

Landslides

The potential for landslides exists in the general vicinity of the rehabilitation sites; landslides in the vicinity typically occur in association with high precipitation and runoff events. The inherent slope stability in the greater Lewiston area is dependent on the underlying geology, although disturbance associated with road construction and catastrophic wildfire influence landslide types and locations. A large debris slide occurred on the uphill side of Old Lewiston Road in 2005. This slide continues to generate fine-textured sediment to the Dark Gulch site during periods of heavy runoff.

Seiches

Seiches could occur upstream at TRD facilities as result of seismic, meteorologic, or geologic activities. A seiche is an oscillation or standing wave in a body of water confined in a basin. Seiches commonly arise from a sudden local change in atmospheric pressure, accompanied by wind and, occasionally, tidal currents. They can also occur as the result of ground shaking caused by earthquakes, or by the force of large landslides or debris flows entering a water body. Local water bodies capable of generating a large-scale seiche include Trinity Lake, Lewiston Lake, and Grass Valley Creek Reservoir. The hazards associated with a seiche involve the overtopping or possible failure of these dams, with resultant modifications to the flow regime of the Trinity River (i.e., flooding). However, the likelihood of such an event is considered minimal.

Volcanic Activity

Volcanic hazards in the general vicinity of the rehabilitation sites are limited primarily to ash fall and minor seiches in Trinity and Lewiston lakes. There are three large active volcanoes in the Cascade Range in California—Lassen Peak, Mount Shasta, and the Medicine Lake Volcano—as well as numerous smaller vents. The distance (75 to 100 miles) from these volcanic centers suggests that the Proposed Action would not likely be significantly affected by a volcanic eruption (Trinity County 2001).

Soils

The majority of the soils at the rehabilitation sites are described in the Soil Survey of Trinity County, California, Weaverville Area (U.S. Department of Agriculture 1998). The entire area of the Lewiston–Dark Gulch rehabilitation sites is covered by this survey. Detailed soil descriptions and soil survey maps of the study area are presented in Trinity River Mechanical Channel Rehabilitation Project, Lewiston–Dark Gulch Sites, Delineation of Waters of the United States, Including Wetlands (North State Resources 2005) (Appendix C).

3.3.2 Regulatory Framework

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 geology issues associated with the Proposed Action were taken from the applicable elements of the

General Plan (Trinity County 2001). The General Plan includes the Lewiston Community Plan (Trinity County 2001).

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.

Conservation Element

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

To conserve, preserve and maintain the habitat for wildlife species, plant life and the environment:

- By planning for mineral production and performance so as to avoid destruction, pollution or degradation of surrounding land, water and air resources. After mineral extraction has been completed, land used for mineral production should be revegetated and restored to its natural condition.
- By identifying all geologic and soil areas and developing standards for restricted development of any hazard areas.

Safety Element

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

Seismic Safety Goal

- A. Reduce the threat to life and property from seismic and geologic hazards.
- B. Promote safety from seismic and geologic hazards
 - Geologic hazards and seismic safety shall be considered in the preparation of environmental documents as required by CEQA.
 - The County shall confirm that all construction and grading activities done will not adversely affect the stability of any slope.

Trinity County Zoning Ordinance

Section 12. Mining (Ordinance. No. 315-230, Ordinance. No. 315-596)

Purpose. To provide for the extraction of minerals, essential to the continued economic well-being of the County, while ensuring that mined lands are reclaimed to prevent or minimize adverse effects on the environment and to protect the public health and safety.

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 related to geology, fluvial geology, or soils.

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 sites so that they function in a manner that is closer to historic conditions (e.g., pre-Lewiston Dam).

3.3.3 Environmental Consequences/Impacts and Mitigation Measures

Methodology

Data for the following analysis were taken from existing reports on local and site-specific geology as well as on-site assessments during field reviews. These reports include the following documents: the Soil Survey of Trinity County, California, Weaverville Area (U.S. Department of Agriculture 1998); Lewiston–Dark Gulch Sites, Delineation of Waters of the United States, including Wetlands (North State Resources 2005); the FEIS/EIR; the Trinity River Maintenance Flow Study Final Report (McBain and Trush 1997); the Trinity County General Plan; and previously cited online and Geographic Information Systems (GIS) data sources.

Criteria for Determining Significance

A project would have a significant impact related to geology, geomorphology, and soils if it could subject people, structures, or other resources to geologic or seismic hazards or disrupt, eliminate, or otherwise render unusable geologic or soil resources. Significant impacts would occur if the Proposed Action would:

- expose people, structures, or critical utility facilities to major geologic hazards (including seismicity, landslides, seiches, and liquefaction);
- involve changes in topography that would result in unstable soil conditions;
- increase erosion rates to a level at which associated sedimentation levels could affect streams, rivers, or other water bodies;
- interfere with existing, proposed, or potential development of mineral resources; and/or
- be inconsistent with the 10 Trinity River healthy alluvial river attributes.

Impacts and Mitigation Measures

Table 3.3-1 summarizes the potential geology, fluvial geomorphology, and soils impacts resulting from construction and operation of the Proposed Action.

Table 3.3-1. Summary of Geology and Soils 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 3.3-1	Implementation of the project could result in the exposure of structures and people to geologic hazards, including ground shaking and liquefaction.			
NI	NI	NI	N/A ¹	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.			
NI	S	S	LS	LS
Impact 3.3-3	Implementation of the project would interfere with existing, proposed, or potential development of mineral resources.			
NI	NI	NI	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

¹Because 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 No-Action Alternative, Proposed Action, and Alternative 1

No-Action Alternative

Under the No-Action Alternative, there would be no new exposure of structures and people to geologic hazards because the project would not be constructed.

Proposed Action and Alternative 1

Under the Proposed Action and Alternative 1, no permanent structures or facilities would be constructed and, there would be no new exposure of structures and/or people to geologic hazards. Therefore, there would be no impact related to geologic hazards.

Mitigation Measures

No-Action Alternative, Proposed Action, and Alternative 2

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. No Impact

for No-Action Alternative; Significant Impact for Proposed Action and Alternative 1

No-Action Alternative

Under the No-Action Alternative, no construction-related erosion or associated sedimentation of the Trinity River would occur because the project would not be constructed.

Proposed Action and Alternative 1

Construction of the Proposed Action or Alternative 1 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 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.

For comparative purposes, 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 the Proposed Action and Alternative 1.

Table 3.3-2. Area and Volume of Soil Disturbance Under the Proposed Action and Alternative 1

Activity Type	Proposed Action	Alternative 1
In-channel activities (acres) yards ³	(9.37) 51,630	53,200
Riverine treatment areas (acres) yards ³	(25.1) 87,000	(27.5) 190,600
Upland activity areas (acres) yards ³	(12.05) 84,600	(12.31) 110,600
Staging areas/access roads/river crossings (acres)	(14.58)	(15.24)
(Total acres) Total yards ³	(61.10) 223,230	(55.31) 354,400

The potential for increases in soil erosion and sedimentation is considered a significant impact under both of the action alternatives. However, soil compaction that would occur as a result of construction staging and access road areas would be less for the Proposed Action than Alternative 1. The modification of the weir at IC-3 SO and the creation of a large floodplain in conjunction with gravel processing would increase the area of disturbance within, or in close proximity to, the river. Alternative 1 also requires a slight increase in new road construction that could contribute to erosion and sedimentation impacts. Although the area and volume of material that would be affected under the Proposed Action is less than under Alternative 1, either alternative could have the potential to increase soil erosion and sedimentation. This is considered 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 Reclamation or its contractors shall implement the following measures during construction activities:

- Areas where ground disturbance would occur shall be identified in advance of construction and limited to only those areas that have been approved by Reclamation.
- All vehicular construction traffic shall be confined to the designated access routes and staging areas.
- Disturbance shall be limited to the minimum necessary to complete all rehabilitation activities.
- All supervisory construction personnel shall be informed of environmental concerns, permit conditions, and final project specifications.

2b Reclamation or its contractors shall prepare an erosion and sedimentation control plan (Storm Water Pollution Prevention Plan [SWPPP]). Measures for erosion control will be prioritized based on proximity to the river. The following measures shall be used as a guide to develop this plan:

- Restore disturbed areas to pre-construction contours to the fullest extent feasible.
- Salvage, store, and use the highest quality soil for revegetation.
- Discourage noxious weed competition and control noxious weeds.
- Clear or remove roots from steep slopes immediately prior to scheduled construction.
- Leave drainage gaps in topsoil and spoil piles to accommodate surface water runoff.
- To the fullest extent possible, cease excavation activities during significantly wet or windy weather.
- Use bales and/or silt fencing as appropriate.
- Before seeding disturbed soils, work the topsoil to reduce compaction caused by construction vehicle traffic.

- Rip feathered edges (and floodplain surfaces where appropriate) to approximately 18 inches depth. The furrowing of the river's edge will remove plant roots to allow mobilization of the bed, but will also intercept sediment before it reaches the waterway.
- Spoil sites 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.
- Sediment control measures shall be in place prior to the onset of the rainy season and will be monitored and maintained in good working condition until disturbed areas have been revegetated. If work activities take place during the rainy season, erosion control structures must be in place and operational at the end of each construction day.

Reclamation will develop the erosion and sedimentation control plan in conjunction with the STNF, BLM, and the Regional Water Board and in cooperation with NMFS and CDFG. Reclamation's project manager will ensure the preparation and implementation of an erosion and sediment control plan prior to the start of construction.

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. *No Impact for the No-Action Alternative, Proposed Action, and Alternative 2*

No-Action Alternative; Proposed Action, and Alternative 1

There are no current or proposed mining activities operating under either a federally authorized operating plan or through a County SMARA permit within the vicinity of the rehabilitation sites (Hitt, pers. comm. 2006). Therefore, there would be no impacts to mineral activities under any of the alternatives.

Mitigation Measures

No-Action Alternative, Proposed Action, and Alternative 2

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

Significance after Mitigation

N/A

