS

LS = Less than Significant S = Significant B = Beneficial
[1]Because this potential impact is less than significant, no mitigation is required.

Impact 3.6-1: Implementation of the project could result in effects on potential spawning and rearing habitat for anadromous fishes, including federally listed coho salmon. ***Significant Impact for Alternative 3***

Alternative 3

Coho Salmon. No permanent adverse effects to spawning habitat for coho salmon within the project boundary will occur. Revised Figures 3.6-9a and 3.6-9b illustrate the extent of the grading and excavating activity that would occur under Alternative 3. The long-term design objective is that implementation of Alternative 3 along with the flow management regime identified in the TRRP Record of Decision would re-activate channel migration across the floodplain within the project boundary. 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. Temporary effects on spawning habitat associated with construction of Alternative 3 are expected to be limited to short-term, localized sedimentation caused by settling of silt disturbed by bank-side excavation activities.

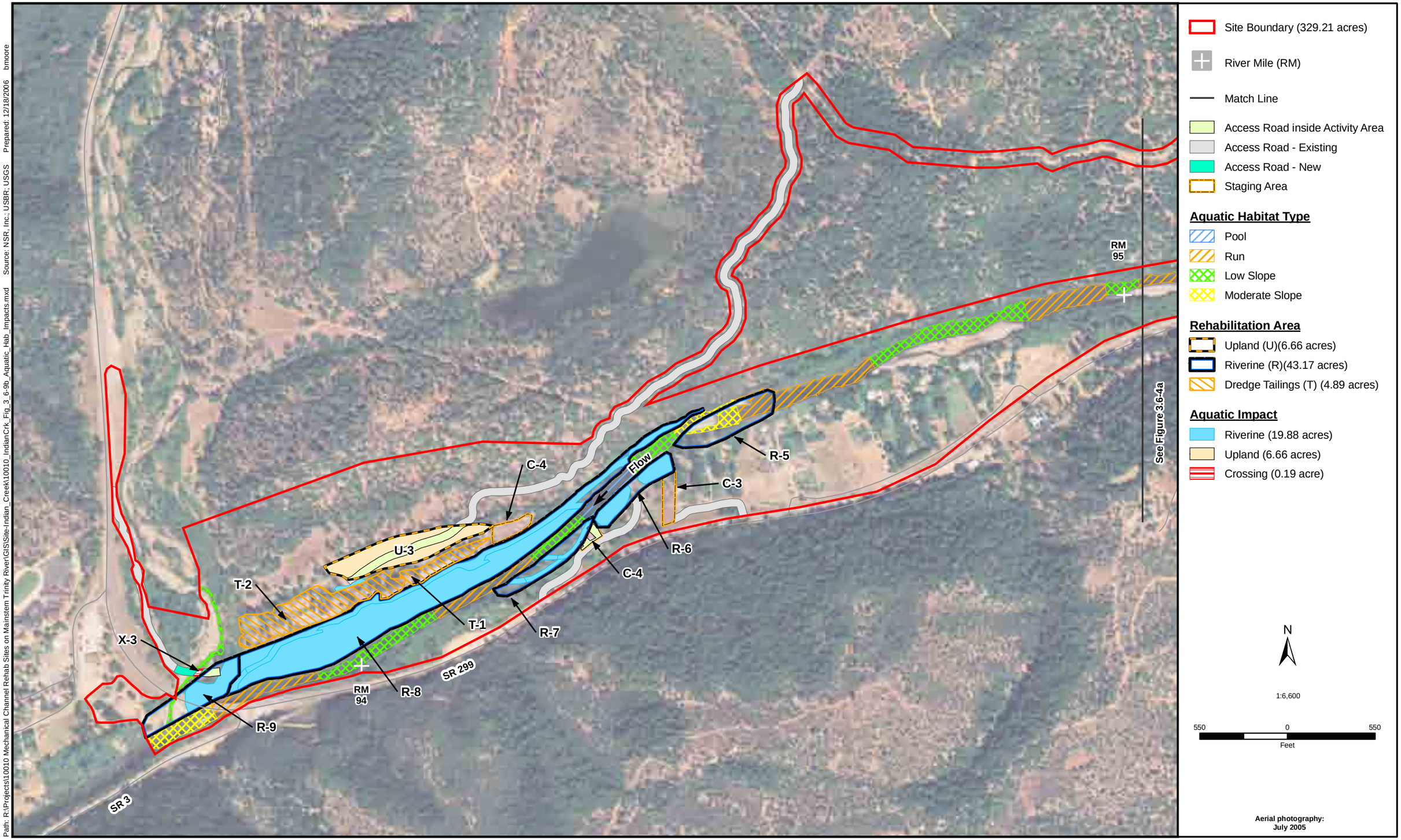


Path: R:\Projects\10010 Mechanical Channel Rehab Sites on Mainstem Trinity River\GIS\Site-Indian_Creek\10010_IndianCrk_Fig_3_6-9a_Aquatic_Hab_Impacts_Alt3.mxd Source: NSR, Inc.; USBR; USGS Prepared: 12/18/06 bmoore

North State Resources, Inc.

Indian Creek Rehabilitation Site: Trinity River Mile 93.7 to 96.5

Figure 3.6-9a
Impacts of Alternative 3 on Aquatic Habitats



Path: R:\Projects\10010 Mechanical Channel Rehab Sites on Mainstem Trinity River\GIS\Site-Indian_Creek\10010_IndianCrk_Fig_3_6-9b_Aquatic_Hab_Impacts.mxd Source: NSR, Inc.; USBR; USGS Prepared: 12/18/2006 bmoore

North State Resources, Inc.

Indian Creek Rehabilitation Site: Trinity River Mile 93.7 to 96.5

Figure 3.6-9b
Impacts of Alternative 3 on Aquatic Habitats

Additionally, installation of temporary gravel berm crossings (i.e., X-1 and X-3) for heavy equipment across the low-flow channel of the Trinity River and Weaver Creek could introduce a small amount of silt and cause streambed disturbance, resulting in re-suspension of fine substrate materials (i.e., silt) and create short-term, localized increases in turbidity and suspended sediments. Crossing locations (i.e., X-1 and X-3) were selected based on spawning data provided by member agencies of the TRRP. In essence, this information indicated that these locations have not been used by spawning salmonids. River crossings would occur only during low-flow conditions (Trinity River flows of <1,500 cfs), which typically take place between July and December, but a few equipment crossings at low-flow conditions during other months (e.g., late winter/early spring) might also be required. Although the amount of silt mobilized by construction of these crossings is expected to be minimal, this silt could be deposited on either spawning habitat and/or on salmon redds downstream of the activity areas.

Construction in and near the low-flow channel is planned to occur during summer and fall months (between June 1, through Nov. 1). Project activities may require access to these riverine areas during other low-flow periods. Grading activities at R-8 are scheduled to begin during summer 2007. Additional grading activities could occur during the summer and fall periods over the course of the five-year construction period, as required to ensure project objectives are met.

Suitable rearing habitat for juvenile coho salmon and other salmonids occurs within the project boundary. However, rearing habitat for coho salmon is limited by the relatively small amount of pool and backwater habitat associated with suitable cover. Some temporary effects on the quality of juvenile salmonid rearing habitat will occur through removal of riparian vegetation that contributes to shaded riverine aquatic (SRA) habitat in the project reaches and through the placement of low-flow channel crossings on the Trinity River and Weaver Creek. These temporary effects range from elimination of stream shading that moderates localized water temperatures to removal of physical cover provided by overhanging riparian vegetation and associated roots protruding from eroding banks. The temporary effects of construction of low-flow channel crossings will range from reducing the stream depth at two narrow channel cross sections with gravel fill to physical disturbances associated with in-river work. The principal effects on fish include displacement of rearing salmonid fishes from the locations of low-water crossings by reducing the suitability of the habitat, and 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 Deibel 1986).

The limited and localized temporary impacts on rearing habitat are expected to be offset in the long-term by beneficial increases and improved suitability of physical rearing habitat associated with implementing Alternative 3. These benefits will accrue from the engineered improvements of floodplain connection to the river, channel migration through the upper elevation floodplain, and revegetation of the rehabilitated floodplain with native plant species that will eventually 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 habitats will collectively increase the relative abundance of this preferred salmon fry rearing habitat, compared to

the existing condition within the project reaches. Alternative 3 will include construction of a side channel providing habitat at flows over 300 cfs at R8. Ultimately, the collective changes in channel morphology as a result of Alternative 3 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).

Chinook Salmon. Potential impacts and benefits to Upper Klamath-Trinity Rivers evolutionarily significant unit (ESU) Chinook salmon populations in the Trinity River resulting from implementation of Alternative 3 would be generally similar to those previously described for coho salmon. Spring- and fall-run Chinook salmon are known to spawn and rear within the project boundary. Additionally adult spring-run Chinook salmon over-summer in the deeper run and pool habitats near the R1 rehabilitation unit where bank work may disturb staging fish using this area during the summer months; however, over-summering habitat is available to these fishes in adjacent river reaches upstream and downstream of the project site. Spring-run Chinook salmon juveniles can be expected to rear year-round within the project boundary and may be displaced by in-river work activities.

Steelhead. Potential impacts and benefits to the Klamath Mountains Province (KMP) ESU steelhead populations in the Trinity River resulting from implementation of Alternative 3 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 boundary established for Alternative 3.

Pacific Lamprey. Potential impacts and benefits to Pacific lamprey populations in the Trinity River resulting from implementation of Alternative 3 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.

Mitigation Measures

Alternative 3

Mitigation measures for this impact under Alternative 3 are identical to those described for the action alternatives in the EA/DEIR. Please see page 3.6-33, 34 of the EA/DEIR for these measures.

Significance after Mitigation: Less than Significant.

Impact 3.6-2: Implementation of the project could result in increased erosion and sedimentation levels that could adversely affect fishes, including federally listed coho salmon. ***Significant Impact for Alternative 3***

Alternative 3

Coho Salmon. Activities related to implementation of Alternative 3 would result in the localized loss of vegetation and general disturbance to the soil. Removal of vegetation and soil could accelerate erosion

processes within the project boundary and increase the potential for sediment to enter 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 organisms and may suppress photosynthetic activity at the base of food webs, affecting aquatic organisms either directly or indirectly (Alabaster and Lloyd 1980).

Within the project boundary, silt and sand in the river banks would be disturbed during excavation of the riverine activity areas. Exposed soils on the excavated surfaces are susceptible to mobilization from rainfall and during early season high flows. Fill placements and treatments in the upland spoils sites could be susceptible to erosion and runoff during rainfall events.

Approximately, 0.15 acres of mainstem Trinity River main channel habitat and 0.04 acres of Weaver Creek delta habitat will be temporarily affected during construction by installation of gravel berms to create low-flow channel crossings for occasional equipment crossings. Removal and spreading of gravels composing the temporary low-flow channel crossings after construction will restore stream channels to original contours. 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 Alternative 3 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. The majority of grading activities at the river's edge is expected to be performed during low-flow periods during summer and fall periods, as weather permits, and thus would increase the potential for effects on adult coho migration, spawning, and smolt emigration. 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 Biological Opinion for in-stream work.

Chinook Salmon. Potential impacts to Upper Klamath-Trinity Rivers ESU Chinook salmon populations in the Trinity River resulting from implementation of Alternative 3 would be generally similar to those described for coho salmon. Consequently, resuspension 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 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 project boundary and transient increases in turbidity and resuspension of sediments are thought 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 Alternative 3 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 boundary, throughout the proposed construction season. All three runs generally spawn during the winter.

Pacific Lamprey. Potential impacts on Pacific lamprey populations in the Trinity River resulting from implementation of Alternative 3 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.

Mitigation Measures

Alternative 3

Mitigation measures for this impact under Alternative 3 are identical to those described for the action alternatives in the EA/DEIR. Please see page 3.6-37, 38 of the EA/DEIR for these measures.

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 federally listed coho salmon. ***Significant Impact for Alternative 3***

Alternative 3

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, Indian Creek, and Weaver Creek. Oils, fuels, and other contaminants could have deleterious effects on all salmonid life stages within close proximity to construction activities.

Chinook Salmon. Potential impacts to Upper Klamath-Trinity Rivers ESU Chinook salmon populations in the Trinity River resulting from 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.

Mitigation Measures

Alternative 3

Mitigation measures for this impact under Alternative 3 are identical to those described for the action alternatives in the EA/DEIR. Please see page 3.6-39 of the EA/DEIR for these measures.

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 federally listed coho salmon. ***Significant Impact for Alternative 3***

Alternative 3

Coho Salmon. Coho salmon are known to occur throughout the Trinity River. Limited suitable coho salmon rearing habitat exists within the project boundary; however, juvenile coho salmon may be expected to rear within the project boundary year-round. Adult coho migrate through the project boundary, and suitable spawning habitat exists within the project boundary. Direct injury to, or mortality of, coho salmon may occur during in-river construction and construction of the low-flow channel crossings planned under Alternative 3. Construction in and near the low-flow channel is scheduled to occur during summer and fall months; however, access in and out of the sites might also be required during other times of low flows. River crossings would likely occur only during low flow conditions (Trinity River flows of <1,500 cfs) which typically take place between July through December, but some equipment crossings at low flow conditions during other months (e.g., late winter/early spring) might also be required Channel rehabilitation work planned at R-8 is scheduled primarily for summer and fall periods. Consequently, it is likely that some of this work would occur during the coho salmon spawning period.

A small, temporary, but uncertain level of stranding of coho salmon fry may 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 may 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 may 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.

Chinook Salmon. Potential impacts to Upper Klamath-Trinity Rivers ESU Chinook salmon populations in the Trinity River resulting from implementation of Alternative 3 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 3 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 Alternative 3 would be similar to those previously described for coho salmon and other anadromous salmonids.

Mitigation Measures

Alternative 3

Mitigation measures for this impact under Alternative 3 are identical to those described for the action alternatives in the EA/DEIR. Please see page 3.6-41, 42 of the EA/DEIR for these measures.

Significance after Mitigation: Less than Significant

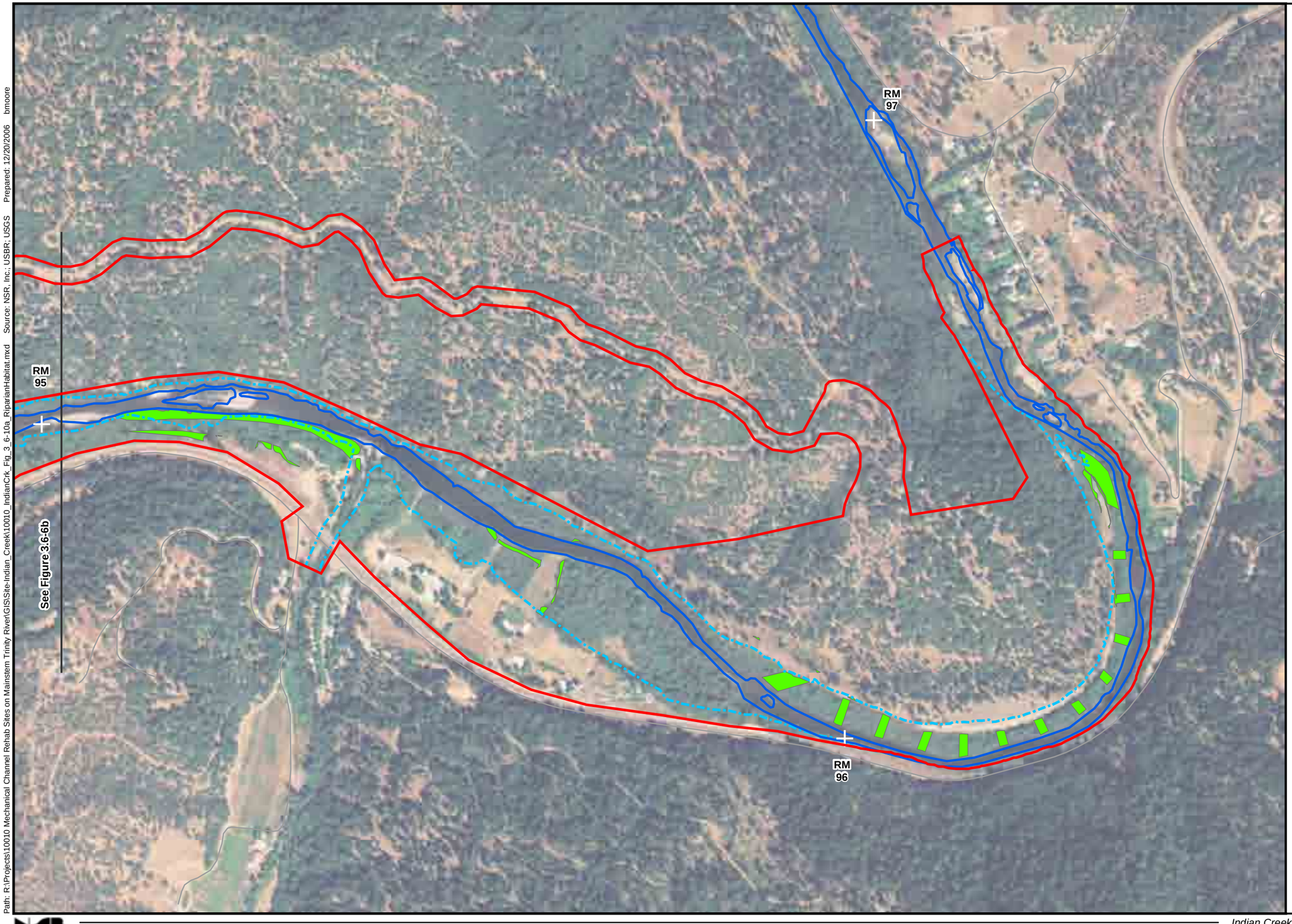
Impact 3.6-5: Implementation of the project would result in the permanent and temporary loss of shaded riverine aquatic habitat (SRA) for anadromous salmonids. ***Significant Impact for Alternative 3***

Alternative 3

Riparian habitat is a general term that encompasses the range of riparian vegetation conditions within the project boundary. It does not have a specific legal description or definition. Revised Figures 3.6-10a and 3.6-10b represent the impacts of Alternative 3 on SRA habitat.

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 included as an element of designated critical habitat for the Southern Oregon—Northern California Coast (SONCC) ESU coho salmon and a component of Essential Fish Habitat (EFH) for Chinook and coho salmon. However, complexity in the riparian environment, also important in fish habitat, will be increased under Alternative 3.

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) estimated to be lost as a result of berm removal and floodplain contouring. Under Alternative 3, large seed trees (willow and cottonwood) and large nesting trees would be left intact. Additionally, riparian habitat removed under Alternative 3 would be replaced during the revegetation efforts. Therefore, no permanent net loss of SRA features would necessarily occur**.**



Site Boundary (329.21 acres)

River Mile (RM)

Match Line

River Line (300 cfs)

Ordinary High Water Mark (6,000 cfs)

Alternative 3

Riparian Area Habitat Impacts* (17.29 acres)

*Includes temporary impacts

N

1:6,600

550 0 550

Feet

Aerial photography: July 2005

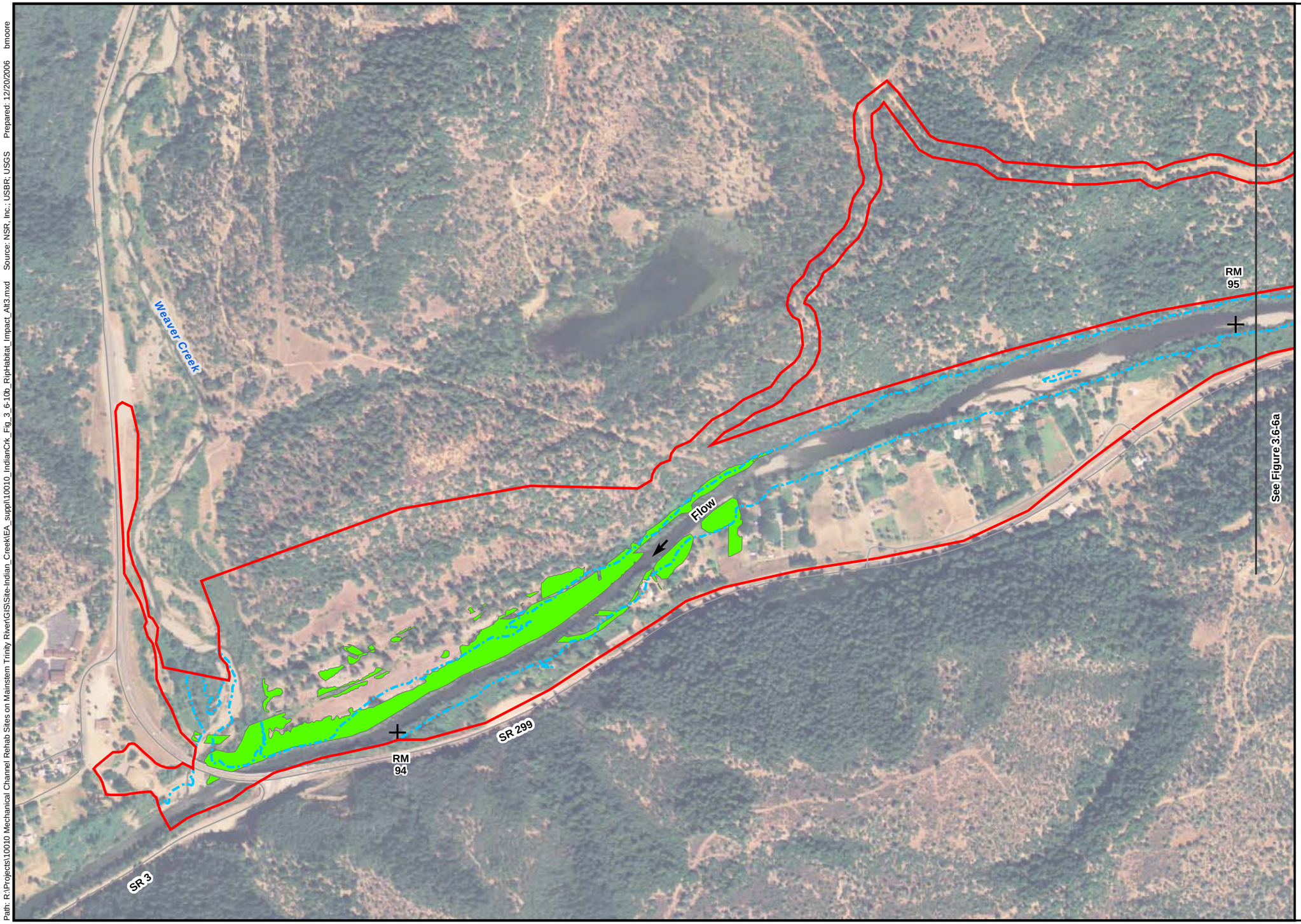
Path: R:\Projects\10010 Mechanical Channel Rehab Sites on Mainstem Trinity River\GIS\Site-Indian_Creek\10010_IndianCrk_Fig_3_6-10a_RiparianHabitat.mxd Source: NSR, Inc.; USBR; USGS Prepared: 12/20/2006 bmoore

North State Resources, Inc.

Indian Creek Rehabilitation Site: Trinity River Mile 93.7 to 96.5

Figure 3.6-10a
Alternative 3 Riparian Area Habitat

Path: R:\Projects\10010 Mechanical Channel Rehab Sites on Mainstem Trinity River\GIS\Site-Indian_Creek\EA_suppl\10010_IndianCrk_Fig_3_6-10b_RipHabitat_Impact_Alt3.mxd Source: NSR, Inc.; USBR; USGS Prepared: 12/20/2006 bmoore



Site Boundary (329.21 acres)

River Mile (RM)

Match Line

River Line (300 cfs)

Ordinary High Water Mark (6,000 cfs)

Alternative 3

Riparian Area Habitat Impacts* (17.29 acres)

*Includes temporary impacts

N

1:6,600

550 0 550

Feet

Aerial photography: July 2005

North State Resources, Inc.

Indian Creek Rehabilitation Site: Trinity River Mile 93.7 to 96.5

Figure 3.6-10b
Alternative 3 Riparian Area Habitat

Mitigation Measures

Alternative 3

Mitigation measures for this impact under Alternative 3 are identical to those described for the action alternatives in the EA/DEIR. Please see page 3.6-49, 50 of the EA/DEIR for these measures.

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. ***Significant Impact for Alternative 3***

Alternative 3

Coho Salmon. Construction activities associated with Alternative 3 will require temporary placement of low-flow channel crossings, consisting of gravel fill materials, at X-1 on the Trinity River and at X-3 on Weaver Creek. The crossings will be constructed in a manner that maintains adequate water depths and velocities for fish passage. The low water crossing will be used to move heavy equipment across the low-flow channels to access restoration areas on the right bank of the Trinity River. Construction activities may require service vehicles to cross up to several times per week; otherwise, vehicle crossing traffic will be kept to a minimum. Equipment operators and inspectors will use a small boat to cross the river on a routine basis.

Temporary gravel fill work ramps and low-flow channel crossings (X-1) to access R-1, U-1, and U-2 will be constructed to extend across the width of the low-flow channel (123 feet long, 0.15 acres in area) and are expected to be in place long enough to complete work in at these activity areas. The low-flow channel crossing (X-3) on Weaver Creek will provide access to R-8, R-9, R-10, U-3, T-1, and T-2. This crossing will span the low-flow channel of Weaver Creek (32 feet long, and 0.04 acre in area) and remain in place for the duration of the initial construction period. The length of the construction period (five years) could result in the removal and reinstallation of this crossing periodically in order to access this portion of the project area. Construction in and near the active low-flow channel is planned to occur during summer and fall months (between June 1 and November 1); however, access in and out of the sites might also be required during other low-flow times. River crossings would likely occur only during low-flow conditions (Trinity River flows of <1,500 cfs), which typically take place between July and December, but a few equipment crossings at low-flow conditions during other months (e.g., late winter/early spring) might also be required. Channel rehabilitation work planned at R-8 is scheduled primarily for summer and fall. Consequently, it is likely that some of this work would occur during the coho salmon spawning period.

In-channel activities (i.e., X-1 and X-3) may occur during the onset of the fall coho smolt emigration, depending on seasonal conditions (flow, temperatures, etc.), and encompass 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 will be dismantled and gravel fill material will be contoured to the river bottom. Fill materials will consist of appropriately sized spawning gravel.

Fish passage design is typically based on swimming capability of the weakest species or life stage that requires upstream access and should accommodate the weakest individual within that group. For

Alternative 3, low-flow channel crossings will need to meet velocity criteria for upstream migrating adult and juvenile salmonids and depth criteria for migrating adult salmonids, including the federally listed (threatened) coho salmon. Maximum velocities and minimum depths to be incorporated in low-flow crossings 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). Adult salmonids can negotiate water velocities of up to 8 to 9 feet per second (fps) without difficulty (Bjornn and Reiser 1991). However, juvenile salmonids can typically negotiate water velocities up to 2 fps only over short distances and up to about 1 fps over long distances and sustained periods (NMFS 2001); therefore, crossing designs will include criteria to accommodate these slower velocities for juvenile fish. Minimum water depth over the equipment crossings at low flow shall not be less than 12 inches to provide adequate depth for migrating adult Chinook and coho salmon (NMFS 2001).

Although the construction period may extend into smolt emigration and coho salmon spawning season, the effect of the low water crossing on fish passage is expected to be is 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. Any temporary impacts on fish passage are expected to be offset by the long-term beneficial changes to physical rearing habitat associated with implementing Alternative 3.

Chinook Salmon. Potential impacts to Upper Klamath-Trinity Rivers ESU Chinook salmon populations in the Trinity River resulting from implementation of Alternative 3 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 boundary during the construction season. The temporary placement of gravel fill 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 Alternative 3 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 3 would be similar to those previously described for coho and Chinook salmon and steelhead.

Mitigation Measures

Alternative 3

Mitigation measures for this impact under Alternative 3 are identical to those described for the action alternatives in the EA/DEIR. Please see page 3.6-53 of the EA/DEIR for these measures.

Significance after Mitigation: Less than Significant