Hotelling Gulch Fish Passage and Stream Restoration Project
Environmental Assessment

Salmon/Scott River Ranger District, Klamath National Forest, Siskiyou County, California

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Introduction

The proposed action is stream channel realignment, habitat restoration and fish passage improvement on about 500 feet of stream channel on Hotelling Gulch on the South Fork Salmon River within a 5 acre project area on the Salmon/Scott River Ranger District of the Klamath National Forest. It is within the South Fork Salmon River watershed, approximately 2.7 aerial miles southeast of the town of Forks of Salmon, California in Siskiyou County. It is located south of the South Fork Salmon in the Negro Creek-South Fork Salmon 7th field watershed (18010210010802). The legal location is Township (T) 10 North (N), Range (R) 8 East (E), Section 28 (Humboldt Meridian). (See Appendix A for vicinity and site maps).

We prepared this environmental assessment (EA) to determine whether implementation of stream realignment, restoration and fish passage improvement may significantly affect the quality of the human environment and thereby require the preparation of an environmental impact statement. By preparing this EA, we are fulfilling agency policy and direction to comply with the National Environmental Policy Act (NEPA). For more details of the proposed action, see the Proposed Action and Alternatives section of this document.

Background

The Salmon River is one of the most biologically intact sub-basins of the Klamath River. The Salmon River hosts all the native anadromous fish runs present in the Klamath River Basin, including the state and federally listed Southern Oregon-Northern California Coast Ecological Significant Unit population of coho salmon. This almost ½ million acre watershed is 98% publicly owned and many segments of the river are designated as Wild and Scenic. The large proportion of federal land and the comparatively high quality water and habitat conditions, make the Salmon River one of the best candidates for succeeding in restoring anadromous fisheries in the Klamath River Basin. Little is known about historic run sizes of coho salmon in the Salmon River, however, National Marine Fisheries Service’s Intrinsic Potential model suggests it has a moderate carrying capacity for coho salmon. The Salmon River likely supported a population of a few thousand coho salmon in the past. That number has dropped precipitously in the last two decades, and presently adult returns are likely less than 50 per year (NMFS, 2014). Problems facing coho salmon and other fish on the Salmon River include invasive species, barriers to fish passage, depleted large woody debris, high sediment loads, large wildfires, limited riparian function, unstable spawning gravels, and temperature impairment.

Starting in the 1850s land use changes in the Salmon River, such as large scale hydraulic mining and timber harvest, began to alter river channels and riparian areas. Between 1870 and 1950 it is estimated that over 15 million cubic yards of sediment was discharged into the Salmon River as a result of gold mining. Mining impacted the landscape, vegetation, soil, water quality, and channel structure in many fish-bearing streams including Hotelling Gulch. Remnant mine tailings and riparian disturbance continue to affect fish habitat and mined-over floodplains and terraces have remained poorly vegetated many decades after large-scale mining has ended.

Despite its relatively high amount of habitat and water quality, the fishery of the Salmon River is a remnant of what it once was. Wild runs of spring Chinook and coho salmon still persist in the relatively high quality waters of the Salmon River, yet they face a high risk of extinction. Increasing the available rearing habitat for juvenile salmonids is of great importance for the future of coho salmon in the Salmon River Watershed. Because this species requires slow water refugia and summer cold water temperatures for rearing habitat, increasing high-flow and temperature refugia, and slow water rearing habitat, are especially beneficial to the recovery of coho salmon populations in this watershed.
Purpose and Need

The objective of the project is to increase access to low gradient stream habitat for coho salmon and other anadromous fish in Hotelling Gulch, as well as improve natural stream function and the transport of watershed products to the South Fork Salmon River.

An evaluation of fish passage at road crossings in Siskiyou County identified the county road crossing of Hotelling Gulch as a high priority site because it currently prevents all species and life stages of fish from moving upstream to access a comparatively large area of high quality habitat in this area of the watershed (Ross Taylor and Associates, 2002). Hotelling Gulch is located within a reach of the South Fork Salmon that is potentially a key coho salmon spawning reach on a river with limited potential for this species which is listed as Threatened by both State and Federal Endangered Species Act. Since coho salmon spawn in December when flows are highest, suitable spawning habitat is typically limited in the main river channel with off-channel habitats and small tributaries providing most suitable habitat for spawning coho salmon.

The low gradient of this reach of the South Fork Salmon River makes it preferred habitat for coho salmon, and Hotelling Gulch would likely be utilized for both spawning and rearing if it were accessible to the species. Hotelling Gulch has the potential to provide 1.4 miles of suitable spawning and rearing habitat for coho salmon and steelhead trout above the current county road crossing. The stream contains perennial pools that hold cool water in the summer and dense riparian canopy.

Hotelling Gulch is located within a river reach that has been given a high priority ranking for riparian restoration. Currently, Hotelling has limited spatial and temporal connectivity for aquatic organisms. The current channel is also disconnected from the floodplain and groundwater and therefore is not attaining the optimal in-stream flow during critical summer months. Both of these components are essential to meeting the Aquatic Conservation Strategy Objectives outlined in the Forest Plan (page 4-6) and will be addressed by this project.

Hotelling Gulch enters the South Fork Salmon within one of the few unconfined channel reaches in the entire Salmon River watershed. This reach of the South Fork has a lower channel gradient and wider valley bottom than most other Salmon River reaches. Coho habitat values within this reach are high due to this topography and therefore coho salmon are likely attempting to utilize Hotelling Gulch (Soto, 2011). In addition, the lower portion of the Hotelling channel, once it is restored, will offer good low gradient habitat that will serve as slow water rearing habitat as well as refugia during high flow events.

Through field investigations and aerial photograph analysis, geomorphologists have characterized lower Hotelling Gulch as flowing over a broad alluvial fan that is prone to channel avulsion and shifting alignments. Analysis of the aerial photographs verified that Hotelling Gulch flowed along the historical western channel alignment as recently as 1964. Evidence of the historical channel persists, including a culvert crossing at Cecilville Road and a ground water fed perennial channel that flows from the culvert inlet to the confluence with South Fork Salmon River. Because the project area has been highly disturbed through hydraulic mining, the exact pre-mining alignment of the channel is unknown.

The project area consists of approximately 5 acres of alluvial fan/river terrace complex, much of which appears to have been reworked by historical mining activities. The entire Hotelling Gulch project area is located on Klamath National Forest lands. Cecilville Road (a Siskiyou County maintained road) crosses Hotelling Gulch and forms a fish barrier approximately 200 ft. upstream from its confluence with the South Fork Salmon River. Currently, there are two 36 inch culverts in this crossing. With this undersized crossing design, stream flow frequently diverts west to the inboard ditch during storm flows. During large storm events, Hotelling Gulch overtops the road. As a result, the road crossing has been rebuilt multiple times due to storm damage. Another 36 inch culvert conveys flow under the county road approximately 200 ft. to the west of the current stream crossing. This culvert discharges flow from several sources including an intermittent swale above the road, flow from the approaching inboard ditch, and diverted flow from Hotelling Gulch when the Cecilville Road stream crossing exceeds capacity. Subsurface flow creates a perennial stream channel below the road, and this cold-seep provides a small
amount of cooling to the confluence pool. This location has been referred to as the “historic” or “western” Hotelling Gulch watercourse alignment, and its culvert lies at a lower elevation than the present alignment. The present channel dries up seasonally in its lower reach, making it unsuitable for summer access to perennial stream habitat upstream. By restoring the historic channel, the goal is that surface water connectivity will be improved, increasing the amount of perennial flow, and improving thermal refugia conditions at the mouth of Hotelling Gulch.

Several prior investigations into restoring fish passage and suitable fish habitat in Hotelling Gulch provide the basis of understanding existing conditions at this location. These previous studies provide peak design flow and fish passage flow estimates, a topographic base map, estimates of depth to bedrock and depth to groundwater during the dry season along western channel alignment. This information has been incorporated into the final design efforts:

- Siskiyou County Culvert Inventory and Fish Passage Evaluation by Ross Taylor & Associates, 2002;
- Preliminary Hydraulic Analysis of Existing and Proposed Conditions along Present Hotelling Gulch Channel Alignment, Technical Memorandum by Mike Love and Associates, August 7, 2009;
- Hotelling Gulch Stream Crossing and Channel Realignment Feasibility Study by Pacific Watershed Associates, 2010;
- Fish Access to Hotelling Gulch from the South Fork Salmon River, Technical Memorandum by Mike Love and Associates, June 1, 2012;
- Preliminary Exploration of Alluvial Deposits in the West Channel of Hotelling Gulch, Memorandum by Pacific Watershed Associates, October 15, 2012; and
- Basis of Preliminary Design for the Restoration of Hotelling Gulch with a Road-Stream Crossing Replacement on Cecilville Road, Siskiyou County, California, June 30, 2016.

Decision Framework

The responsible official for this project is Ted McArthur, District Ranger for the Salmon/Scott River Ranger District, Klamath National Forest. This EA is not a decision document; it discloses the environmental consequences of implementing the action alternative, or taking no action. This EA also aids the responsible official in determining whether the effects disclosed would have a significant effect on the environment. If the responsible official determines there would be no significant effects, he will select the proposed action alternative, issue a “Finding of No Significant Impact” (FONSI), and sign a Decision Notice (DN).

Within the DN, the responsible official will determine whether to implement the proposed action or choose no action (Alternative 1) at this time. The final decision will be based on the information in this document, the supplementary information contained in the project record, consideration of any public comments, how well the selected alternative meets the purpose and need for the project, and whether the selected alternative complies with agency policy, applicable state and federal laws, and Forest Plan direction.

Public Involvement

On February 12, 2016, the proposal was mailed to nearby landowners or claim owners, to four tribes and to the North Coast Water Quality Control Board for a 30-day public scoping period from 12 February to 14 March 2016. The proposal was posted on the Forest website on April 1, 2016, and first listed in the Schedule of Proposed Actions on April 1, 2016. The Forest did not receive any comments from the public as a result of scoping the proposed action.
Alternatives

Alternative 1 – No Action

Under the No Action alternative, no treatments as proposed will be implemented. The No Action alternative provides reviewers a baseline against which to compare the magnitude of environmental effects of the action and any alternatives.

Alternative 2 - Proposed Action

Aquatic Organism Passage

The current crossing of Hotelling Gulch under the Cecilville Road is comprised of two 36-inch culverts within the existing channel alignment, an inboard ditch that often conveys stream flow from this undersized crossing, and one 36 inch culvert within the pre-1964 (western) alignment. The crossing does not meet fish passage criteria for all species and life stages, and blocks access to approximately 1.4 miles of potential habitat for salmonids including coho salmon (Taylor and Associates, 2002). The project will re-connect surface flows of Hotelling Gulch into one channel (western alignment) within the natural valley low, and upgrade the undersized crossing at the Cecilville Road to a bridge, box culvert, or other design appropriate to the site. The new structure will fully span the reconstructed channel and allow for uninterrupted passage of watershed products (large wood and coarse sediment), as well as fish and other aquatic organisms.

Stream channel reconstruction

Stream channel realignment activities will reconstruct approximately 550 feet of streambed in the pre-1964 (or western) alignment, and abandon or block off about 600 feet of channel in the existing (or eastern) alignment. An excavator would be used to construct the restored channel following designs that specify the appropriate grade and channel form. The new channel will be built using a reference reach template, thereby providing a suitable mixture of pool and fast-water habitat, locally appropriate substrate size, and other elements required to create a functional system. A floodplain feature will also be incorporated into the design. Excess dirt and rocks generated from reconstructing the restored western channel alignment will be used to block off the eastern channel alignment; if more material is generated by reconstruction than is needed to block the eastern channel, the excess will be spoiled in specific areas that have been identified as outside of the 100-year floodplain.

Channel design and construction will be suitable for gradient, substrate, and other conditions of the site. The end result will be a channel and floodplain area which will resemble a natural stream appropriate to the drainage area. There is no expectation of channel maintenance following construction activities, the constructed channel will be designed to evolve in a dynamic manner in response to discharge, substrate movement, wood input, and natural events.

Abandonment of the eastern Hotelling Gulch channel will require installation of a lateral berm at the point of diversion to the western channel, and partial in-filling of the abandoned channel (up to 300 feet upstream of the point of diversion to the new channel). This action is necessary to prevent reoccupation of the eastern channel during a large flood event. However, because the western channel alignment occupies the lower elevation alignment, the risk of channel avulsion to the eastern alignment is reduced. The eastern channel alignment will be filled using excess material produced from channel and floodplain reconstruction activities.

If de-watering and re-watering of Hotelling Gulch channels is necessary, it will be done in a manner that minimizes sediment mobilization and avoids potential impacts to salmonids including SONCC coho salmon. During near and in-channel work, there will be no surface water connection between Hotelling Gulch and South Fork Salmon River. Appropriate sediment retention devices, such as silt fence, hay bales, washed gravel berms wrapped in plastic, and/or wattles, will be used during excavation work to prevent contaminants and sediment from entering the river. In-channel sediment barriers will be
removed only after mechanized equipment has completed all work at the site and sediment from construction activity has settled. At that time, either hand operations or an excavator arm will be used to remove the remaining fill between the constructed habitat and the adjacent river. Excess excavated fill generated from project activities will be placed to minimize erosion and/or to prevent Hotelling Gulch flow from entering an unwanted channel during subsequent elevated flows. Blackberry, shrub, and tree removal to allow equipment access/operation will result in the least possible amount of canopy shade loss over the reconstructed Hotelling Gulch channel. In order to construct the restored channel, about 10 alders, 3-5 pines, and some oaks would be removed; each of the trees are less than 18 inches in diameter and some are dead. The restored Hotelling Gulch channel corridor will be planted with riparian trees and shrubs to ensure quick re-establishment of effective canopy shade. Trees removed during project activities will be retained on-site for use as in-channel and floodplain structure complexity elements.

*Fish habitat restoration*

The project will include placement of large woody debris into the channel. This woody debris will be obtained from utilizing trees that are removed as part of project construction. They will be incorporated into the pools to provide cover for rearing salmonids. The project will also restore channel complexity, which will support scour and sorting substrate, creating areas with gravel sized material suitable for spawning by adult salmonids.

**Project Design Features**

Project design features specific to this project, developed prior to and after scoping, will be used as a part of the proposed action to minimize or eliminate negative effects to resources in the project area. Specific best management practices (BMPs) that will be followed are listed in appendix B of this document. Design features listed in Table 1 are listed under the resource for which they are intended to mitigate effects.

**Table 1: Project Design Features Incorporated into Alternative 2.**

<table>
<thead>
<tr>
<th>Design Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIR-1</td>
<td>Dust control measures will be implemented to minimize dust generation and effects to visibility to drivers on the county road.</td>
</tr>
<tr>
<td>ARCH-1</td>
<td>If any late discoveries of human remains or features not previously recorded are identified during project implementation, work in the immediate area will stop and the District Archaeologist and Heritage Program Manager will be contacted.</td>
</tr>
<tr>
<td>WS -1</td>
<td>For activities that occur within Riparian Reserves, the Normal Operating Season (NOS) will be June 1st to November 15th. Ground disturbing activities will also be restricted during periods of wet weather during the NOS. See BMP 1.5.</td>
</tr>
<tr>
<td>WS-2</td>
<td>Mulch and/or seed areas disturbed by restorations activities where sufficient levels of soil cover are lacking.</td>
</tr>
<tr>
<td>Design Feature</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>WS-3</td>
<td>Erosion control and other requirements to protect water quality are described in BMPs. Appendix B.</td>
</tr>
</tbody>
</table>
| WS-4 | The designated Project drafting site is within a Pacific salmonid-bearing stream reach. Therefore, *NOAA Fisheries Water Drafting Specifications* guidelines will be used. They include, but are not limited to, the following:  
  1. When in habitat potentially occupied by Chinook and Coho salmon, intakes will be screened with 3/32-inch mesh for rounded or square openings, or 1/16-inch mesh for slotted openings. When in habitat potentially occupied by steelhead trout, intakes will be screened with 1/8-inch mesh size. Wetted surface area of the screen or fish-exclusion device shall be proportional to the pump rate to ensure that water velocity at the screen surface does not exceed 0.33 feet/second.  
     a. Use of a NOAA approved fish screen will ensure the above specifications are met.  
  2. Fish screen will be placed parallel to flow.  
  3. Pumping rate will not exceed 350 gallons-per-minute (gpm) or 10% of the flow of the anadromous stream drafted from.  
  4. Pumping will be terminated when tank is full.  

For any water drafting that occurs in non-fish bearing waters, Forest Service BMP 2.5 defines restrictions.  
All water drafting will avoid areas of thermal refugia. Drafting is not to have any effect on the amount of cold water in thermal refugia at creek mouths and seeps. |
| WEED-1 | Noxious weed infestations will be flagged on the ground prior to project implementation. Material from within the flagged noxious weed boundary will not be transported unless to a location that is approved by the District Botanist in order to prevent transporting seed bank to uninfested locations. Known infestations of noxious weeds will be treated by either manual or mechanical methods prior to seed set to avoid transporting seeds from the infested locations into other portions of the project area. |
| WEED-2 | Equipment will be cleaned of soil, seeds, vegetative matter, and other debris that could contain or hold seed prior to moving to the project area, and after leaving the project area. |
| WEED-3 | Wherever seed and/or straw is used to restore areas of ground disturbance, certified weed free seed and straw would be specified in the contract and used during implementation and any follow up treatments. |
| WL-1 | To avoid disturbance to NSO that may be breeding near the project area, project activities that involve louder than ambient noise levels will be prohibited from February 1 to July 9 each year. |
Alternatives Considered but Eliminated from Detailed Study

Several scenarios for restoring natural function in this section of Hotelling Gulch were evaluated over the life of project development. One main alternative was pursued which was restoring the eastern alignment channel instead of the western alignment that is proposed in the action alternative.

These alternatives primarily involve channel modification along the existing channel alignment and upgrading the eastern stream crossing structure to a bridge. Two different alternatives to channel grading were considered. Alternative A would reconfigure the existing channel profile and cross section at the bridge crossing, while Alternative B would include additional channel grading downstream from the bridge to allow for more efficient conveyance of sediment. Additionally, to prevent roadway flooding, the existing low left bank upstream of the crossing would be raised to an elevation sufficient to contain the 100-year flow, but should be substantially lower than the bottom of the bridge deck. Through the channel regrade section downstream from the new bridge, the banks would be sloped back to a 2:1 grade with a 12.5 ft final channel width. For the channel reach through the new bridge section, the banks would be sloped back to 1.5:1 grade with a 12.5 ft final channel width, and rip-rap be placed along the sideslopes to prevent bridge abutment scour. The final channel, with an approximate 175 ft regrade length, will transition from ~ 2% slope in the lower section to over 4% slope in the upper section.

These alternatives were dropped from further study for several reasons.

- Because the eastern channel alignment occupies the higher elevation alignment, the risk of channel avulsion to the western alignment is higher.
- Due to the shallow profile of the eastern channel, the road surface would have to be raised approximately 5 ft to obtain the necessary flow conveyance and freeboard. This would increase road and bridge maintenance costs.
- The eastern channel enters the river in a riffle, making fish access more difficult.
- The eastern channel dries up seasonally in its lower reach, making it unsuitable for summer access to perennial stream habitat upstream.

Environmental Impacts of the Proposed Action and Alternatives

This section summarizes the biological, physical, and cultural environments of the affected project area and the potential changes to those environments due to project implementation.

This EA incorporates the KNF Forest Plan by reference and tiers to the Final Environmental Impact Statement (USFS 1994). The discussions of resource potential effects take advantage of existing information included in the Forest Plan and other sources as indicated. Where applicable, such information is briefly summarized and referenced to minimize duplication. The planning record includes all project-specific information such as resource reports, ecosystem analyses, and other results of field investigations.

The supporting resource specialist reports and their amendments are available on the Forest internet website at: http://www.fs.fed.us/nepa/nepa_project_exp.php?project=48527. Key points from the analysis documents are summarized in this section and the documents, including resource reports, are incorporated by reference.
Water Quality

Methodology

Analysis Indicators and Measures

The potential direct and indirect effects of each alternative will primarily be assessed qualitatively. In addition, four analysis indicators will be used to assess the relative risk to water and riparian resources:

- **Likelihood of increased temperature loading to the Salmon River.** An increase in stream temperature may occur because of a temporary decrease in stream shade due to necessary construction activities. The potential for increasing temperature is approximated by acres of riparian vegetation removal.

- **Likelihood of increased sediment loading to the Salmon River.** A short-term increase in sediment may occur due to construction activities (equipment access and storage areas and stream channel construction). The potential for increasing sediment delivery is approximated by the total acres of project area resulting in soil disturbance.

- **Likelihood of channel stability in Hotelling Gulch.** The reconstructed (western) channel could avulse back into the current (eastern) channel alignment during a high flow event. The potential for channel avulsion was evaluated by Michael Love and Associates during project design and will be described in this document.

- **Potential for groundwater contribution to instream flow.** The contribution of groundwater to the stream flow will be estimated based on the conceptual model described by J. Toth in 1963, in a theoretical analysis of groundwater flow in small drainage basins published in the Journal of Geophysical Research. Groundwater contribution to instream flow can reduce stream temperatures at the local and reach scales.

Spatial and Temporal Bounding of Analysis Area

The Negro Creek-South Fork Salmon River 7th field watershed (18010210010802), about 10.2 square miles (6,524 acres), is the spatial bound for this analysis. This boundary is appropriate for assessing the project impacts as they might be experienced by an aquatic organism at the confluence with the Salmon River. The short-term temporal bound for the analysis is 2 years and is based on the assumption that an overbank flow event has a high likelihood of occurring within 2 years of project implementation. The long-term temporal bound for the project is 10 years because it is expected that any potential reductions to stream shade (and indirect and cumulative adverse effects to water temperature) from project activities will recover within 10 years, if not more quickly.

Affected Environment

The project area is about 5 acres and flows over the alluvial fan/river terrace, which is prone to channel avulsion and shifting alignments. This area has been highly disturbed through hydraulic mining; therefore, the pre-mining alignment of the channel is unknown. Cecilville Road (a Siskiyou County maintained road) crosses Hotelling Gulch’s eastern channel and runs through two 36 inch culverts. During large storm events, Hotelling Gulch sediment aggrades at the mouth of the culverts and flow overtops the road. The eastern channel dries up seasonally in its lower reach, making it unsuitable for aquatic species summer access to perennial stream habitat upstream. Hotelling Gulch flowed along the western channel alignment as recently as 1964. In the western channel subsurface flow creates a perennial stream channel below the road; this cold-seep provides a small amount of cooling to the confluence pool in the South Fork Salmon River.

The Salmon River hydrologic area (as defined by the North Coast Regional Water Quality Control Board), which includes Hotelling Gulch, is registered on the Clean Water Act 303(d) list as impaired for temperature, as part of the Klamath Hydrologic Unit listing (NCRWQCB, 2005). As part of the listing, the 2005 Salmon River Total
Maximum Daily Load for Temperature and Implementation Plan adopted a temperature “loading capacity” limit for the river (NCRWQCB, 2005). The threshold of no more than 5°F rise in the temperature of cold water above natural receiving water temperatures applies to the confluence of the South Fork Salmon River and Hotelling Gulch, which is within the project area.

Klamath NF conducted a stream temperature study during low flow conditions in 2010 and 2011. Hotelling Gulch was not evaluated, however, Knownothing and Methodist Creeks, which bound the project area, were found to have altered shade and 7-day maximum temperatures greater than 16°C, the temperature threshold for core juvenile salmonid rearing. Interestingly, the study found that 85% of the of all the assessed streams on the Forest are warmer than the 16°C standard, including 15 out of the 20 reference, or unmanaged streams, suggesting that the natural temperatures of many streams on the Klamath NF are warmer than the threshold standards used to assess them.

Within the 7th field watershed, current activity in addition to this project include 5 active mining claims and the Knownothing Fuels Reduction Project. The mining claims are all placer claims and do not have Plans of Operations in place. Therefore, the mining is limited to gold panning, small test hole excavation for prospecting, and small scale processing of the mined material. The Knownothing Fuels Reduction Project began in 2013 and is on-going. It includes the removal of ladder fuels, brush re-growth, and hazardous snags through cutting, handpiling, and burning piles.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Currently, Hotelling Gulch is disconnected from groundwater and therefore is not attaining the optimal in-stream flow for spatial and temporal connectivity for aquatic organisms during critical summer months. Both of these components are essential to meeting the Forest Plan Aquatic Conservation Strategy Objectives. The frequent sediment aggradation and overtopping of the road results in regular road crossing failure. Each failure conveys increased sediment and road debris into Hotelling Gulch and the South Fork Salmon River.

The current (eastern) alignment is entrenched and relatively stable in its current flow path. However, lower Hotelling Gulch flows over a broad alluvial fan/river terrace complex that is naturally prone to channel avulsion and shifting alignments. As recently as 1964, Hotelling Gulch flowed along the western channel alignment. Therefore, there is a possibility that during an extreme storm event the channel could avulse back into the western alignment. When taken all together the channel has a moderate stability overall.

The current channel of Hotelling Gulch is not in the thalweg (or lowest part) of the alluvial fan. The current channel goes dry in the project area early in the spring and has no evidence of springs or groundwater seeps. So the contribution of groundwater to the portion of the current channel in the project area is none. The trend will be neutral compared to current conditions.

Cumulative Effects

The effects of mining activity within the watershed is minimal and limited to small surface disturbances. The fuel reduction work is localized and has a small project footprint relative to the 7th field watershed. Neither of these activities is expected to affect instream flows, including stream temperature, sediment, channel stability, or groundwater systems within the project area, Hotelling Gulch, or the 7th field watershed. Therefore, the current condition of the channel in relation to the ongoing activities within the watershed (mining and fuels reduction) will not combine to result in adverse cumulative effects including reaching the TOC for mass-wasting.
Alternative 2

Direct Effects and Indirect Effects

The project would reconnect surface flows of Hotelling Gulch into one channel (western alignment) within a more natural valley at a lower elevation. Upgrading the undersized crossing of Cecilville Road would eliminate the regular failure of the current road crossing, and allow for natural processes of sediment and debris delivery to the South Fork Salmon River. This alternative will result in a channel and floodplain area which will resemble a natural stream appropriate to the drainage area, including cascades, steps and pools constructed of native material (rock and large wood) salvaged onsite.

The proposed action has the potential to adversely affect stream temperature in the short term through a loss of shade by riparian vegetation where channel excavation removes canopy cover. Both air temperature and stream shade were shown in Laurie, 2012 to be significantly correlated to stream temperature. These potential impacts could be expected to last no more than 10 years; however, blackberry and poison oak are expected to recover and fully shade the stream within a few years of disturbance. These long-term impacts will be reduced by planting appropriate and fast growing riparian vegetation (primarily native willows) immediately following disturbance. Additionally, avoiding removal of the white alder trees along the west side of the channel below Cecilville Road will maintain shade over the channel. The trees removed along the east side of the channel may take up to 20 years to recover.

However, by restoring the western channel, surface water connectivity will be improved, substantially increasing the amount of perennial flow, and improving thermal refugia conditions at the mouth of Hotelling Gulch. Within and beyond the long-term timeframe, the western channel would have a beneficial indirect effect on water temperature by maintaining hyporheic flow (groundwater/surface water interaction) longer into the water year, providing cool water inputs to the South Fork Salmon River during critical summer months. This means that there is a high potential for groundwater contribution to in stream flows in Hotelling Gulch following stream restoration.

Within the short-term (2 years) timeframe, the proposed action has the potential to increase sediment loads within Hotelling Gulch and the South Fork Salmon River. While sediment is a natural and necessary part of every fluvial system, it is physically and ecologically important to avoid contributing excess sediment by anthropogenic means. Where soil and vegetation are disturbed by excavation, fill piling, and site access, water is more likely to erode and deliver sediment to the stream channel. These short-term impacts will be reduced by working during dry conditions and placing erosion controls prior to and during construction, as well as permanent stabilization immediately following construction. If water is present in the channel during construction, dewatering of the channel will be conducted to minimize disturbance to hydrology and in accordance with standard BMPs. The site will also be revegetated with appropriate riparian species immediately following the disturbance. Within the long-term timeframe, vegetation is expected to fully stabilize any disturbed soil.

The reconstructed (western) channel could avulse back into the current (eastern) channel alignment during a high flow event. Potential avulsion was evaluated through the design process, Michael Love and Associates developed a project design to mitigate the possibility of avulsion as much as possible. The eastern channel will be plugged with materials excavated from the restored channel resistant to scour and would have a top elevation 3 feet above predicted 100-year flow elevation. It will also be planted with live willow cuttings in order to maintain the plug in place. Additionally, the eastern channel plug will be monitored for stability annually and following extremely high flow events. The stream channel will be more stable than in its current condition because of the low topographic location of the western channel and the restoration design.

Although temporarily increasing temperature and sediment loads in the short term is possible, though unlikely, the potential effects must be put into perspective. When one considers the area of disturbance in comparison to the 7th field watershed area, it is clear the overall potential effects on stream temperature and sediment regime should be
very small (insignificant), if not imperceptible, within the short-term and absent during the long-term. The disturbance is expected to be about 1.5 acres total, which is 0.02% of the 7th field watershed and 0.20% of Hotelling Gulch.

To further reduce the risk of adversely affecting water resources, Project Design Features (PDFs) and Best Management Practices (BMPs) would be required during implementation and they are described in of the Proposed Action and Appendix B of this EA.

**Cumulative Effects**

The effects of current mining activity within the watershed is minimal and limited to small surface disturbances. The fuels reduction work is localized and has a small project footprint relative to the 7th field watershed. Neither of these activates is expected to affect instream flows, including stream temperature, sediment, channel stability, or groundwater systems within the project area, Hotelling Gulch, or the 7th field watershed.

Therefore, the addition of this project to the ongoing activities within the watershed (mining and fuels reduction) will not combine to result in adverse cumulative effects including reaching the threshold of concern for mass-wasting. Therefore, restoration activities will not produce adverse cumulative effects to water quality due to the small size for the project and specified project design features (PDF) and best management practices (BMP) which will mitigate potential impacts of the project.

**Compliance with law, regulation, policy, and the Forest Plan**

The Klamath LRMP Record of Decision (ROD) is the guiding document for all Forest projects. The Klamath LRMP includes reference to the Aquatic Conservation Strategy (ACS), which incorporates specific standards and guidelines for riparian reserves set within the overarching Northwest Forest Plan (ROD to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl) (USDA Forest Service and USDI Bureau of Land Management 1994). All projects within Riparian Reserves on the Klamath National Forest must therefore be consistent with the objectives, standards, and guidelines of the ACS. The project is located in the Riparian Reserve Management Area (MA-10). Forest-wide standards and guidelines include direction to maintain and restore water quality necessary to support healthy riparian, aquatic and wetland ecosystems. These include, but are not exclusive to, standards and guidelines: 9-1, 9-4, MA10-13, MA10-17, MA10-18, MA10-19, MA10-20. The Hotelling Gulch Fish Passage and Channel Restoration Project is consistent with the LRMP standards and guidelines, including the ACS objectives.

The North Coast Regional Water Quality Control Board and US Environmental Protection Agency have listed the Salmon River as impaired due to elevated water temperatures. The Salmon River Temperature Total Maximum Daily Load and Implementation Plan was prepared to reduce the temperature issues in the watershed over the long-term (NCRWQCB, 2005). By enhancing riparian vegetative shading and increasing hyperheic flow, this project will cool flows into the South Fork Salmon River, benefiting both anadromous fisheries recovery and temperature implementation goals.

**Fisheries**

**Methodology**

**Analysis Indicators and Measures**

The analysis of the potential effects to fish and their habitat is organized by direct and indirect effects and by effects to seventeen Indicators of anadromous fish habitat conditions. The Indicators originate from the “Analytical Process for Developing Biological Assessments for Federal Actions Affecting Fish within the Northwest Forest Plan Area” (USDI, USDA, and NOAA 2004). Effects of project elements to an Indicator may be neutral (no effect), discountable (extremely unlikely to occur), insignificant (effects are not able to be
meaningfully measured, detected, or evaluated), or significant (effects able to be measured). Furthermore, effects may be either positive or negative. After the appropriate Indicators have been evaluated, the resulting information is used to determine overall effects on aquatic species, including Coho Critical Habitat and Essential Fish Habitat.

Although the methodology for effects analysis only technically applies to anadromous fish within the Project area (e.g., Coho, Chinook, and steelhead), it may also be used for resident rainbow trout to ensure a consistent assessment of fish species; and indirect effects to anadromous fish will serve as a proxy for lamprey. Additionally, Indicators are used to assess the existing environment of anadromous systems, with each Indicator labeled as to if it is “Properly Functioning,” “Functioning-At-Risk,” or “Not Properly Functioning” for a given stream.

Of the seventeen total Indicators, the following are potentially affected by the Project and will undergo further discussion:

- Temperature
- Turbidity
- Physical Barriers
- Sediment/Substrate
- Large Woody Debris
- Pool Frequency and Quality
- Refugia
- Width/Depth Ratio
- Streambank Condition
- Floodplain Connectivity
- Peak/Base Flows
- Drainage Network
- Disturbance History/Regime
- Riparian Reserves

**Temperature** – This indicator is rated by stream temperature, and the expected increase/decrease from the existing condition due to Project activities in fish-bearing reaches of stream channels.

**Turbidity** – This indicator is rated by professional judgment following observation of conditions after high water events, amount of substrate fines, CWE models (USLE/GEO), and condition of Riparian Reserves. In addition, the distance to fish habitat and the likelihood of activities to introduce fine sediment into fish-bearing streams will be incorporated into the effects analysis.

**Physical Barriers** – This indicator is rated by presence/absence of human-built barriers which affect fish distribution.

**Sediment/Substrate** – This indicator is rated by percentage of substrate composition of finer material. Considered data can include composition of surface and subsurface of non-pool units, as well as volume of pools filled with fines. Where no or limited survey data is available, evaluation may utilize CWE (USLE/GEO) models and professional judgment.

**Large Woody Debris** – This indicator is rated using amount of “large wood” per linear length of stream; and is only applicable in 3rd or larger order stream systems. The Northwest Forest Plan and KNF Land Resource Management Plan offer guidelines as to an acceptable amount of wood, as well as provide definitions of “large wood”. If professional judgment concludes guidelines are inadequate or do not capture the nature of the system under consideration, channel width and potential of the site to produce and retain woody debris may be used. Potential for future large woody debris recruitment in both short- and long-term should also be considered.
Recruitment will be determined using the likelihood of the removal of standing trees that have a high probability of becoming large woody debris in the stream channel based on professional judgment and scientific literature.

**Pool Frequency and Quality** – This indicator is rated by frequency and quality of pools present in a stream system.

**Refugia** – This indicator is a synthesis of presence and degree of functionality of habitat elements available for fish throughout their life history. Considerations for rating include stream temperature, water quality, riparian reserve, water flow, sediment in pools, and connectivity.

**Width/Depth Ratio** – This indicator is rated by width-to-depth ratio, in relationship to Rosgen stream type, and amount of braiding due to sediment aggradation. If data is limited or lacking, other considerations may include drainage history of debris flows and mass wasting, pool frequency and depth, frequency of largewoody debris, and CWE models.

**Streambank Condition** – This indicator is rated bank stability of a stream system. If data is limited or not available, considerations may include density of road-stream crossings, amount of inner gorge road, type and amount of non-road areas of compaction near the stream, presence of artificial berms, and extent of recent debris flows.

**Floodplain Connectivity** – This indicator is rated by hydrological connectivity of a stream with its floodplain and other areas off the mainstem channel. If data is not available, professional judgement may be used to assess the ability of a stream to access the floodplain during high-water flows, frequency thereof, and condition of riparian vegetation and adjacent wetland areas.

**Peak/Base Flows** – For watershed-level, this indicator is rated using elements of ERA, road density, vegetation and Riparian Reserve condition, and other associated components. Any potential effects to flows due to a site-specific project element are considered individually.

**Drainage Network** – This indicator is rated by increase/decrease in drainage network as related to roads, ditches, and other similar structures.

**Disturbance History/Regime** – This indicator is primarily rated using CWE (ERA/USLE/GEO) models. If professional judgment concludes that these models are not fully capturing disturbance risk, road density and location, current impacts from past stand-replacing timber harvest and wildfire, fire regime, vegetation regime, and development on private property may also be considered.

**Riparian Reserves** – This indicator is a consideration of the riparian environs, and extending into the near uplands. It is rated as a synthesis of shade; large woody debris recruitment; disturbance, roading, and other impacts to the Riparian Reserve management zone.

**Spatial and Temporal Bounding of Analysis Area**

The analysis area for aquatic resources includes effects at the site-specific and watershed-scale extent. Watersheds utilized in the analysis are at the 5th- and 7th-field level. Site-specific analysis discussion will focus on in and near stream channel actions and water drafting. Temporal analysis timeframe includes effects during implementation, short-term effects expected to occur within the first year following implementation, and long-term effects (greater than one year).

**Affected Environment**

The Hotelling Gulch Project is situated east of the Forks of Salmon community, about three miles upstream South Fork Salmon River along County Road 1C0C. The project is located at the mouth of Hotelling Gulch and adjacent to Hotelling Gulch Campground. Fish-bearing streams potentially affected by the project include South Fork Salmon River and Hotelling Gulch.
The only Threatened or Endangered fish in the analysis area is the Southern Oregon/Northern California Coasts Coho salmon (*Onchorhynchus kisutch*), including Critical Habitat. Sensitive fish species for the Klamath National Forest in the Project are the Upper Klamath-Trinity Rivers Chinook (*Onchorhynchus tshawytscha*), Klamath Mountains Province Steelhead (*Onchorhynchus mykiss*), Klamath River lamprey (*Entosphenus similis*), and Pacific lamprey (*Entosphenus tridentatus*). Both steelhead and resident rainbow trout (*Onchorhynchus mykiss*) are management indicator species in the Forest Plan. Additionally, Essential Fish Habitat designation is associated with Coho salmon and Chinook salmon.

Summary of actual and potential occupancy by analysis species of creeks/rivers within 7th- and 5th-field watersheds is in Table 2.

**Table 2: Pre-project actual and potential fish occupancy.**

<table>
<thead>
<tr>
<th>Species</th>
<th>7th-Field</th>
<th>5th-Field</th>
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<tbody>
<tr>
<td></td>
<td>Hotelling</td>
<td>SF Salmon</td>
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<tr>
<td></td>
<td>Gulch</td>
<td>River</td>
</tr>
<tr>
<td>Coho</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Chinook</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Steelhead</td>
<td>P¹</td>
<td>X</td>
</tr>
<tr>
<td>Resident Rainbow Trout</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Pacific Lamprey</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Klamath River Lamprey</td>
<td></td>
<td>P</td>
</tr>
</tbody>
</table>

X - confirmed present  
P - potential presence  
¹Resident rainbow trout have been observed. Origin as offspring of resident or steelhead is unknown.

For the analysis indicators, baseline existing condition – “Properly Functioning”, “Functioning-at-Risk”, and “Not Properly Functioning” – applies principally to creeks which directly or indirectly support anadromous species. “Direct” can include spawning and/or rearing habitat; and “Indirect” may refer to providing a recognized cold-water thermal refugia. Baseline for analysis indicators for stream with anadromous fish habitat in the project area is described in Table 3.
Table 3: Baseline indicators for streams with anadromous fish habitat.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Hotelling Gulch</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>NF</td>
<td>NF</td>
<td>FAR</td>
<td>FAR</td>
<td>NF</td>
<td>FAR</td>
<td>NF</td>
<td>FAR</td>
<td>FAR</td>
<td>FAR</td>
<td>FAR</td>
</tr>
<tr>
<td>SF Salmon River</td>
<td>NF</td>
<td>FAR</td>
<td>FAR</td>
<td>P</td>
<td>NF</td>
<td>FAR</td>
<td>P</td>
<td>P</td>
<td>P</td>
<td>FAR</td>
<td>FAR</td>
<td>FAR</td>
<td>FAR</td>
<td>FAR</td>
</tr>
</tbody>
</table>

P - "Properly Functioning"
FAR - "Functioning-at-Risk"
NF - "Not Properly Functioning"

Environmental Consequences

Alternative 1 – No Action

*Direct Effects and Indirect Effects*

Under the No Action alternative, the Project will not happen and no management actions will be taken. Access into Hotelling Gulch habitat will continue to be very difficult to impossible dependent upon fish species and size of a given individual.

*Cumulative Effects*

Cumulative impact occurs when the effect of one project overlaps with or compounds the effects of another. The Hotelling Gulch Project does not influence the implementation of any nearby project, nor visa-versa. Therefore, without direct effects or a compounding indirect effect, there cannot be cumulative effects for the No Action Alternative.

Alternative 2 – Proposed Action

*Direct Effects*

Direct effects to aquatic resources may occur as a result of water drafting activities and/or actions taken to remove fish from the Project area prior to implementation.

*Water Drafting (South Fork Salmon River)* – Fish screens and resource protection measures/BMPs will preclude impingement or disturbance to thermal refugia areas. Fish temporarily avoiding water drafting activities are not likely to experience reduced feeding success, nor result in a significantly higher probability of exposure to predators. The drafting site is not located in association with thermal refugia.

*Fish Relocation (Hotelling Gulch)* – The potential for fish presence during construction is very low because Hotelling Gulch is likely to be dry by the time ground disturbing activities commence. Pre-project, Hotelling Gulch is not accessible for Coho or Chinook salmon. The fish most likely to be present is resident rainbow trout, although juvenile steelhead are a possibility.
If water is present in the project area, the channels will be checked for fish. Any individuals found will be captured via appropriate electrofishing protocol and relocated, as per described by the 2012 Biological Opinion for projects (like Hotelling Gulch) which can be permitted under the NOAA restoration project program (NMFS, 2012). The Biological Opinion lists potential direct effects of fish relocation to be injury or mortality, but the expectation is very low; and relocation activities will not significantly reduce the number of returning salmonid adults. Block nets and other appropriate actions will be taken to prevent channel reoccupation by fish should discharge levels change, such as the result of a summer thunderstorm or other precipitation event.

**Indirect Effects**

Potential indirect impact to aquatic resources will occur as a result of stream crossing upgrade, channel reconstruction, and water drafting. The indirect effects to indicators which may be affected by project activities are as follows:

**Temperature** – There will be no measurable effect to stream temperature from channel reconstruction activities during implementation because Hotelling Gulch channel will be dry and the shade decrease over the South Fork Salmon River will be minor. Hotelling Gulch may experience an insignificant increase in water temperature post-implementation, but the effect will diminish in two or three years as effective shade is re-established. Long term, there would be benefits to shade and associated stream temperature as the Project is likely to increase ground and surface water connections in riparian and floodplain areas. The project will have a minor, short-term effect to stream flow during water drafting operations on the South Fork Salmon River. However, the effects are not likely to have any detectable change to stream temperature or have any meaningful impact to fish habitat due to the river’s large size and flow volume. As part of water drafting, areas of potential thermal refugia will be avoided therefore these activities will not impact stream temperature in thermal refugia.

**Turbidity** – There will be an insignificant degree of turbidity during project implementation and for a short time (months) post-construction once Hotelling Gulch reconnects to South Fork Salmon River. Turbidity is only expected to occur during and after storm events. Any turbidity is not likely to be of sufficient intensity to negatively affect fish or fish habitat. Turbidity after storm events is expected to return to normal in less than a year, as vegetation re-establishes. Effects to turbidity from water drafting will be localized, minimal in extent and duration, with the most likely fish behavior to be one of avoidance. Long term, there would be benefits to turbidity, sediment storage and transport, at the site because the project will restore channel function and remove the artificial barrier/constriction posed by the current undersized crossings.

**Physical Barriers** – The perennial portion of Hotelling Gulch will be reconnected with South Fork Salmon River. Actions will include upgrading the County Road crossing with a structure passable by aquatic organisms at all normal (i.e., non-extreme [dry or flood]) discharge conditions, as well as modifying the mouth and alluvial fan to facilitate fish access and provide a higher quality of habitat. Post project, fish access to about 0.5 miles of habitat in Hotelling Gulch will be opened up for all species and life history stages dependent upon flows; for more details on expected fish passage in Hotelling Gulch post project see the fish passage technical memorandum prepared for this project (Love 2012). Additionally, natural watershed processes associated with sediment regime and woody debris transport will be restored. While these actions will significantly improve the ability of Hotelling Gulch to support anadromous and residential fish, it will not be possible to upgrade drainage status to “Properly Functioning” because the upstream limit of fish distribution in Hotelling Gulch is further constrained by the culvert crossing of Forest Road 10N16, a distance of ~0.5 mile upstream of the project. While additional fish habitat is available higher in the drainage, this latter culvert requires assessment to determine if it is a partial or complete barrier.

**Sediment/Substrate** – There will be an insignificant short-term effect of the project in regards to substrate/sediment composition. Fine sediment is expected to mobilize from recently disturbed surfaces following construction. There will be no measurable impact to the South Fork Salmon River because the amount of sediment which may export from Hotelling Gulch will be very small compared to the size of the river; and it will be of insufficient volume to affect existing sediment-dependent habitat values. Within Hotelling Gulch, post-
project movement of sediment within the site footprint has the potential to detrimentally affect newly constructed channel features, but it should not be enough to significantly affect fish habitat parameters. Long-term, erosion will decrease as vegetation re-establishes, and the sediment transport and storage regime within the stream will be restored to a more natural state. There may be an insignificant benefit from the fine sediment in Hotelling Gulch because sands/silts will promote the streambed sealing process, thereby contributing towards delay of seasonal channel drying across the alluvial fan.

**Large Woody Debris** – Because implementation will require the removal of several trees less than 18 inches in diameter near the channels of Hotelling Gulch and South Fork Salmon River, the project will affect the location of current large woody debris (trees), as well as the timing of recruitment of this wood to the channel. Trees cut during construction will be saved for incorporation into the reconstructed channel, as a component of pool structures, as general in-stream wood, or as floodplain (terrestrial) coarse woody debris habitat. Trees cut during channel reconstruction will not be lost from the pool of potential recruits, and will instead be artificially “recruited” to Hotelling Gulch at the time of implementation. Wood transportation will experience an immediate benefit upon completion of the project. Design of the new road crossing structure will take into account the need to accommodate stream processes, including the passage of wood. In the very long-term, channel realignment and reconstruction will benefit future production of woody debris. One of the expected results of the Project is for the development of a riparian area across the alluvial fan which is similar to that currently present below the County Road. This means that the potential for Hotelling Gulch to produce large and small wood will be expanded. The development of a riparian area capable of supplying large wood is a process which will require decades (large alders) to over a century (conifers), and is dependent upon occurrence of natural events such as large flood. However, channel reconstruction will produce a system which is more resilient to extreme events, and is therefore more likely to move towards a mature riparian compared to the existing condition. In the short- and long-term following project completion, large wood within the project area, and the processes which rely upon the debris, will be benefited.

**Pool Frequency and Quality** – Channel reconstruction will benefit Hotelling Gulch in regards to the pool frequency and quality indicator. By moving Hotelling Gulch to its historic alignment and reconstructing the channel, the frequency and quality of pools will be enhanced. The improvement will be measureable, but not significant enough to fully restore the system at the watershed scale. This is because Hotelling Gulch continues to be a highly impacted system due to causes both human-caused and natural. However, the purpose of the project is not to return Hotelling Gulch to a pre-settlement state, but rather create an increased degree of functionality in regards to connectivity and fish habitat. The channel reconstruction, including creation of pools that incorporate wood and rock features, will successfully accomplish this goal.

**Refugia** – The project will significantly benefit the refugia indicator for Hotelling Gulch. Channel reconstruction within the historical alignment will positively affect the following key fish habitat indicators: temperature, barriers, substrate, pool frequency and quality, streambanks, floodplain connectivity, peak/base flows, and Riparian Reserves. Some benefits will be observable immediately following project completion, while other responses will require short-term (months), long-term (years), or very long-term (decades) to fully transpire. For instance, the project is expected to provide accessible winter, off-channel (velocity) refugia habitat for salmonids.

**Width/Depth Ratio** – Channel reconstruction will benefit Hotelling Gulch in regards to width/depth ratio. The existing condition across the alluvial fan is one of entrenchment. Without a functional floodplain, the creek is narrower and deeper than is normal for a stream of its size. By moving Hotelling Gulch to its historic alignment and reconstructing both streambed and floodplain, the state of severe entrenchment will be eliminated. The improvement will be measureable, but not sufficiently significant enough to consider the system fully restored. However, the purpose of the project is not to return Hotelling Gulch to a pre-settlement state, but rather create an increased degree of functionality in regards to connectivity and fish habitat. The channel reconstruction will successfully accomplish this goal for this indicator.

**Streambank Condition** – Channel reconstruction will benefit the streambank condition indicator for Hotelling Gulch in the long term. The existing channel across the alluvial fan exhibits streambanks less stable and less
developed compared to other locations within the drainage. Moving Hotelling Gulch to its historic alignment and reconstructing the channel, including the addition of a floodplain, will enhance functionality of the streambank component. In the short-term during and immediately after construction, the streambanks may be more erosion-prone. However, the site will stabilize as vegetation re-establishes in the months and years post-implementation. In the long-term, the bank is expected to display higher stability compared to the existing condition, as well as exhibit a higher functionality in regards to biotic processes.

**Floodplain Connectivity** – Channel reconstruction will significantly benefit the floodplain connectivity indicator for Hotelling Gulch. The existing channel is channelized and does not exhibit a functional floodplain through the alluvial fan. The realignment of Hotelling Gulch to its historical channel will include construction of a floodplain. This floodplain, while small and physically restricted due to the presence of alluvial fan material, will nonetheless restore a degree of functionality.

**Peak/Base Flows** – There will be a post-implementation benefit to peak/base flows within the project area. Flow behavior will be normalized: water may still go subsurface during the summer, but the period the channel is wetted will be closer to what is expected given the coarse substrate nature of the alluvial fan. Additionally, the construction of a floodplain will provide a location for high flows to dissipate energy and deposit transported sediment, nutrients, and wood. Water drafting to support project implementation will result in a temporary decrease in flow within the South Fork Salmon River, the effects of which are considered insignificantly small to fish and fish habitat.

**Drainage Network** – The project will benefit Hotelling Gulch in regards to the drainage network indicator. A critical component of project activities will be to plug the existing channel. Although the amount of channel to be reconstructed is similar to the amount of channel to be abandoned, the nature of the two channels is very different. The existing channel is entrenched, has no functional floodplain, and otherwise closely resembles a ditch. In comparison, the new channel will be constructed based upon the template of a reference reach selected to provide functional fish habitat. Additionally, there will be replacement of an undersized culvert structure with infrastructure appropriately sized to accommodate local hydrologic processes. Overall, while the amount of human-built drainage network within the Hotelling Gulch drainage will not measurably change, the quality of what is present will be insignificantly improved.

**Disturbance History/Regime** – Disturbance indices will not increase as a result of project implementation. Therefore, there will be no change in the existing risk represented by the respective CWE models at either the 5th- or 7th-field watershed level. Within the project area, more than CWE models should be considered when discussing the disturbance indicator. The Hotelling Gulch alluvial fan and adjacent vicinity have been greatly altered by past human actions, most notably mining; and the general area continues to be affected by current and recent activities of various kinds. By implementing the project, Hotelling Gulch will be reintroduced to its historical channel; and while it is unknown what the alignment may have been prior to large-scale mining, it is the most “natural” placement available. By executing the realignment, constructing a more natural channel form, and plugging the existing channel, the project will address some of the legacy effects associated with human impact to the Hotelling Gulch drainage.

**Riparian Reserves** – Project activities will have both a short- and long-term effect to Riparian Reserves. In the short-term, some of the individual components which comprise the Riparian Reserves indicator will impart an insignificant, localized negative effect. In the long-term, channel reconstruction is expected to provide a benefit via the development and expansion of riparian vegetation across the alluvial fan. The improvement of local Riparian Reserves character is not significant on a landscape level, but it is a step towards long-term recovery of this habitat element in the South Fork Salmon River.

**Cumulative Effects**

Cumulative impact occurs when the effects of one project overlaps with or compounds the effects of another. In the Hotelling Gulch Project area, an ongoing fuels project and several mining claims share a common watershed without physical boundary overlap. There will be no adverse additive effects to aquatic habitat indicators in
Hotelling Gulch or South Fork Salmon River from implementing this project along with those other activities. Cumulative Watershed Effects models remain below the threshold of concern when the effects of the proposed action and all current and future foreseeable projects are included in the model. Mining claims are not included in analyses because the models are insensitive to the very small amounts of disturbance which may occur with this activity type. There will be no cumulative impacts to aquatics from current and reasonably future foreseeable projects within the vicinity of the Hotelling Gulch Project.

**Summary of Effects**

Potential direct impacts to aquatic resources may occur as a result of water drafting (South Fork Salmon River) and fish relocation (Hotelling Gulch).

- **Water Drafting.** Fish screens and resource protection measures/BMPs, will preclude impingement. Fish temporarily avoiding water drafting activities are not likely to experience reduced feeding success, nor result in a significantly higher probability of exposure to predators. The only drafting site that is approved for use is not located in association with thermal refugia.

- **Fish Relocation.** Potential for fish presence in the project area during implementation is very low. Pre-Project Hotelling Gulch is not accessible to Coho or Chinook salmon. The fish most likely to be present is resident rainbow trout, although juvenile steelhead are a possibility. Potential direct effects can include injury or mortality, but the expectation is very low; and relocation activities will not significantly reduce the number of returning salmonid adults (NMFS, 2012).

Potential indirect impacts to aquatic resources will occur as a result of channel reconstruction activities and water drafting. Any detrimental effects will be localized, insignificant, and short-term and will impart no negative consequential impact to fish or fish habitat, including Coho and Coho Critical Habitat. Ground disturbing activities in Hotelling Gulch will occur under a dry-channel condition; and resource protection measures/BMPs, including an erosion and sediment control plan, will provide mitigation for potential impactors to aquatic resources. There will be multiple benefits to fish and fish habitat upon completion of the project. Some improvements will be immediate, while others may require months or years to be observed. Most importantly, barriers into Hotelling Gulch will be removed or modified, normalizing fish access into the drainage and extending accessible Critical Habitat for ESA-listed coho salmon. Other elements expected to be benefited include indicators associated with physical habitat parameters and riparian condition.

Therefore, the Fish Biologist has reached the determinations described in Table 4.
Table 4: Determinations of effects of the project on Threatened, Endangered, Forest Sensitive and Management Indicator Species.

<table>
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<th>Species</th>
<th>Special Status</th>
<th>Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fishes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coho Salmon (and CH)</td>
<td>Federally Threatened</td>
<td>NLAA</td>
</tr>
<tr>
<td>Chinook Salmon (Spring/Fall runs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Upper Klamath-Trinity Rivers)</td>
<td>FSS</td>
<td>MANL</td>
</tr>
<tr>
<td>Steelhead Trout</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Klamath Mountains Province)</td>
<td>FSS, MIS</td>
<td>MANL</td>
</tr>
<tr>
<td>Rainbow Trout (resident)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pacific Lamprey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Klamath River Lamprey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Essential Fish Habitat (Coho/Chinook)</td>
<td></td>
<td>May adversely affect</td>
</tr>
</tbody>
</table>

1Federally Listed Species
NE - Will not affect the species or its Critical Habitat
NLAA - May affect, not likely to adversely affect the species or its Critical Habitat
LAA - May affect, likely to adversely affect the species or its Critical Habitat

Forest Sensitive Species (FSS)/Management Indicator Species (MIS)
NE - No effect to the species (FSS and MIS)
MANL - May affect individuals, but is not likely to lead to a trend towards listing (FSS); and/or
May affect individuals, but is not likely to lead to a decreasing population trend (MIS)
MALT - May affect individuals, and is likely to result in a trend towards listing (FSS); and/or
May affect individuals, and is likely to lead to a decreasing population trend (MIS)

Reconstructing the alluvial fan channel will be sufficient to upgrade the indicator standings of Refugia and Floodplain Connectivity from “Not Functioning” to “Functioning-at-Risk”. The “Physical Barrier” indicator cannot be upgraded because a culvert of uncertain passage status is present at the Forest Road 10N16 crossing of Hotelling Gulch, about a half mile upstream of the project. Other indicators, while benefited long-term, are insufficiently improved to permit a change from current baseline functionality.
Table 5: Comparison of effects of alternatives for analysis indicators.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Alternative 1 (no action)</th>
<th>Alternative 2 (proposed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>0</td>
<td>-/+</td>
</tr>
<tr>
<td>Turbidity</td>
<td>0</td>
<td>-/0</td>
</tr>
<tr>
<td>Physical Barriers</td>
<td>0</td>
<td>+/-/S+</td>
</tr>
<tr>
<td>Substrate/Sediment</td>
<td>0</td>
<td>-/+</td>
</tr>
<tr>
<td>Large Woody Debris</td>
<td>0</td>
<td>-/+</td>
</tr>
<tr>
<td>Pool Frequency/Quality</td>
<td>0</td>
<td>0/+</td>
</tr>
<tr>
<td>Refugia</td>
<td>0</td>
<td>+/-/S+</td>
</tr>
<tr>
<td>Width/Depth Ratio</td>
<td>0</td>
<td>0/+</td>
</tr>
<tr>
<td>Streambank Condition</td>
<td>0</td>
<td>-/+</td>
</tr>
<tr>
<td>Floodplain Connectivity</td>
<td>0</td>
<td>0/S+</td>
</tr>
<tr>
<td>Peak/Base Flow</td>
<td>0</td>
<td>-/+</td>
</tr>
<tr>
<td>Drainage Network</td>
<td>0</td>
<td>0/+</td>
</tr>
<tr>
<td>Disturbance History/Regime</td>
<td>0</td>
<td>0/+</td>
</tr>
<tr>
<td>Riparian Reserves</td>
<td>0</td>
<td>-/+</td>
</tr>
</tbody>
</table>

0 = Neutral effects  
- = Insignificant or discountable negative effects  
+ = Insignificant or discountable positive effects  
S= Significant negative effects  
S+ = Significant positive effects  
*/# = Short-term/long-term effects  

Compliance with law, regulation, policy, and the Forest Plan

All Alternatives will meet Forest Plan Standards and Guides, Endangered Species Act, Magnuson-Stevens Fishery Conservation and Management Act, Northwest Forest Plan, and all other relevant regulations, laws, and policies. The appropriate level of Section 7 consultation will be completed with the National Marine Fisheries Service for Alternative 2 (Proposed Action) by coverage under the Restoration Center’s programmatic document (NMFS, 2012).

The project is consistent with the goals and objectives, and would implement specific recovery actions, in the SONCC coho salmon recovery plan (NMFS, 2014). That document identifies the highest priority for recovery of Salmon River stocks to be improving the quality and extent of rearing habitat and refugia (pg. 35-20). The project would increase potential winter rearing in Hotelling Gulch for this reach of the South Fork Salmon River.
Soils and Geologic Resources

Methodology

Analysis Indicators and Measures

- Potential for the project to cause hillslope instability which is measured by determining how likely the project is to change the mass balance of the hillslope.
- The functioning category of soil productivity in the project area which is measured by determining the effects of the project on soil stability, organic matter, soil strength and moisture regimes.

Spatial and Temporal Bounding of Analysis Area

The spatial analysis boundary will be the project area because this is the extent that effects are likely to be noticeable for the indicators defined above. The temporal bounds for cumulative effects will be four to five years for the hillslope instability and soil productivity. This is about how long we will see an increase in soil erosion as well as how long it will likely take for any changes in hillslope mass balance to become apparent (likely during a 2-10 year storm event).

Affected Environment

The project area is on an alluvial fan that has been hydraulically mined in the past. This has left behind a mix of natural and man-made landforms including a steep headwall above the project area. Also, because of past uses the alluvium on the fan is shallow meaning that bedrock is near the surface in places (<10 feet). The soil has a moderate erosion hazard rating meaning that erosion will be noticeable during storms that have just above average precipitation (3-5 year storm event). However, the soil has a low tendency toward rilling or gullying. Sheet wash is the most likely process of erosion for this soil and landform so sufficient soil cover can moderate erosion. Currently, the soils are properly functioning for soil productivity in the river bar environment.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

There would be no action taken in the No Action Alternative so there is no effect to geologic or soils resources.

Cumulative Effects

There are no direct or indirect effects as a result the No Action Alternative so there are no cumulative effects.

Alternative 2

Direct Effects and Indirect Effects

The work proposed is on gentle, relatively stable landforms (alluvial fan) for the project area. The headwall of the hydraulic mine is outside of the project area and will not be affected by the project activities. The filling of the existing channel or the modification of the existing channel will not undercut any sensitive landforms and won’t change the mass balance of the hillslope. The proposed action is not likely to increase hillslope instability.
The heavy machinery will cause a small amount of soil compaction in the project area which will be minimized by strategic use of heavy equipment. The gravelly loam soils throughout this area have relatively high soil strength so the soil has a moderate soil compaction hazard rating. The work will be completed when the soil moisture is low (summer/fall) and compaction is least likely. There may be some localized compaction but it will be on the short-term and once vegetation is re-established it will be broken up. The soil areas will not have measurable soil compaction over the long-term. Soil cover will be maintained or enhanced by stabilizing and re-vegetating disturbed areas with native vegetation. The project area will continue to be in the properly functioning category for soil productivity.

**Cumulative Effects**

The other current or reasonably foreseeable projects in the project area do not directly overlap with the areas of disturbance for this project so there are no cumulative effects for soils resources. There are no effects to geologic resources so there are no cumulative effects.

**Compliance with law, regulation, policy, and the Forest Plan**

This project complies with USFS direction in Forest Service Manual 2550 (Soil Management) (USDA Forest Service, 2012) and the Forest Plan standards and guidelines (USDA Forest Service, 2010).

**Botanical Resources and Non-Native Invasive Species**

**Methodology**

**Analysis Indicators and Measures**

**Threatened, Endangered, Proposed, or Candidate Species**

There are no plant species listed as Threatened, Endangered, Proposed, or Candidate within the project area, therefore, there will be no impacts to analyze as a result of project activities and no further analysis completed for this category of plant species.

**Sensitive Species:**

The analysis indicators are based on law, policy, and direction including the Forest Service Policy (FSM 2670) direct federal agencies to ensure that any action authorized, funded, or permitted by such agencies is not likely to jeopardize the continued existence of species listed as Sensitive by the Region 5 Regional Forester, or to cause a trend to federal listing for species listed as Sensitive (USDA 2005).

The alternatives are compared using the following indicators:

- The likelihood that the level of disturbance would decrease the ability of the species to maintain reproducing, self-sustaining populations within the project area.

- The likelihood that habitat would be managed in a manner that most closely imitates the natural ecological processes that created and maintained the habitat historically.

**Survey & Manage plant species:**

Analysis indicators include species of concern identified as Survey and Manage species. The Bureau of Land Management and Forest Service adopted standards and guidelines for the management of habitat to late-successional and old-growth forest related species within the range of the northern spotted owl, commonly known as the Northwest Forest Plan (NWFP). The NWFP included measures for management of known sites, site-specific pre-habitat disturbing surveys, and/or landscape scale surveys for about 400 rare and/or isolated species.
To be in compliance with the 2014 Survey and Manage direction (USDA 2014), projects must have pre-disturbance surveys conducted if the activity is potentially considered to be habitat-disturbing, and known sites must be managed to protect persistence at the site.

The alternatives are compared using the following indicator:

- Compliance with Survey and Manage requirements

**Noxious Weeds:**

The analysis indicators for measuring the effects are based on policy, and direction. Forest Service Manual 2900 Invasive Species Management (USDA 2011) includes a policy statement calling for a risk assessment for noxious weeds to be completed for every project. The KNF Land and Resource Management Plan includes Forest-wide Standards and Guidelines for vegetative management that call for all silvicultural practices to consider how to best prevent introducing noxious or alien weeds (USDA 1994, p.4-50). Additional direction is found in Executive Order #13112 (1999).

The alternatives are compared using the following indicator:

- Risk of spread of Noxious Weeds.

**Spatial and Temporal Bounding of Analysis Area**

**Sensitive, Survey & Manage, and Other Plant Species of Interest:**

The project area is the analysis area. This boundary is appropriate for assessing the project impacts as they might be experienced by existing sensitive species within the project area. The temporal boundary for *Phaeocollybia olivacea* is the time it takes to complete project implementation and for a layer of mulch and debris to recover bare ground, three to five years. The temporal bound for *Silene marmorensis* is the time it takes for the population to recover from disturbance, ten years.

**Noxious Weeds**

The spatial boundary is the project area and adjacent access roads. The temporal boundary is the time it takes to complete project implementation and for a layer of mulch and debris to recover bare ground, three to five years.

**Affected Environment**

A pre-field review was conducted to determine which species of concern are present, and for which species a field survey may be necessary. There are no known sites and surveys were not triggered for any species listed as Threatened, Endangered, Proposed, or Candidate. There are no known locations of Survey and Manage species in the project area, and no new locations were discovered during survey, therefore, this project is in compliance with Survey and Manage requirements and will not be discussed further in this report. Field surveys have been conducted for the specific project area. The pre-field review revealed that the locally-rare species *Silene marmorensis* occurs within the project area and that the noxious weed species, *Centaurea solstitialis* and *Isatis tinctoria* occur in the project area. Though the pre-field review indicated surveys should be conducted for *Phaeocollybia olivacea* (KNF Sensitive and Survey and Manage Category E), surveys for preferred habitat were conducted, while occurrence surveys were not conducted because this species would not be fruiting until fall, which is outside the window for project surveys.
Table 6: Plant species of concern present or with suitable habitat in the project area.

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Phaeocorybia olivacea</em></td>
<td>KNF Sensitive; Survey and Manage Category E</td>
</tr>
<tr>
<td><em>Silene marmorensis</em></td>
<td>State Rare Plant Rank 1B.2</td>
</tr>
<tr>
<td><em>Centaurea solstitialis</em></td>
<td>Noxious Weed; KNF moderate priority; State CW-rated</td>
</tr>
<tr>
<td><em>Isatis tinctoria</em></td>
<td>Noxious Weed; KNF moderate priority; State BW-rated</td>
</tr>
</tbody>
</table>

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

Sensitive and Other Plant Species of Interest:
The no action alternative would have no effect on the ability of *Silene marmorensis* or *Phaeocorybia olivacea* to maintain a reproducing, self-sustaining population within the project area. It is unlikely that the no action alternative would result in developing habitat that most closely imitates the natural ecological processes that created and maintained the habitat for *Silene marmorensis* or *Phaeocorybia olivacea* historically.

Noxious Weeds
The no action alternative would have no effect to Klamath N.F. listed noxious weeds.

Cumulative Effects

Sensitive and Other Plant Species of Interest:
There are no on-going or reasonably foreseeable actions in the project area and therefore no cumulative effects.

Noxious Weeds
There are no effects related to noxious weeds from this project, therefore there is no cumulative effects.

Alternative 2

Direct Effects and Indirect Effects

Sensitive and Other Plant Species of Interest:
The Hotelling Gulch Fish Passage and Channel Restoration Project would not significantly affect Sensitive plant species or other plant species of concern. It is very unlikely that the proposed action would decrease the ability of the *Silene marmorensis* to maintain reproducing, self-sustaining populations within the project area. It is very unlikely that the proposed action would decrease the quality of habitat that could support reproducing, self-sustaining populations of *Phaeocorybia olivacea* in the project area. It is highly likely that the proposed action would result in developing habitat that most closely imitates the natural ecological processes that created and maintained the habitat for *Silene marmorensis* and *Phaeocorybia olivacea* historically. There are no known sites of any Survey & Manage plant species present within the project area. Therefore there will be no direct or indirect effects to Survey & Manage plant species.

Noxious Weeds
There is a low risk that the Hotelling Gulch Fish Passage and Channel Restoration Project would cause the introduction or spread of Klamath N.F. listed noxious weeds. The project is expected to have a low risk of
introducing or spreading listed noxious weeds with the implementation of project design features that include heavy machinery washing.

Cumulative Effects

Sensitive and Other Plant Species of Interest:
There are no on-going or reasonably foreseeable actions in the project area and therefore no cumulative effects.

Noxious Weeds

The Kownothing Fuels Reduction project is adjacent to Cecilville Road which goes through the project area. The project is expected to have a low risk of introducing or spreading listed noxious weeds into the project area. When the Hotelling Gulch Fish Passage and Stream Restoration project is combined with the Kownothing Fuels Reduction project the risk of introduction or spread of weeds remains low.

Compliance with law, regulation, policy, and the Forest Plan

The Hotelling Gulch Fish Passage and Channel Restoration Project complies with section 7 of the Endangered Species Act, as amended, Forest Service Policy (FSM 2670), and Klamath National Forest LRMP Standards and Guidelines for Sensitive plant species. The Hotelling Gulch Fish Passage and Channel Restoration Project complies with the direction for Survey and Manage Plant species (USDA 2014). The project complies with the Forest Service Manual 2900 and Forest Plan Standards and Guidelines for noxious weed species and Executive Order #13112.

Wildlife Resources

Methodology

Analysis Indicators and Measures

Because the project involves the use of heavy equipment and noise that may be above current ambient levels in the area, potential direct effects in the form of noise disturbance during the breeding season was evaluated for northern spotted owl (NSO) and other sensitive species as described in the Forest Plan.

A northern spotted owl habitat assessment was performed to estimate the number of habitat acres present in the analysis area and project area, and the number of habitat acres likely to be affected by the proposed action. The quantity of northern spotted owl habitat was calculated using the Forest GIS layer, derived from 2007 remotely sensed data. This data provides a generally accurate depiction of northern spotted owl habitat that was then verified at the site scale. Northern spotted owl habitat is classified into four categories non-habitat, dispersal habitat, foraging habitat and nesting/roosting habitat. Treatments occurring in foraging and nesting/roosting habitat are analyzed for potential effects and reported as acres of habitat potentially affected by the proposed action.

Northern spotted owl habitat is used as a proxy for effects to late successional/old growth associated species such as the fisher, marten, wolverine, and northern goshawk. The effects to northern spotted owl nesting/roosting and foraging habitat was used as the analysis indicator of potential effects to fisher, marten, and northern goshawk habitat.

Spatial and Temporal Bounds

The analysis area is represented by the project area plus a 1.3 mile buffer surrounding the project area. This boundary is appropriate because it will capture all potential effects to all Forest Service Sensitive species within the analysis area for this project. Habitat within the analysis area was classified into three habitat types specific to northern spotted owl and for species that are analyzed by proxy using northern spotted owl habitat: nesting/roosting, foraging, or dispersal.
The short-term temporal bound for this project is the time in which direct effects of the project may be observed during the project implementation.

The long-term temporal bound for the project is 10 years because it is expected that any potential reduction to vegetation, and associated loss of shade over the Hotelling Gulch channel, resulting from project activities will recover within 10 years. This timeframe assumes that reduced shade and canopy cover is primarily due to the disturbance to 15 trees less than 18 inches in diameter: alder, madrone, and pine. It is expected that planted vegetation and natural reproduction of shrub species at the site will recover and provide vegetation habitat within a few years of disturbance, no more than 10 years.

**Northern Spotted Owl**

*Affected Environment*

The northern spotted owl analysis area contains 3,390 acres. The analysis area has 481 acres of dispersal habitat, 558 acres of foraging habitat, and 286 acres of nesting/roosting habitat. The project area where activities will occur is approximately 5 acres. The Forest GIS layer determined that approximately .42 acres of the project area was foraging habitat for NSO. After reviewing aerial photos, and a field visit to the site it was determined that these areas were not suitable northern spotted owl habitat. There is approximately 1,324 acres of northern spotted owl habitat in the analysis/project area. No suitable nesting/roosting or foraging northern spotted owl habitat within the analysis area or the project area will be degraded, downgraded or removed by this action (See table 7).

**Table 7: Summary of habitat type in the analysis area and the project area for Northern Spotted Owl.**

<table>
<thead>
<tr>
<th>Habitat Type</th>
<th>Acres of Habitat Type in Analysis Area</th>
<th>Acres of NSO Habitat affected within the Analysis/Project Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foraging</td>
<td>558</td>
<td>0</td>
</tr>
<tr>
<td>Nesting/Roosting</td>
<td>286</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>844</td>
<td>0</td>
</tr>
</tbody>
</table>

**Environmental Consequences**

**Alternative 1**

*Direct, Indirect and Cumulative Effects*

Under alternative 1, project implementation would not occur so no direct or ind.rrect effects would occur to the northern spotted owl. Therefore, there would be no cumulative effects.

**Alternative 2**

*Direct and Indirect Effects*

Potential direct effects of the project on northern spotted owls are limited to noise disturbance within .25 mile of suitable habitat during the nesting period. The nearest known northern spotted owl activity center is 1.45 miles away from the project area, which is beyond the average home range distance. Surveys for northern spotted owls have not been conducted. Due to the lack of recent surveys, it is unknown to what extent the project area is used by northern spotted owls. Therefore, a seasonal restriction applied to this project will eliminate the potential for disturbance to unknown nesting owls. This seasonal restriction will mitigate project generated noise disturbance above ambient levels from February 1- July 9th. Therefore the proposed action will not result in affecting potential nesting owls adjacent to the project activities.
The proposed action will remove approximately 15 trees less than 18 inches in diameter in the project area. The tree species consist of madrone, alder, and pine; some of which are alive and some are already dead trees. Because the project actions will not remove suitable northern spotted owl habitat, the loss of these few relatively small trees will have no effect on northern spotted owls or northern spotted owl habitat. Because seasonal restrictions will be in place to protect nesting owls from noise disturbance, and northern spotted owl habitat will not be affected. Alternative 2 will have no effect on northern spotted owl.

**Cumulative Effects**

The projects considered for cumulative effects that are within the analysis area are activities at mining claims and the Knownnothing Fuels project. The mining claims do not have plans of operations so the disturbance involved is superficial, will not remove habitat and is limited in scale so any impact to northern spotted owl habitat is unlikely. The Knownnothing Fuels project would have no effect to northern spotted owl as described in the environmental analysis for that project. Therefore, there is no cumulative effects to northern spotted owl from the project when combined with on-going and reasonably foreseeable actions.

**Northern Goshawk**

**Affected Environment**

On the west side of the Klamath National Forest, goshawk habitat generally consists of mid- and late-successional mixed conifer forest with scattered harvested and natural openings. Many of the known goshawk sites on Scott River, Salmon River, and Oak Knoll Districts are associated with northern spotted owl sites and goshawks were found incidentally while surveying for owls. Suitable goshawk habitat is considered equivalent to nesting, roosting and foraging habitat defined for northern spotted owl. The analysis area, consisting of the project area plus a 1.3 mile buffer, contains suitable habitat for the northern goshawk, however there is no suitable habitat in the project area.

**Environmental Consequences**

**Alternative 1**

**Direct, Indirect and Cumulative Effects**

Under alternative 1, project implementation would not occur so no direct or indirect effects would occur. Therefore, there would be no cumulative effects.

**Alternative 2**

**Direct and Indirect Effects**

Similar to northern spotted owl, potential effects of the project on northern goshawk are limited to noise disturbance in suitable habitat adjacent to project activities during the nesting period. Without a seasonal restriction noise generation could occur above ambient levels within .25 miles of suitable nesting habitat. There are no known territories or nesting sites within the project area but due to the lack of recent surveys, it is unknown to what extent the project area is used by northern goshawk. The seasonal restriction for northern spotted owl will restrict ambient project noise levels from February 1 – July 9th in the project area. The project avoids disturbance during the critical nesting period and therefore would have no effect on the success of nesting northern goshawks. Operations occurring after July 9th will generate noise but juvenile goshawks will be fledged and habitat removal will not occur within suitable habitat. This will eliminate the chance to injure fledged juveniles during project activities. Alternative 2 will have no effect to northern goshawk.

**Cumulative Effects**

The projects considered for cumulative effects that are within the analysis area are activities at mining claims and the Knownnothing Fuels project. The mining claims do not have plans of operations so the disturbance involved is
superficial, will not remove habitat and is limited in scale so any impact to goshawk habitat is unlikely. The Knownnothing Fuels project would have no effect to northern goshawk as described in the environmental analysis for that project. Therefore, there is no cumulative effects to northern goshawk from the project when combined with on-going and reasonably foreseeable actions.

**Pacific Fisher**

*Affected Environment*

General surveys have been conducted on the west side of the Forest using baited trip cameras and baited 35mm camera stations; positive detections have been made at many of the stations on Scott River, Oak Knoll and Ukonom Districts. An on-going fisher genetic study on federal and non-federal ownerships has detected numerous fishers. Incidental sightings of fisher have also occurred on the Klamath National Forest KNF for the most part along major roads and highways associated with rivers or large creeks, but no den sites have been located. Most detections on or adjacent to the Forest have been in mid-late seral true fir, mixed conifer and mixed conifer-hardwood habitats.

Northern spotted owl nesting/roosting/foraging habitat is considered a proxy for high quality fisher denning and resting habitat because this habitat type typically contains large trees, denser canopy closure, and structural complexity. There is fisher denning and resting habitat within the analysis area, but not within the project area. Alternative 2 will have no effect to pacific fisher.

*Environmental Consequences*

**Alternative 1**

*Direct, Indirect and Cumulative Effects*

Under alternative 1 no activities would occur so no direct or indirect effects would occur. Therefore, there will be no cumulative effects.

**Alternative 2**

*Direct and Indirect Effects*

Similar to northern spotted owl, potential effects of the project on fisher are limited to noise disturbance during the breeding period. Due to seasonal restrictions, noise disturbance related to project activities would occur between July 10 and November 15. During this time period, noise above ambient levels would be relatively short-lived, lasting for several hours during the day over several weeks.

The project area is not suitable denning/resting habitat for fisher. For project implementation, about 10 alders, 3-5 pines, and some oaks would be removed; each of the trees are less than 18 inches in diameter. This loss of several relatively small trees would not have any impact on fisher habitat in the area and, because disturbance during the breeding season would be avoided, the project would have no effect on fisher. Alternative 2 would have no effect on fisher.

*Cumulative Effects*

The projects considered for cumulative effects that are within the analysis area are the existing mining claims and the Knownnothing Fuels project. The mining claims do not have plans of operation so any disturbance due to these activities is superficial, will not remove habitat, and are limited in scale so that effects on habitat are unlikely. The Knownnothing Fuels project Decision Memo states that there would be no effect to sensitive species from the project. Therefore, there is no cumulative effects from the project when combine with the on-going and reasonably foreseeable actions.
Western Pond Turtle

Affected Environment

Surveys for pond turtles have not been conducted for the Hotelling Gulch Project. There is suitable aquatic habitat for this species in the adjacent South Fork Salmon River, but not within the current channel of Hotelling Gulch due to its small size and seasonally dry conditions. The project area has about 5 acres of bedrock and shaded riparian habitat that may be suitable for this species.

Environmental Consequences

Alternative 1

Direct, Indirect and Cumulative Effects

Under alternative 1 no activities would occur so no direct, indirect or cumulative effects would occur. With no action, the availability of water would continue to be low in both the historic channel and current alignment of Hotelling Gulch and therefore would not provide potential habitat for this species.

Alternative 2

Direct and Indirect Effects

The project would result in a small area of near stream disturbance and the temporary loss of a small amount of riparian habitat adjacent to Hotelling Gulch. Disturbance to the soil caused by large machinery within the 600 foot distance from the bank may cause a short term effect on turtles who may begin to overwinter in early fall, therefore, if any overwintering individuals are observed they will be moved from the project area downstream or upstream of the work site, to a safe location.

It is expected that once the project is completed, merging the channels into one restored channel will provide perennial flow in Hotelling Gulch for longer in the summer, increasing water and riparian habitat for the western pond turtle. In the long term, this project is expected to have a beneficial effect on pond turtles by providing improved habitat conditions. The proposed action may affect preferred habitat and individuals, but will not cause a trend toward federal listing for western pond turtle.

Cumulative Effects

The projects considered for cumulative effects that are within the analysis area are the mining claims and the Knownothing Fuels project. The mining claims do not have a plan of operations so the disturbance is superficial, will not remove habitat and limited in scale so the effects on habitat are unlikely. The Knownothing Fuels project Decision Memo states that there would be no effect to sensitive species from the project. Therefore, there is no cumulative effects from the project when combine with the on-going and reasonably foreseeable actions.

Foothill yellow-legged frog

Affected Environment

The current channel of Hotelling Gulch is not suitable for the foothill yellow-legged frog because of steeper gradients and seasonally dry conditions. Foothill yellow-legged frog are known to occur in the South Fork Salmon River, adjacent to the project area.

Environmental Consequences

Alternative 1

Direct, Indirect and Cumulative Effects

Under alternative 1 no activities would occur so no direct, indirect or cumulative effects would occur. With no action, the availability of suitable habitat for this species would remain unchanged.
Alternative 2

Direct and Indirect Effects

Suitable habitat for the foothill yellow-legged frog is not present in Hotelling Gulch because of its seasonally dry conditions, however, there may be potential suitable habitat available in the adjacent South Fork Salmon River. Foothill yellow-legged frogs are known to exist in elevations below 1800 feet, therefore it is possible that they may exist in the South Fork Salmon River adjacent to the project area which lies at 1600 feet in elevation. The removal of riparian habitat along the Hotelling Gulch channel is not likely to impact Foothill yellow-legged frogs or their habitat in the South Fork Salmon River. Alternative will have no effect on the foothill yellow-legged frog.

Cumulative Effects

The projects considered for cumulative effects that are within the analysis area are the mining claims and the Knownothing Fuels project. The mining claims do not have a plan of operations so the disturbance is superficial, will not remove habitat and limited in scale so the effects on habitat are unlikely. The Knownothing Fuels project Decision Memo states that there would be no effect to sensitive species from the project. Therefore, there is no cumulative effects from the project when combine with the on-going and reasonably foreseeable actions.

Heritage Resources

The purpose of this section is to analyze the Hotelling Gulch Fish Passage and Stream Restoration Project in sufficient detail to determine its effects on properties included in or eligible for the National Register of Historic Places (NRHP). This analysis is required under Section 106 of the Historic Preservation Act of 1966, as amended and is accomplished by the Klamath National Forest (Forest) under the Programmatic Agreement Among the USDA Forest Service, Pacific Southwest Region (Region 5), California State Historic Preservation Officer, Nevada State Historic Preservation Officer and the Advisory Council on Historic Preservation (Regional PA).

Methodology

Analysis Indicators and Measures

Indicators for analyzing project effects on historic properties are (1) the number of historic properties in the project area that are at risk from project activities and (2) the degree (level) to which the integrity of historic values of these properties may be diminished by the project activities. Direct and indirect effects, as well as the effects of reasonably foreseeable future actions (cumulative effects) that may diminish the integrity of historic properties identified in the area of potential effects (APE), are analyzed.

At-risk historic properties are those that are significant and retain integrity and have been identified as being susceptible to adverse effects by specific undertaking activities. The degree to which an at-risk historic property’s integrity is diminished by project activities is indicated by relative degree within four categories - negligible, minor, moderate, or major. If the project activities would change one or more of the character-defining features and diminish the integrity of the resource to the extent that it would no longer be eligible for listing on the NRHP, the effects would be adverse (the degree of change would be moderate or major). Adverse effects to sites must be resolved in consultation with the State Historic Preservation Office.

Spatial and Temporal Bounding of Analysis Area

The spatial boundary for the analysis is the “Area of Potential Effect,” or those areas within the project boundaries where treatment activities are proposed and areas within or outside of the project boundaries used in support of treatment activities. Temporal boundaries for the short term are based on the effect being anticipated to occur during or within one to five years of implementation. Long-term effects will occur after the first five years following implementation.
Affected Environment

The project lies within the ancestral territory of the Konomihu, who are part of the larger Shastean Complex. While no direct evidence exists in the project area for Konomihu occupation, evidence may have been present prior to landscape level changes that occurred during historic period mining. Euro-Americans entered the area by the early 1840s and were present in ever growing numbers once placer gold deposits were discovered in the Salmon River region in 1848 (North and South Forks).

Although mining in this area began early in the historic period, mining activity in the project area lagged behind that of other areas, as access was difficult and miners were dependent on supplies from the outside. Once the more easily accessed surface placers were exhausted, it took capital investment to make mining profitable, and operations had to become larger and more organized. By the 1870s, large-scale hydraulic mining of the region’s placer deposits began. From the 1870s into the early twentieth century, systems of high ditches, head boxes, iron-pipe penstocks, “giant” nozzles, huge sluice systems, and the other accoutrements of “hydraulicking” transformed many of the area’s stream bottoms into a landscape of vast, linear ‘washing pits’ (the mined-out areas of ancient alluvium) located within, adjacent, and parallel to the stream courses. The project area is entirely within a large-scale hydraulic mining site that is situated within portions of at least two overlapping historic mining districts.

Environmental Consequences

Alternative 1

Direct Effects and Indirect Effects

No ground-disturbing activities would occur under this alternative; hence, there are no effects to document.

Cumulative Effects

Since there are no direct or indirect effects and there are no projects within the APE planned in the reasonable foreseeable future, there are no cumulative effects to document under this alternative.

Alternative 2

Direct Effects and Indirect Effects

The project will directly affect the historic mining site within which the project is located. However, this site is not eligible under any of the National Register of Historic Places criterion (i.e. not significant), and while it still possesses some integrity, that alone is not enough to warrant listing on the National Register of Historic Places. It is not a contributing property due to the high level of disturbance at the site and its lack of artifacts or other cultural components that could provide meaningful information to a potential mining district. Therefore, no historic properties are present in the APE and a ‘no-effect’ determination has been rendered. SHPO concurrence with this determination is pending. There are no indirect effects to document regarding heritage resources as the result of the project. No standard resource protection measures or mitigation measures are required.

Cumulative Effects

Since the project has a “no effect” determination and there are no projects within the APE in the reasonable foreseeable future, there are no cumulative effects to document regarding heritage resources from these alternatives.

Compliance with law, regulation, policy, and the Forest Plan
The Hotelling Gulch Fish Passage and Channel Restoration Project complies with the National Historic Preservation Act, other applicable heritage resource laws, regulation, policy, and the Klamath National Forest LRMP Standards and Guidelines for Cultural Resources. Consultation was conducted with the Karuk Tribe, Quartz Valley Indian Reservation, the Shasta Indian Nation and the Shasta Nation, Inc. No tribal concerns have been identified.

**Wild and Scenic River**

The South Fork Salmon River is a Designated Scenic River for recreational opportunities. The outstandingly remarkable value for the river is fisheries. The management goals for this designation include that the free-flowing condition be maintained and the outstandingly remarkable value not be adversely impacted (Forest Plan, pg. 4-120:121). Also, Partial Visual Quality Objectives must be met in the Wild and Scenic River Corridor (Forest Plan, pg. 4-121). This means that the management activities may be noticeable but remain subordinate to the character of the landscape.

The project will increase the probability of late in-stream flows on Hotelling Gulch and cold water refugia on the South Fork Salmon River. There will be a positive benefit to fisheries resources and habitat (see fisheries input). So the outstandingly remarkable values will be benefited by this project. The visual effects of this project will be noticeable from the South Fork Salmon River during and immediately after the changes to the stream channel configuration. These will be subordinate to the overall landscape within three years of implementation and will not be noticeable after about 10 years once the vegetation has fully recovered. Therefore, the project will meet the Partial Retention Visual Quality Objectives.

**Air Resources**

Siskiyou County is identified as in attainment for all criteria air pollutants under both state and federal standards. The project is not likely to lead to the non-attainment and is therefore consistent with the Conformity Rule. Dust emissions will be local, last only during construction, and will not lead to the violation of the Regional Haze Rule. The project is compliant with all applicable rules of under the Clean Air Act.
References


Appendix A – Project Maps

Figure 1: Vicinity map showing the project area relative to the Forest boundary.
Hotelling Gulch Fish Passage and Stream Restoration

Figure 2: Project area map.
Appendix B – Best Management Practices

Best management practices were developed to comply with Section 208 of the Clean Water Act. Best management practices have been certified by the State Water Quality Resources Control Board and approved by the Environmental Protection Agency as the most effective way of protecting water quality from impacts stemming from non-point sources of pollution. These practices have been applied to forest activities and have been found to application of the Region 5 USFS BMPs has been found to maintain water quality that is in conformance with the water quality objectives in the North Coast Regional Water Quality Control Board’s (Control Board) Basin Plan [http://www.waterboards.ca.gov/northcoast/water_issues/programs/basin_plan/]

Region 5 Forest Service best management practices have been monitored and modified since their original implementation in 1979 to make them more effective. Numerous on-site evaluations by the Control Board have found the practices to be effective in maintaining water quality and protecting beneficial uses.

The Klamath National Forest (Forest) monitors the implementation and effectiveness of best management practices on randomly selected projects each year. From 2000 to 2012, best management practice implementation requirements were met on 78 to 100 percent (91 percent average) of sites sampled, and best management practice effectiveness requirements were met on 88 to 100 percent (94 percent average) of the sites sampled. The critical best management practice evaluation is effectiveness which is a field evaluation and determines how well the best management practice worked to prevent sedimentation. Best management practice implementation is an office evaluation and is not critical to the best management practices field performance. The success rate for effectiveness has been in the high eighties and nineties each year since 1993. Results of this monitoring can be found on the Forest (Fiscal Year 2012 Best Management Practices Report [USFS 2013]).

Best management practices utilized by the Forest are listed in Appendix D of the Forest Plan (USFS 1995). These basic best management practices are similar to those listed in the 2011 Region 5 Best Management update in Chapter 10 of the Soil and Water Conservation Handbook, which additionally includes a narrative and objective of each (USFS 2011); where there are differences, direction is to employ the newer best management practice list.

The following list of best management practices will be implemented in the Hotelling Gulch Fish Passage and Channel Restoration Project (Project). A description of the objective of each best management practice is included, as well as how each practice will be specifically implemented within the Project in regards to watershed-associated resources of fisheries, geology, hydrology, and/or soils. All other provisions of the best management practices will also be followed. For additional information on the best management practices and their objectives, see the Region 5 Soil and Water Conservation Handbook (USFS 2011).

**BMP 1.4 – Use of Project Maps for Designating Water Quality Protection:** Identify sensitive areas and water uses as part of the Project contract to assist operators in locating water concerns and applying protection methods. This is accomplished during contract preparation and implemented during Project operations.

- All protected locations will be illustrated on the site plans.
- Vehicle access points to the work site will be illustrated on the site plans.
- Staging areas will be illustrated on project maps and site plans.
• Water drafting will be from existing drafting sites and will be identified on project maps.
• Temporary and permanent storage area for spoils will be illustrated on the site plans.

**BMP 1.5 – Limiting Operating Period:** To prevent soil compaction and erosion from operations during wet weather; and to ensure placement of erosion control structures prior to the onset of winter to reduce water quality impacts. This is accomplished during the Project operations.

• The Project is proposed to take place during the normal operating season (NOS) that is defined as June 1 to November 15. Activities will be restricted during periods of wet weather during the NOS.
• When there is a 30% chance of rain in the next 24 hours the Contracting Officer (CO) will be on site to insure that erosion control procedures are implemented in a timely fashion and to initiate shutdown or resume operations. Operations will not resume until suitable weather, soil, and forecast conditions exist.
• The Klamath Wet Weather Operation Standards (WWOS) (USDA Forest Service 2002) will be used for all project activities.
• The WWOS will be used to guide operations during periods of wet weather. The CO will examine field conditions to determine when the soil and/or road has dried out enough to enable operations to resume. The Project earth scientist or hydrologist may be called on to make recommendations to the CO who will provide direction to the Contractor as to when operations may resume to insure that BMPs will be met and adverse impacts will be avoided.
• All ground disturbing Project activities will be conducted during appropriate periods of weather and soil moisture to insure BMP attainment and the avoidance of adverse impacts to listed species. Forecast periods will also be of a suitable length to allow completion of the task undertaken before precipitation events occur.

**BMP 1.8 – Streamside Management Zone (SMZ) Designation:** Designate zones adjacent to water and/or riparian areas as zones of special management. This is accomplished during the planning and layout phase of the project.

• Sites for water drafting will be designated by the Forest Service and agreed to by the Contractor.
• Activities which require culvert replacement or removal will occur during the least critical periods for water and aquatic resources: when streams are dry; during low-water conditions; and/or in compliance with spawning and breeding season restrictions. Low-water/dry conditions for the Project area generally occur June through November, dependent upon snowpack and individual drainage characteristic. Consultation will be made with District Fish Biologist or Hydrologist for timing in regards to specific sites.

**BMP 1.13 – Erosion Prevention and Control Measures During Project Operations:** Ensure that Project operations shall be conducted reasonably to minimize soil erosion. This is accomplished during the pre-Project project design process, including consultation with Project consultants/engineers, and throughout the operations phase of the Project.

• Erosion control measures are discussed during the pre-Project meeting with the Contractor and the Forest Service. They are updated throughout the operations phase of the timber sale.
• An erosion and sediment control plan will be developed prior to commencement of Project activities.
• The Klamath Wet Weather Operation Standards (WWOS) (USDA Forest Service 2002) will be used for all project activities.

**BMP 1.15 – Revegetation of Areas Disturbed by Project Activities:** Establish a vegetative ground cover on disturbed sites to prevent erosion and sedimentation.

• The type and intensity of treatment to establish appropriate ground cover will be discussed with Project design Contractor/engineer and Forest Service, with assistance from earth scientists and botanists, as needed

**BMP 1.19 – Streamcourse and Aquatic Protection (National BMP AqEco-2):** Conduct management actions within these areas in a manner that maintains or improves riparian and aquatic values, provide unobstructed passage of stormflows, and control sediment and other pollutants entering streamcourses.

• An erosion and sediment control plan will be developed prior to commencement of Project activities.
• All modifications to a streamcourse, including damage to banks and channels, shall be repaired to the extent practicable prior to project completion.
• All project generated debris shall be removed from the streamcourse, unless otherwise agreed to by the project implementation lead.
• Equipment use within the streamside management zone shall be limited to designated access routes.
• Project activities shall only be implemented during base flow conditions, so as to reduce the risk of introducing sediment to the stream course or disrupting salmonid spawning.
• Project activities shall be coordinated with the appropriate State and Federal agencies.
• The project design and plan shall incorporate Clean Water Act (CWA) 404 permit requirements and other Federal, State, and local permits/requirements. Project implementation shall not begin until required permits are obtained.
• The work zone shall be clearly delineated.
• Tracked equipment, which produces less soil compaction than wheeled equipment, shall be used.
• All project equipment shall be inspected prior to arriving at the project site. It shall be well maintained, clean of aquatic invasive species, as well as oil and grease.
• Vegetable oil or other biodegradable hydraulic oil shall be used wherever possible.
• The number of access routes, and equipment entry into or across the stream channel, shall be minimized as much as possible.
• At project completion, access routes will be closed to prevent continued use. If necessary, water bars, seeding, and other erosion control measures will be utilized to minimize post-project movement of sediment from access routes to watercourses.
• Erosion control measures shall be promptly installed and appropriately maintained.
• Where applicable, topsoil shall be stockpiled and protected for reuse in site revegetation.
• Excavated materials shall be kept out of the stream channel.
• Materials brought to the site (e.g., plans, see, rock) shall be free of toxins and invasive species.
• Filled areas shall be properly compacted in order to avoid and minimize erosion.
• Prior to initiation of in-channel ground disturbing activities, a Fish Biologist will assess the Project site and, if necessary, remove and relocate fish and amphibians. A block net will be installed at the mouth of the “historic” Hotelling Gulch channel to prevent fish was occupying the Project site.

• Implementation monitoring by Forest fisheries and watershed personnel shall occur in order to identify necessary corrections to work quality and/or materials.

• Effectiveness monitoring by Forest fisheries and watershed personnel shall occur in order to evaluate the success of the project in meeting design objectives and avoiding unacceptable impacts to water quality.

BMP 1.20 – Erosion Control Structure Maintenance: To ensure that constructed erosion-control structures are stabilized and working.

• The Contractor will maintain, inspect, and repair erosion-control structures at project site. A status and repair log will be kept.

BMP 2.5 – Water Source Development and Utilization: To supply water for road construction, maintenance, dust abatement, fire protection, and other management activities, while protecting and maintaining water quality.

• Road approaches will be armored, as necessary.

Fish-Occupied (Anadromous) Water
The designated Project drafting site is within a Pacific salmonid-bearing stream reach. Therefore, NOAA Fisheries Water Drafting Specifications guidelines will be used. They include, but are not limited to, the following:

5. When in habitat potentially occupied by Chinook and Coho salmon, intakes will be screened with 3/32-inch mesh for rounded or square openings, or 1/16-inch mesh for slotted openings. When in habitat potentially occupied by steelhead trout, intakes will be screened with 1/8-inch mesh size. Wetted surface area of the screen or fish-exclusion device shall be proportional to the pump rate to ensure that water velocity at the screen surface does not exceed 0.33 feet/second.
   a. Use of a NOAA approved fish screen will ensure the above specifications are met.
   b. Use of a NOAA approved fish screen will ensure the above specifications are met.

6. Fish screen will be placed parallel to flow.

7. Pumping rate will not exceed 350 gallons-per-minute (gpm) or 10% of the flow of the anadromous stream drafted from.

8. Pumping will be terminated when tank is full.

In general, NOAA Fisheries Water Drafting Specifications are more strict and specific than those provided by BMPs, and thus take precedence. Additional applicable requirements as specified by the BMP includes:

• Water drafting by more than one truck shall not occur simultaneously.

BMP 2.8 – Stream Crossings: Minimize water, aquatic, and riparian resource disturbances and related sediment production when constructing, reconstructing, or maintaining temporary and permanent water crossings.

• Proposed action includes replacement of culvert with a structure sufficient to pass fish and allow for normal abiotic stream processes.
   o The Forest Service will coordinate with design Contractor/engineer to use a structure appropriate to site conditions and traffic levels.
The Forest Service will coordinate with design Contractor/engineer to minimize sedimentation effects (also see the Erosion Control Plan).

- Activities which require culvert replacement will occur during the least critical periods for water and aquatic resources: when streams are dry; during low-water conditions; and/or in compliance with spawning and breeding season restrictions.
  - Low-water/dry conditions for the project area generally occur June through November, dependent upon snowpack and individual drainage characteristic.
  - Consultation will be made with District Fish Biologist or Hydrologist for timing.

**BMP 2.10 – Parking and Staging Areas (National BMP Road-10):** Ensure parking and staging areas shall no impact water quality though runoff.

- Parking, staging, and refueling areas shall be located to avoid sensitive areas such as riparian areas, wetlands, meadows, bogs, fens, inner gorges, overly steep slopes, and unstable landforms to the extent practicable.
- The size of parking, staging and fueling areas shall be minimized.
- Signage shall clearly indicate parking, staging and fueling areas.
- Parking, staging, and fueling areas shall be located upon existing road pull-outs and similar wherever possible.
- Upon project completion, and where necessary, parking, staging and fueling areas shall be rehabilitated through decompaction, grading/contouring, mulching and/or planting.

**BMP 2.11 – Equipment Refueling and Servicing (National BMP Road-10):** Prevent fuels, lubricants, cleaners, and other harmful materials from discharging into nearby surface waters or infiltrating through soils and to contaminate groundwater resources.

- No fueling/refueling of mechanical equipment will occur within 100 feet of any flowing watercourse or intermittent drainage.
- Petroleum and chemical delivery and storage facilities shall be located maintained consistent with local, State and Federal regulations.
- Contour berms shall surround equipment refueling areas in order to prevent surface water contamination through runoff. Liners shall be used to prevent groundwater contamination through seepage though the soil. The measures shall be promptly installed at the start of the project and maintained throughout implementation.
- Project implementation personnel shall be trained on proper fuel and chemical storage, handling, and disposal.
- Excess chemicals or wastes shall not accumulate or be stored within the project area.
- Upon project completion residues, waste oil, and other materials shall be promptly removed from NFS land and properly disposed of.
- Should a spill occur, it shall be reported and cleaned-up in accordance with applicable State and Federal laws, rules and regulations. The Forest hazardous materials coordinator’s name and phone number shall be available to personnel who administer or manage activities utilizing petroleum-powered equipment.
- Should a spill occur, contaminated soil and other material shall be promptly removed from NFS lands and disposed of in an appropriate manner.
- Should a spill occur, the Forest shall notify the State Water Board.
• Should a spill which may affect listed aquatic species occur, NOAA Fisheries shall be notified for emergency consultation.

BMP 2.13 – Erosion Control Plan: Effectively limit and mitigate erosion and sedimentation from any ground-disturbing activities, through planning prior to commencement of project activity, and through project management and administration during project implementation.

• An erosion and sediment control plan (Erosion Control Plan) will be developed prior to commencement of Project activities.

• The Forest's Wet Weather Operations Standards are included in the Erosion Control Plan.

BMP 5.4 – Revegetation of Surface-Disturbed Areas: Protect water quality by minimizing soil erosion through the stabilizing influence of vegetation foliage and root network.

• All spoil piles shall be mulched, seeded and/or planted with native species appropriate for the location of the spoil pile (i.e., riparian species if located within the riparian zone) prior to project completion.

• All other areas of bare soil exposed by project activities shall be mulched, seeded and/or planted with native species prior to project completion.

• For all locations, consultation shall be made between the Forest Service and Contractor as to appropriate vegetation to be used, including extent of mulching, seeding, etc. required given Project site conditions.

BMP 5.6 – Soil Moisture Limitations for Mechanical Equipment Operations: Prevent compaction, rutting, and gullyng, with resultant sediment production and turbidity.

• The Klamath National Forest Wet Weather Operation Standards shall be followed during implementation of the project at all sites.

• Outside of areas where groundwater is intersected to meet project objectives, equipment shall not be operated when ground conditions are such that excessive damage shall result to the soil resource. This includes observations of soil smearing, oozing, and/or caking on tracks/tires/boots, and/or rutting (4+ inches deep). These conditions are indicators of excessive damage through the destruction of the original soil structure.

BMP 7.1 – Watershed Restoration: To repair degraded watershed conditions, and improve water quality and soil stability.

• Proposed action is for purposes of watershed restoration.
Appendix C – Aquatic Conservation Strategy Objective Analysis

The Klamath National Forest Land and Resource Management Plan contains the components, objectives and standards and guidelines for consistency of projects with the Aquatic Conservation Strategy. The Record of Decision for the Klamath National Forest - Forest Plan (USDA 1995) is the guiding document for Forest projects; the Klamath National Forest Record of Decision incorporates the Aquatic Conservation Strategy standards and guidelines from the Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl (commonly known as the Northwest Forest Plan) (USDA and USDA 1994).

The Klamath National Forest - Forest Plan lists four components of the Aquatic Conservation Strategy, as stated on pages 4-25 through 4-27 of the Klamath National Forest - Forest Plan: “1) Riparian reserves, 2) Key watersheds, 3) Watershed analysis and 4) Watershed restoration” (USDA 1995). The four components of the Aquatic Conservation Strategy are designed to operate together to maintain and restore the productivity and resiliency of riparian and aquatic ecosystems (USDA and USDA 1994).

The following rationale was developed to inform the decision maker for the Hotelling Gulch Fish Passage and Stream Restoration Project in making the Aquatic Conservation Strategy consistency findings. A description of the existing watershed conditions, including important physical and biological components is located in the following applicable specialist reports (Hydrology, Geology, Aquatic Resources, Wildlife, and Botany).

Riparian Reserves:
- The relevant Riparian Reserve width for the Project area is defined as two-site potential trees to each side of a fish-bearing waterway (USFS 1997; page 3-9). Within the Lower South Fork Salmon River Ecosystem Analysis area, one-site potential tree is 170 feet. Therefore, the width of the Riparian Reserve within the Project area is 340 feet.

Key Watershed and Watershed Analysis:
- Key Watershed - Salmon River (inclusive the South Fork Salmon River)
  - Relevant Watershed Analysis
    * Lower South Fork of the Salmon River Ecosystem Analysis (USFS 1997)
    * Upper South Fork of the Salmon River Ecosystem Analysis (USFS 1994)

Watershed Restoration:
- Project is a restoration action

Aquatic Conservation Strategy Objective 1: Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

Meet/Restore - The Proposed Action will restore connectivity between South Fork Salmon River and the perennial portion of Hotelling Gulch, benefitting aquatic organisms and abiotic stream
processes. Additionally, habitat values of the realigned and reconstructed stream will provide a degree of functionality not currently present in the existing, highly entrenched channel. The proposed action will include construction of floodplain and stream habitat features; and there is the post-project expectation of a longer season of surface flow, which in turn will promote conditions to foster riparian growth. In comparison, the existing alignment is a simplified, somewhat unstable system with patchy, underdeveloped riparian vegetation that offers limited habitat for aquatic or terrestrial species. The proposed action would restore the distribution, diversity, and complexity of watershed features, thereby providing benefit to Hotelling Gulch, as well as the associated 7th-field watershed and the 5th-field South Fork Salmon River watershed.

**Aquatic Conservation Strategy Objective 2:** Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

**Meet/Restore** - The proposed action will restore connectivity between South Fork Salmon River and Hotelling Gulch. Alluvial fan channel reconstruction is expected to increase the temporal presence of surface water compared to the existing condition. With a streambed composed of a high porosity coarse substrate and exhibiting an elevation that is higher than the low drainage point (e.g., remnant historical channel below the County Road), the existing alignment typically dries by late spring. The historical channel aligns with the low point through the alluvial fan; and channel reconstruction will build a streambed which will be much closer to local groundwater elevation. Channel realignment will also include construction of a floodplain, a feature not currently present and/or not functional in the existing channel. In summary, the proposed action will restore spatial and temporal connectivity between the 5th-field mainstem system of South Fork Salmon River and the local 7th-field Hotelling Gulch watershed, providing benefits to biological resources, as well as improving the health of local wood transport and hydrologic/sediment regimes.

**Aquatic Conservation Strategy Objective 3:** Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

**Meet/Restore** - The proposed action will include realignment and reconstruction of the Hotelling Gulch channel across the alluvial fan. Under the existing condition, the banks and streambed is relatively uniform, moderately unstable, lacks a floodplain due to channel entrenchment, has little to no wood present, and is otherwise poorly suited to support aquatic organisms. The new channel will be built using a reference reach template, thereby providing a suitable mixture of pool and fast-water habitat, locally appropriate substrate size, and other elements required to create a functional system. A floodplain feature will also be incorporated into the design. These components of the proposed action will restore shorelines, banks, and bottom configuration for Hotelling Gulch across the alluvial fan, benefitting local, 7th-field, and 5th-field watershed levels.

**Aquatic Conservation Strategy Objective 4:** Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.
Meet/Restore - In the short-term, the proposed action may insignificantly increase stream temperature and turbidity, as well as affect fine sediment composition. In the long-term, water quality will return to the current baseline and/or may exhibit a benefit.

Hotelling Gulch may experience an insignificant increase in water temperature after implementation when/if the channel is wet during the summer, but the effect will diminish in two or three years as effective shade is re-established. In the long-term, Hotelling Gulch shade through the alluvial fan is anticipated to be in better condition than the existing channel because water will be more accessible for riparian plants. Denser shade will better maintain in-stream water temperatures. While shade to the South Fork Salmon River will be slightly reduced where several trees will need to be removed to allow construction access/safety near the mouth of the historic Hotelling Gulch channel, impact to water temperature is discountable because of the river’s large flow volume and the small length of affected shoreline. Additionally, Hotelling Gulch supports too small a volume of water to affect South Fork Salmon River water temperatures.

Turbidity and the mobilization of fine sediments is most likely to occur following completion of the project, especially following storm events during the first winter after Hotelling Gulch reconnects to South Fork Salmon River. Therefore, it is assumed that there will be a temporary increase in turbidity within Hotelling Gulch and adjacent South Fork Salmon River following channel re-watering, as well as a short-term increase in sand/silt mobilization. The elevation of turbidity during storm events will be short-term, returning to baseline by the first year post-construction, if not sooner. Similarly, while there may be an insignificant to unmeasurable exportation of fine sediment, it will not alter the current substrate composition of South Fork Salmon River. The occurrence of fine sediment mobilization will decrease as riparian vegetation regrows along Hotelling Gulch. There may be an insignificant benefit from the fine sediment in Hotelling Gulch because sands/silts will promote the streambed sealing process, thereby contributing towards delay of seasonal channel drying across the alluvial fan.

In summary, the proposed action will restore water quality at the local and 7th-field watershed level, and maintain existing water quality at the 5th-field level.

Aquatic Conservation Strategy Objective 5: Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

Meet/Restore - The proposed action will benefit the local sediment regime in regards to timing, volume, rate, and character of sediment input, storage, and transport. While there may be a short-term negative impact to sediment, long-term effects of the project will be beneficial. Benefits will occur at the local, 5th-field, and 7th-field watershed levels.

Mobilization of fine sediments is most likely to occur following completion of the project, especially following storm events during the first winter after Hotelling Gulch reconnects to South Fork Salmon River. Therefore, it is assumed that there will be a short-term increase in sand/silt mobilization. While there may be an insignificant to unmeasurable exportation of fine sediment, it will not alter the current substrate composition of South Fork Salmon River.

The reference reach upon which the reconstruction will be based has a slightly coarser substrate composition compared to the existing channel. Because of the relatively small size of Hotelling Gulch and the normally low volume of water, there may be an initial measurable adjustment to sediment composition within the reconstructed channel due to post-construction mobilization of fine sediments. Amount of sand/silt, while it has the potential to detrimentally affect newly constructed fish habitat, should not be enough to meaningfully affect pool volume nor
width/depth ratio of the channel; and mobilization of fines will decrease as vegetation re-establishes. It is anticipated that fine sediment will promote the streambed sealing process, a beneficial action which will contributing towards the delay in seasonal channel drying.

The realignment of Hotelling Gulch to its historical channel will include construction of a floodplain. This floodplain, while small and physically restricted due to the presence of alluvial fan material, will nonetheless restore a degree of functionality. The new floodplain will be a location for high water events to deposit sediment, an action which is vital to the process of building stream banks.

The proposed action includes the installation of a road structure which will allow free passage of aquatic biota. This structure will also restore unrestricted transport of sediment. This benefit is contrasted to the culverts present within the existing channel. These undersized structures impede free sediment movement. The re-establishment of functional sediment transport will occur immediately following construction of the new structure.

Aquatic Conservation Strategy Objective 6: Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

Meet/Restore - The proposed action will restore in-stream flows to Hotelling Gulch.
Low flows - Alluvial fan channel reconstruction is expected to increase the temporal presence of surface water compared to the existing condition. With a streambed composed of a high porosity coarse substrate and exhibiting an elevation that is higher than the low drainage point, the existing alignment typically dries by late spring. The historical channel aligns with the low point through the alluvial fan; and channel reconstruction will build a streambed which will be much closer to local groundwater elevation.

High/Peak flows - While frequency of high flow events and discharge quantity will not be altered by the Proposed Action, how those flows affect the alluvial fan will be modified. The existing channel is so deeply entrenched that there is no functional floodplain and only the largest flood events are able to overtop the channelized reach. Channel realignment will include the construction of a floodplain. A floodplain will (1) allow high water to dissipate energy by being able to leave the channel and spread out upon the adjacent landscape; and (2) provide a location for sediment, nutrients, and wood transported by high water to be deposited, thereby enhancing the local habitat.

The proposed action includes the installation of a road structure which will allow free passage of aquatic biota. This structure will also normalize the flow regime of Hotelling Gulch, including transport of sediment, nutrient, and wood. This benefit is contrasted to the undersized culverts present within the existing channel, whereupon the pattern of in-stream flow has been altered. The re-establishment of functional transport patterns will occur immediately following construction of the new structure.

In summary, the proposed action will enhance in-stream flows and restore patterns of sediment, nutrient, and wood routing. Positive effects will be primarily observed at the local and 7th-field watershed level, but the mainstem system of SF Salmon River at the 5th-field watershed level will also benefit.

Aquatic Conservation Strategy Objective 7: Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
**Meet/Restore** - The proposed action will include construction of a floodplain feature. The existing condition of Hotelling Gulch through the alluvial fan is one of entrenchment; and, as such, there is no functional floodplain and only the largest flood events are able to overtop the channelized reach. Reconstruction activities will include a floodplain appropriate for the channel given the limitations of the surrounding alluvial fan material. Additionally, the historic channel below the County Road will include a degree of floodplain construction so as to decrease current entrenchment and match the constructed floodplain upstream. Therefore, the proposed action will maintain and restore the timing, variability, and duration of floodplain inundation, thereby providing benefit to Hotelling Gulch, as well as the associated 7th-field watershed and the 5th-field South Fork Salmon River watershed.

**Aquatic Conservation Strategy Objective 8:** Maintain and restore the species composition and structural diversity of plant communities in riparian reserves and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

**Meet/Restore** - The proposed action will benefit species composition and structural diversity of plant communities in riparian reserves. Effects will primarily be borne by the local drainage, although there will also be benefits at the 7th-field and 5th-field watershed levels. In the short-term, there will be a detrimental effect to vegetation, including the removal of riparian trees and brush. Once the project is complete, alluvial fan channel reconstruction is expected to increase the temporal presence of surface water compared to the existing condition. One of the subsequent expected results is the eventual development of a riparian area across the alluvial fan which is similar to the dense thicket of alder, blackberry, poison oak, and willow currently present below the County Road along the historic Hotelling Gulch alignment. This outcome will be an improvement upon the patchy and underdeveloped riparian vegetation found in the existing channel. The time horizon for development of the new riparian is months to decades, depending upon the plant species. As the plants regenerate, post-construction surface erosion will decrease, effective shade will re-establish, and streambanks are expected to stabilize. In the very long-term, the proposed action will benefit future production of woody debris. The development of a riparian capable of supplying large wood is a process which will require decades (large alders) to over a century (conifers).

**Aquatic Conservation Strategy Objective 9:** Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

**Meet/Restore** - The proposed action will increase the quantity and quality of habitat for riparian-dependent/aquatic animal and plant species. Habitat values of the realigned and reconstructed stream will provide a degree of functionality not currently present in the existing, highly entrenched channel. The proposed action will include construction of a floodplain and stream habitat features; and there is the post-project expectation of a longer season of surface flow, which in turn will promote conditions to foster riparian growth. In comparison, the existing alignment is a simplified, somewhat unstable system with a patchy, underdeveloped riparian that offers limited habitat for aquatic or terrestrial species. Additionally, connectivity will be restored between South Fork Salmon River and the perennial portion of Hotelling Gulch. The proposed action would therefore enhance the ability of Hotelling Gulch to support well-distributed populations of native species, as well as benefit the associated 7th-field watershed and the 5th-field South Fork Salmon River watershed.
Appendix D – Actions Considered for Cumulative Effects Analysis

The Interdisciplinary Team used the Schedule of Proposed Actions and the Bureau of Land Management’s mining claim database to determine the on-going and reasonably foreseeable actions to consider for the cumulative effects analysis. The Hotelling Gulch 7th field watershed Negro Creek- South Fork Salmon River (18010210010802) was the spatial boundaries for consideration based on the needs identified by the Interdisciplinary Team.

The implementation of the Kownothing Fuels Reduction Project began in 2013 and is on-going as burn windows and force account staff are available. Kownothing Fuels Reduction includes the removal of ladder fuels, brush re-growth, and hazardous snags through cutting and handpiling. The piles will be burnt to dispose of the organic material.

There were five active mining claims identified in the mining claims database. The location is described using quarters of a township and range section. Because of the imprecise location information in the database it was difficult to distinguish the exact location of one mine versus another. There were three distinct areas described in the data available and these are shown in the map below. All five mining claims are within these three areas. All of these mines are placer (mining in river sediment) and none of the mines have a Plan of Operations. This means that only exploratory activities are being performed such as gold panning, the excavation of small test holes for prospecting, and small scale processing of the mined material.
Figure 3: Map of actions considered for cumulative effects.