



United States Department of Agriculture  
Forest Service

# Fort Goff Creek Fish Exclusion Screening Project

## Environmental Assessment

Happy Camp/Oak Knoll Ranger District, Klamath National Forest, Siskiyou County, California  
June 2020



Figure 1: Project location map

**Responsible Official:**

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## Introduction

The Happy Camp/Oak Knoll Ranger District of the Klamath National Forest (Forest) proposes the Fort Goff Creek Fish Exclusion Screening Project to prevent entrainment of juvenile salmon and trout into a water diversion system. We prepared this environmental assessment to determine whether installation of a fish exclusion screen on Fort Goff Creek may significantly affect the quality of the human environment and thereby require the preparation of an environmental impact statement.

## Proposed Project Location

The project area is about two acres in size and located in and adjacent to Fort Goff Creek on the Oak Knoll Ranger District of the Klamath National Forest in Siskiyou County, California. The project site is in and adjacent to Fort Goff Creek about half a mile upstream of the Fort Goff Creek Bridge on State Highway 96, between the communities of Happy Camp and Seiad Valley (Township 47 North, Range 12 West, Section 32, Mount Diablo Meridian (see figure 1)). The project is entirely located within the Fort Goff Creek 7th-field watershed. Project elements would be implemented on both National Forest and private property. Access to the project would be across private land from State Highway 96 on an existing private road.

## Need for the Proposal

This proposal is needed to prevent entrainment of salmon and steelhead trout into an existing water diversion ditch where they could be injured or killed. The purpose of the project is to protect the following species: Southern Oregon/Northern California Coastal Coho salmon which is listed as threatened under the Endangered Species Act; and Upper Klamath/Trinity Rivers Chinook salmon and Klamath Mountains Province steelhead trout which are Forest Service sensitive species.

## Existing and Desired Conditions

### Existing Condition

The existing water diversion ditch intake is not screened with an approved, effective device that prevents Federal- and State-protected coho salmon, and Forest Service sensitive Chinook salmon and steelhead trout from being injured or killed as a result of entrainment into the water ditch. Additionally, construction of a diversion dam that spans nearly the entire channel must be built or re-built each year in order to raise the stream water level high enough to flow into the existing ditch. Annual construction or reconstruction of the diversion dam causes localized to reach-level streambed disturbance in coho salmon critical habitat. The existing diversion across National Forest lands is not currently under permit.

### Desired Condition

The desired condition for Fort Goff Creek is to have a water diversion that protects threatened coho salmon and Forest Service sensitive Chinook salmon and steelhead trout from entrainment into the water system that lead to points of use on adjacent private land. The desired condition is to eliminate the need for an annually constructed or reconstructed diversion dam, or greatly reduce the size of a diversion dam that may still be needed to direct flow to the point of diversion. The desired condition is to ensure that the project meets requirements for issuance of a valid Special Use Permit.

## Management Direction

The 1995 Klamath National Forest Land and Resource Management Plan (Forest Plan, as amended) includes standards and guidelines from the Northwest Forest Plan. The Forest Plan provides forest-wide and management area (MA) direction for project-level projects. Management areas applicable to the Project are found in Table 1 below.

**Table 1. Management areas found within the project boundary**

Management Area	Acres of Project Area	Acres Proposed for Treatment	Pages in Forest Plan	Goals Pertinent to this project
Late Successional Reserve (MA5)	2	1	4-82 to 4-90	Improve conditions for fish, wildlife, or watersheds (MA5-1).
Riparian Reserves (MA10)	2	1	4-106 to 4-114	Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of aquatic conservation strategy objectives (MA10-13). Project would support the Aquatic Conservation Strategy by furthering its goal to: (2) <i>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.</i>

The project is designed to be consistent with all applicable law, regulation, policy, and direction.

## Public Involvement and Tribal Consultation

Starting in early 2015, the Forest held in-person, telephone, and email conversations regarding this project with the property owners who currently use water from Fort Goff Creek (the Hoover and Meager families) that is diverted at the proposed project site. The Forest also consulted the California Department of Fish and Wildlife, the US Fish and Wildlife Service, the National Marine Fisheries Service, and the Siskiyou Resource Conservation District.

The project was first published to the Schedule of Proposed Actions and the Forest website on July 1, 2015. On August 31, 2016, scoping letters were sent to the interested and affected parties mentioned above as well as tribes and non-governmental organizations. On September 1, 2016 a legal notice of scoping was published in the Siskiyou Daily Newspaper. The following table identifies the list of individuals who received a scoping letter regarding the project.

**Table 2. Interested and affected parties receiving project proposal and scoping notice letter**

<b>Affiliation or Organization</b>	<b>Individual's Name</b>
California Deer Association	Pat Fitzmorris
California Department of Fish and Wildlife (Shasta Valley Wildlife Area)	Bob Schaefer
California Department of Forestry and Fire Protection (CAL FIRE)	Bernie Paul
California Forestry Association	Steven Brink
County of Siskiyou, California	Ray Haupt, District 5 Supervisor
Environmental Protection Agency	James Munson
Environmental Protection Information Center	General
Fruit Growers Supply Company	Terry Salvestro
Individual	Sharon Meager
Individual	Tom Hoover
Jefferson State Wildlife Consulting	General
Karuk Tribe	Russell Attebery, Chair
National Oceanic and Atmospheric Administration-Fisheries	Donald Flickinger
Northern California Regional Water Quality Control Board	Tom Wouldiams
Northern California Resource Council	Larry Alexander
Quail Unlimited	Dick Haldeman
Quartz Valley Indian Reservation	Harold Bennett, Chair
Roseburg Forest Products	Toby Mills
Shasta Indian Nation	Janice Crowe, Chair
Shasta Tribe, Inc.	Roy Hall, Jr., Chair
Siskiyou County Natural Resources	Ric Costales
Timber Products	General
Trinity River Lumber	Joe Miller
US Fish and Wildlife Service	Erin Wouldiams

## Issues

The Forest received no comments on this project during the scoping period. Therefore, no issues were identified nor alternatives developed in response to public comments.

## Proposed Action and Alternatives

The following alternatives were considered:

### Alternative 1 – No Action

The analysis of this alternative reflects the environmental effects of not implementing this project. The environmental conditions described in the analysis of this alternative would reflect the cumulative environmental effects of past and on-going activities.

### Alternative 2 - Proposed Action

The proposed action is to install an effective fish exclusion screen for an existing water intake. From upstream to downstream the project would:

- lower the level of the bedrock streambed just upstream from the point of diversion using an expansion agent or mechanical means;
- construct a headgate structure at the existing point of diversion;
- install 165 feet of 12-inch diameter steel pipe from the headgate down and along the existing water ditch;
- install a fish exclusion screen apparatus in and overlapping the existing water ditch;
- install a fish return bypass pipe from the fish exclusion screen back to the wetted channel of Fort Goff Creek; and
- install a flow measurement weir in and overlapping the existing water ditch.

Channel lowering, headgate construction and piping would be implemented on National Forest land. Excavation and placement of fish exclusion screen apparatus, excavation (if necessary) and placement of fish bypass return pipe, and excavation and placement of flow measurement weir would be implemented on private property. The proposed action also includes the conveyance of water across Forest System lands through the diversion to the private property boundary, subject to the provisions of individual special use permit authorizations. Operation of the diversion structure would adhere to the Operations and Maintenance Plan (Appendix D) that was approved by the California Department of Fish and Wildlife. Environmental effects of actions on both National Forest lands and private lands are analyzed in this Environmental Analysis. The California Department of Fish and Wildlife and other Partners in this project would complete the environmental analysis required under the California Environmental Quality Act (CEQA). The final design plans in Appendix A shows where each project element would be implemented.

The existing ditch would be re-profiled to a slope of about 0.015 feet per foot over its length of about 200 feet. A notch would be excavated in the existing bedrock channel upstream of the headgate to facilitate water reaching the point of diversion during low flow periods; about two cubic meters of bedrock would need to be removed. Bedrock would be notched by filling holes drilled in the bedrock with an expanding compound that fractures rock or by mechanical removal. An intake structure would be installed which consists of a concrete headwall with a 12-inch diameter opening and screw gate that would control flows into the diversion. The intake structure would connect to a 165-foot-long, 12-inch diameter steel pipe stub that would be laid in the re-profiled ditch. Diversion flow would be conveyed

through this steel pipe to a fish screen located along the ditch alignment. Screened water would continue down the ditch into the measuring weir and then to points of use. Fish and un-screened water would be returned to Fort Goff Creek via a fish return bypass pipe. The screen would be placed about 100 feet downstream of the point of diversion.

A small excavator would be used to: (1) excavate the areas where the head-gate structure, fish screen structure, and measuring weir would be seated in the ground; (2) re-profile the ditch-line and lay the steel pipe; and (3) position and lay the fish return bypass pipe from the fish screen to Fort Goff Creek. A dump truck would be used to transport the fish exclusion screening device and construction materials to the placement site and to move excavated soils to an approved disposal site.

The existing ditch-line in the project area, about 200 feet, would be altered in the course of project implementation. Installation of the head-gate, fish screen structure, and piping would result in ground disturbance adjacent to the existing ditch-line and in the 50 foot-long swath where bypass flows and fish would be returned to the creek via pipe. The swath of disturbance is likely to range from zero to 12 feet wide along the ditch-line and about 12 feet wide where the bypass flow ditch would need to be excavated. A circular area of disturbance of about a 20-foot radius is possible in the area where the fish exclusion screen structure would be installed, however, about half of this area is existing road. Conifer trees over 24 inch in diameter would be left standing. Most of the vegetation that would be removed or trampled along the ditch line and fish return bypass pipe is grass, forbs, brush, saplings, and invasive ivy and Himalayan blackberry. Much of the vegetation that would be removed or trampled in the course of installing the fish return bypass pipe is invasive ivy and blackberry. The final design plans in Appendix A shows where each project element would be implemented.

If necessary, to prevent or reduce the risk of injury or mortality, fish would be temporarily removed from the project site prior to excavation and construction by seining and/or electrofishing. Captured fish and other aquatic organisms would be relocated well upstream of the project site reach. Block nets would prevent fish from reentering the project site during implementation. A coffer dam would be installed to constrain the flow of Fort Goff Creek on one side of the channel during in-channel excavation and headgate construction. Flow in this channel would be constrained in a manner that does not hinder fish passage through the project site reach.

All project implementation work would occur after July 9<sup>th</sup> and before October 15<sup>th</sup> in observance of aquatic and wildlife limited operating periods, which would avoid or minimize impacts to protected species.

## Project Design Features

The Klamath National Forest developed the following project design features to minimize environmental impacts of the proposed actions to forest resources. These project design features were designed to address overall project objectives, to minimize resource impacts, and to ensure Forest Plan compliance. The project design features in Table 3 apply to all sites where applicable or deemed necessary by contracting personnel.

**Table 3. Project design features**

Project Design Feature	Description
NNIS 1	Equipment and vehicles that leave established road surfaces would be cleaned of soil, seeds, vegetative matter, and other debris that could contain noxious weed propagules prior to entering and before leaving each proposed site.
Botany A	All materials such as soil and vegetation removed from the project area must be deposited at an approved location to prevent the spread of invasive weeds. Consult a botanist to determine location of proper disposal.
Fisheries A	Activities occurring within the stream where anadromous salmonids may be present is restricted from October 15 to April 15.
Archaeology 1	Archaeological features would be flagged for avoidance except those identified and approved for alteration under the proposed action.
Archaeology 2	A Forest Service archaeologist would monitor project activities within site boundaries and the area of potential effect. The monitor would document any and all impacts to archaeological features.
Archaeology 3	Operation of mechanical equipment within site boundaries would be coordinated with the Forest Service archaeologist to reduce impacts to archaeological features.
Archaeology 4	No heavy equipment loading or unloading, staging, or turnarounds are to be conducted outside of clearly identified locations within the area of potential effect.
Archaeology 5	In the event that new archaeological deposits, including human remains, are discovered during project implementation, a Forest archeologist must be notified and all activities in the resource vicinity (150 feet) stopped until clearance is provided by a Forest archeologist.
Watershed 8	Refueling would not take place within Riparian Reserves except at designated landings in locations that are not hydrologically connected to water resources. A spill containment kit would be in place where refueling and servicing take place. Equipment used for refueling in Riparian Reserves would not exceed 150 gallons.
Watershed 23	Operate according to the Forest's Wet Weather Operation Standards (USDA Forest Service 2002).
Watershed A	Post-activity soil cover would range from 50-80 percent depending on slope steepness and soil texture.
Watershed B	Maintain existing coarse woody debris by having ground-based equipment avoid the larger diameter woody debris as much as practical.
Wildlife 26	A seasonal restriction of February 1st through July 9th would apply to all activities that are not in suitable NSO habitat but would potentially produce noise above ambient noise levels within 0.25 miles of an occupied NSO activity center or un-surveyed suitable nesting/roosting/foraging habitat. The LOP may be lifted if protocol surveys determine NSOs are not nesting in the year of action.

# Environmental Impacts of the Proposed Action and Alternatives

This section summarizes the biological, physical, and cultural impacts on the affected environment and the potential changes to those environments due to project implementation. Further analysis and conclusions about the potential effects are available in resource specialist reports and other supporting documentation located in the project record.

The resource specialists participating in the interdisciplinary team determined that there are no concerns for effects of the project on wildlife, geologic, or soil resources. These resources would not be further analyzed here and additional information supporting these determinations are described in the resource checklist available in the project record. The follow are discussions of resources that have relevance to a determination of significance.

## Aquatic Resources

### Alternative 1

#### Direct, Indirect, and Cumulative Effects

The no action alternative would not prevent entrainment of salmon and steelhead trout into the existing water diversion ditch where they could be injured or killed. The no action would not eliminate or reduce the need for a diversion dam structure in coho critical habitat. Under the no action alternative there would be no short-term disturbance in the stream channel, no short-term vegetation and ground disturbance, and no risk of harm to fish and other special status aquatic species or their habitats.

### Alternative 2

#### Direct Effects

Special status (Proposed, Threatened, Endangered, and Forest Service Sensitive) aquatic species and Klamath National Forest management indicator species considered are: coho salmon, Chinook salmon, steelhead trout, rainbow trout, Pacific lamprey, Klamath River lamprey, western brook lamprey, foothill yellow-legged frog, northern red-legged frog, Cascades frog, tailed-frog, Siskiyou Mountains salamander, southern torrent salamander, western pond turtle, northern water shrew, long-tailed vole, and American dipper.

Under the proposed action, zero to a few individuals of threatened, sensitive or management indicator fish species could be injured or killed due to capture, relocation, de-watering, and construction within the stream channel and existing water ditch, and within the riparian zone between the fish screen location in the existing ditch and Fort Goff Creek. It is unlikely but not inconceivable that one or more salmon or steelhead juveniles could be injured or killed during project operations. Under the proposed action, zero to a few tailed-frogs or southern torrent salamanders or western pond turtles could be injured or killed due to being crushed or displaced during construction. It is unlikely, but not inconceivable, that the proposed action could injure or kill foothill yellow-legged frog due to being crushed or displaced during construction because individuals of this species are not seen in this area (personal observation from over 20 years working in this stream reach). It is unlikely that the proposed action would injure or kill an American dipper, northern water shrew, or a long-tailed vole because these animals would likely move away from the construction disturbance. Under the proposed action, less than 0.25 acre of habitat for management indicator species habitat would be directly degraded in the short-

term. Less than 0.1 acre of habitat for non-fish special status aquatic species may be permanently lost due to the 165 feet of piping that could reduce or eliminate 'wet ditch' habitat.

### Indirect Effects

The proposed action would slightly improve pool quality for juvenile fish by deepening the diversion pool and would improve refugia for salmonids and lamprey by preventing entrainment into the water diversion. The proposed action would degrade a small amount of riparian habitat for special status aquatic species other than fish in the short term (5 years or less) only. Degradation of habitat would be short term and would occur only within the 0.25-acre area where vegetation and ground disturbance would occur, and within the 100-meter reach downstream of the construction site. Less than 0.1 acre of habitat for non-fish special status aquatic species may be permanently lost due to the 165 feet of piping that could reduce or eliminate 'wet ditch' habitat. Under the proposed action the functioning condition of all the habitat indicators (listed below) would be maintained at the reach and 7th-field watershed scale. Effects of the proposed action on each habitat indicator is described below:

**Water Temperature:** The proposed action would not measurably affect water temperature in Fort Goff Creek because there would be negligible reduction in stream shading, no increase in air and water interface area over existing conditions, and no increase in diversion rate into the private water systems over current capacity. Water conveyance through 165 feet of steel pipe could increase water temperature but probably not significantly more or less than the contact with air under current condition. Any increase in water temperature due to proposed actions would not result in adverse effects to fish and other aquatic organisms because maximum water summer temperatures in Fort Goff Creek are well within the suitable range for these organisms.

**Substrate-Turbidity:** The proposed action could slightly increase turbidity in heavy precipitation events that may occur during project implementation and for the first few peak flows after implementation is complete due to dust and fine sediment washing off freshly disturbed areas that are hydrologically connected. These increases could last for minutes to a few hours. In the short term, but not long term, turbidity could be increased during peak flows that exceed bankfull if the flow washes over areas where ground disturbance and vegetation removal has recently occurred. However, the magnitude of increase would be insignificant because the area of disturbance is miniscule compared to watershed area upstream. Increased sedimentation would be short-term and not be detectable beyond the reach scale.

**Chemical and Nutrient Contamination:** The excavator or dump truck used to implement the project could drip petroleum-based lubricants or hydraulic fluids but drips would be minor because the Forest Service contracting officer representative would not allow excessively leaky equipment onto the project site and because the project area is small. Spill kits would be on-site at all times in the case of a spill of lubricants, hydraulic fluid, or fuel. Vehicles would not be refueled or serviced near the creek or water ditch. Therefore, no significant contamination of water or soil by petroleum products is expected to occur or be detectable beyond the immediate construction site scale.

**Fish Passage:** The proposed action would not affect passage for fish or other aquatic organisms except for brief periods (hours) when block nets are set to prevent fish from entering the area where the coffer dam would be constructed and de-constructed.

**Substrate Character:** The proposed action would negligibly increase rate of surface erosion, sediment delivery to the stream, and hydrologic connectivity in the short term only. Increased sedimentation would not be detectable beyond the reach scale.

**Off-Channel Habitat and Floodplain Connectivity:** The proposed action would have no effect on natural off-channel habitats and floodplain connectivity.

**Large Woody Debris:** The proposed action would have no effect on existing large woody debris or the potential for future large woody debris recruitment because no large trees would need to be cut and no large woody debris would be removed from site. If snags need to be felled for safety reasons the logs would be left on site.

**Pool Frequency and Quality or Width-to-Depth Ratio:** The proposed action would slightly deepen one pool. The proposed action would not affect any other pool or pool frequency. The proposed action would not indirectly affect downstream pool quality because short term increase in sediment delivery to the stream would be negligible. Width-to-Depth Ratio would slightly decrease at the diversion pool site due to deepening.

**Refugia:** The proposed action would slightly decrease area of available refugia during construction when the diversion pool is dewatered and the stream is pushed to one side of the channel. The proposed action would diminish the quality of refugia in a small area for a matter of hours due to disturbance associated with block net setup and fish relocation. The proposed action would improve refugia function as soon as construction is completed by preventing entrainment of salmon and steelhead into the water diversion.

**Streambank Condition:** A small area (about 100 square feet) of streambank would be permanently modified due to construction of the head-gate structure on the west side of the stream channel at the point of diversion. However, this area is in a perpetual state of disturbance in its existing condition due to frequent maintenance needs of the current diversion system and the existing access road that ends at the diversion point at the stream channel.

**Change in Peak and Base Flows:** The proposed action may slightly increase base flow because piping the water would result in slightly less water loss through the leaky ditch. Therefore, rate of diversion may slightly decrease. Measuring weir would prevent diverting more than authorized quantities of water into the diverters' water systems.

**Drainage Network Increase:** Area of vegetation and ground disturbance would be less than 0.25 acres and hydrologic connectivity of this 0.25 acres would be negligibly increased in the short term only. Therefore, the proposed action would insignificantly increase drainage network density in the short term.

**Road Density and Location:** Road density and location would not be affected because only existing roads in good to fair condition would be used.

**Disturbance History/Regime:** Project implementation would negligibly increase watershed disturbance or affect disturbance regime in the short term because only 0.25 acres would be subject to vegetation and ground disturbance. The proposed action would not increase ground instability.

**Riparian Reserves:** Project implementation would decrease riparian function at the immediate construction site scale in the short term due to vegetation and ground disturbance. However, vegetation structure and riparian function beyond the site scale would not be significantly affected because no large trees would be felled and less than 0.25 acres of ground would be disturbed. In the long term, riparian reserves and riparian reserve function would fully recover. The project would not affect landslide potential. The project would maintain or promote aquatic conservation strategy objectives.

## Cumulative Effects

The proposed action would insignificantly increase cumulative effects to habitat for special status aquatic species because the instream, riparian, or watershed habitat indicators would be negligibly adversely affected beyond the site-scale. There are no other present or reasonably foreseeable actions planned in the Fort Goff Creek watershed. Short term degradation of a miniscule amount of habitat at the site-scale, and the potential loss of a few individuals of special status aquatic species would be cumulative with past, present, and future impacts to these populations, but would not decrease population viability of any of the species, or lead to a trend towards listing or loss of population viability.

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

All proposed actions are in compliance with the National Forest Management Act of 1976 as implemented by the Forest Plan. The proposed action would be compliant with the Forest Plan aimed at minimizing short term impacts to individuals and providing for long term population viability. The design of this project is consistent with Recovery Actions described in the 2014 Southern Oregon/Northern California Coastal Coho Salmon Recovery Plan (NMFS 2014) and would implement actions that would contribute to recovery of Coho salmon and other fish species. The proposed action would support Forest Plan Standard and Guideline MA 10-13 to “*Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of aquatic conservation strategy objectives.*” Section 7 Consultation for Federally listed threatened Coho salmon was concluded by inclusion of this project in the NOAA Restoration Center Arcata Office Programmatic Biological Opinion available in the project record.

## Heritage Resources

### Alternative 1

#### Direct, Indirect, and Cumulative Effects

No ground disturbing activities would occur under this alternative because there would be no action. As a result, no effects on historic properties would occur. Since there are no direct or indirect effects, there are no cumulative effects on historic properties under this alternative.

### Alternative 2

#### Direct and Indirect Effects

There is one unevaluated historic mining site within the project area that would be directly affected by proposed project activities. For the purposes of this project, the site was treated as eligible for the National Register and SHPO consulted regarding the potential effects pursuant to 36 CFR 800.5(b). The Forest determined, and the SHPO concurred (USFS\_2017\_0420\_001), that while there would be direct effects to the site, the effects do not meet the criteria of *adverse effects* as defined under 36 CFR 800.5(a)(1). The effects would not alter those values that make this site potentially eligible for listing on the NRHP or diminish the site’s integrity such that it cannot convey its significance. Under the Region 5 PA, Appendix E, 2.0 Class II: On-Site Historic Property Protection Measures, controlled conditions would be necessary during project implementation to limit effects to the mining site. There would be no direct adverse effects to historic properties with the application of controlled conditions.

There are no indirect effects regarding historic properties as a result of the project.

## Cumulative Effects

Since the project has a “no adverse effect” determination, there are no beneficial impacts, and there are no projects within the Area of Potential Effect in the reasonable and foreseeable future, there are no cumulative effects to document regarding historic properties from this alternative.

## Hydrology

### Alternative 1

#### Direct and Indirect Effects

No ground-disturbing activities would occur under this alternative because there would be no action. As a result, no effects to hydrologic resources would occur. Since there are no direct or indirect effects, there are no cumulative effects to hydrologic resources under this alternative.

### Alternative 2

#### Direct, Indirect, and Cumulative Effects

There is a potential for this alternative to increase sediment inputs into Fort Goff Creek. However, adherence to the project design features described above and best management practices (Appendix B) would ensure that there would be no significant effects in regard to hydrologic resources. In addition, aquatic conservation strategy objectives would be met and improved by the project (Appendix C). Stream shade should not be affected by the project as no trees or vegetation over two inches in diameter would be removed. There are no other projects within the Fort Goff Creek watershed in the reasonably foreseeable future, therefore there are no cumulative effects to hydrologic resources under this alternative.

## Botany

### Alternative 1

#### Direct, Indirect, and Cumulative Effects

No ground-disturbing activities would occur under this alternative because there would be no action. As a result, no effects to botanical resources would occur. Since there are no direct or indirect effects, there are no cumulative effects to botanical resources under this alternative.

### Alternative 2

#### Direct, Indirect, and Cumulative Effects

There is no effect is expected to threatened, endangered, proposed, candidate, sensitive, or survey and manage botanical species from this alternative. No suitable habitat for proposed, threatened, endangered, or candidate plant or fungi species exists within the project area. Some potential exists for sensitive or survey and manage species to occur in the general area; however, there is no suitable habitat for these species within the proposed disturbance footprint due to high-level infestations of non-native invasive plants.

Non-native invasive plants (English ivy, Armenian blackberry) are present at the site and have moderate-to-high potential to be spread locally or dispersed abroad by the proposed action. In addition, ox-eye daisy is present along the project area’s access road, and sulphur cinquefoil and yellow starthistle are suspected to occur. Effects of these non-native invasive plants may be mitigated or minimized

through the use of equipment cleaning and proper waste disposal as identified in the project design features described above.

There are no other projects within the project area in the reasonably foreseeable future, therefore there are no cumulative effects to botanical resources under this alternative.

## **Analysis in Support of a Finding of No Significant Impact**

Significant impact is determined by evaluating the context of the project and intensity of effects using the ten factors identified in 40 CFR 1508.27(b).

### **Context**

For the no action and proposed action alternatives, the context of the environmental effects is based on the environmental analysis in this document. This is a site-specific project that by itself does not have statewide, regional, national, or international importance.

### **Intensity**

Intensity is a measure of the severity, extent, or quantity of effects, and is based on information from the effect's analysis of this environmental assessment and the references in the project record. The ten factors identified in 40 CFR 1508.27(b) for evaluating intensity are as follows:

1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect would be beneficial.

The project has both beneficial and adverse effects, and for many resources, no adverse effects. These effects are fully analyzed in the preceding environmental analysis and in relevant resource reports. Project design features were developed as part of the project in order to minimize the effects of project activities to many resources (Table 3), and best management practices would be applied (Appendix B). Beneficial effects have not been used in any way to offset or compensate for adverse effects. The adverse effects of the project are not significant and are discussed for all intensity factors in the analysis above.

2. The degree to which the proposed action affects public health or safety.

No short or long term effects to public health and safety have been identified.

3. Unique characteristics of the geographic area such as the proximity to historical or cultural resources, parklands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

No parklands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas occur in the project area. However, the project site does occur within a historic mining site and project activities would not significantly alter character-defining features of the resource.

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.

The project is consistent with all applicable laws, regulations, and policy including the Forest Plan, as amended. There is no apparent controversy regarding the project which has the support and cooperation of multiple partner organizations. At this time there have been no comments received from the public regarding the project, and no scientific controversy exists regarding effects.

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

The fish exclusion screening structure was designed by engineers working with the Siskiyou Resource Conservation District, who have implemented numerous soil and water conservation projects since they were established in 1949. The design would be reviewed and approved by a Forest engineer and is compliant with California Department of Fish and Wildlife and NOAA Fisheries criteria. The effects analysis provided in this environmental assessment shows the effects are not uncertain, and do not involve unique or unknown risks.

6. The degree to which the action may establish precedent for future actions with significant effects or represents a decision in principle about a future consideration.

The project would not establish precedent for any future actions with significant effects. Any future action not analyzed in this environmental assessment would be analyzed separately and on its own merits at the time it is proposed in the future.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

The project would not result in significant cumulative adverse effects. There are no other present or reasonably foreseeable actions planned in the Fort Goff Creek watershed that would increase effects beyond those of the proposed project.

8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.

The project would affect two archeological features within the site. However, activities would be localized and not significantly alter character-defining features nor diminish the integrity of the resource to the extent that it would no longer be eligible for listing on the National Register.

The Forest solicited comments from the tribes that may be affected by the project during scoping: Karuk Tribe, Quartz Valley Indian Reservation, Shasta Indian Nation, and Shasta Tribe, Inc. At this time the Forest has not received any response, comments, or concerns from this correspondence.

There are no scientific research sites that may be affected by the project, nor is there any indication that this project would affect any scientific resources.

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

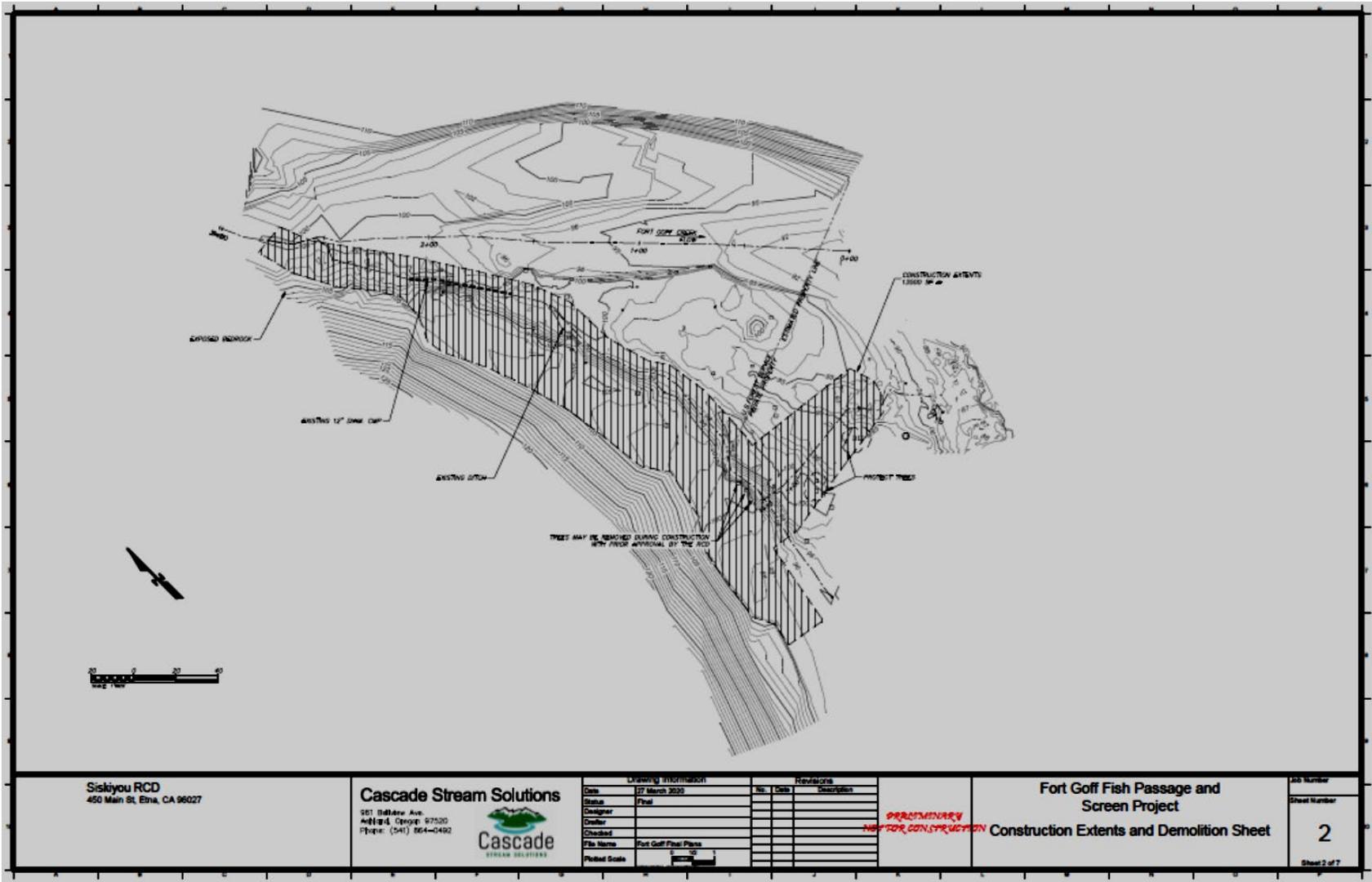
The design of this project is consistent with Recovery Actions described in the 2014 Southern Oregon/Northern California Coastal Coho Salmon Recovery Plan (NMFS 2014) and would implement actions that would contribute to recovery of Coho salmon and other fish species. The project would improve refugia function for the threatened coho salmon by preventing entrainment into the water diversion. However, zero to a few individuals could be injured or killed and a small amount of habitat may be degraded as a result of in-channel and near-stream construction activities during implementation. These effects would be localized to the project site and short term. The functioning condition of habitat indicators would not be significantly affected in the short or long term beyond the reach scale by these small disturbances (aquatic section above)

The project would not adversely affect any wildlife or botanical endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973. There is no suitable habitat for federally listed threatened, endangered, proposed, or candidate species within the project area. The project does not occur within a known northern spotted owl core or Siskiyou Mountain salamander site. No suitable habitat for Siskiyou Mountain salamander occurs in the project area and none for northern spotted owl would be altered by the project (see the Resource Checklist in the project record).

10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

This project would not violate any applicable laws or regulations for the protection of the environment.

# Appendix A: Project Construction Designs



Siskiyou RCD  
450 Main St, Etna, CA 96027

Cascade Stream Solutions

561 Bellvue Ave.  
Willard, Oregon 97520  
Phone: (541) 864-0492



**Drawing Information**

Date	27 March 2020
Status	Final
Designer	
Checker	
Checked	
File Name	Fort Goff Final Plans
Plot/Print Scale	1" = 20'

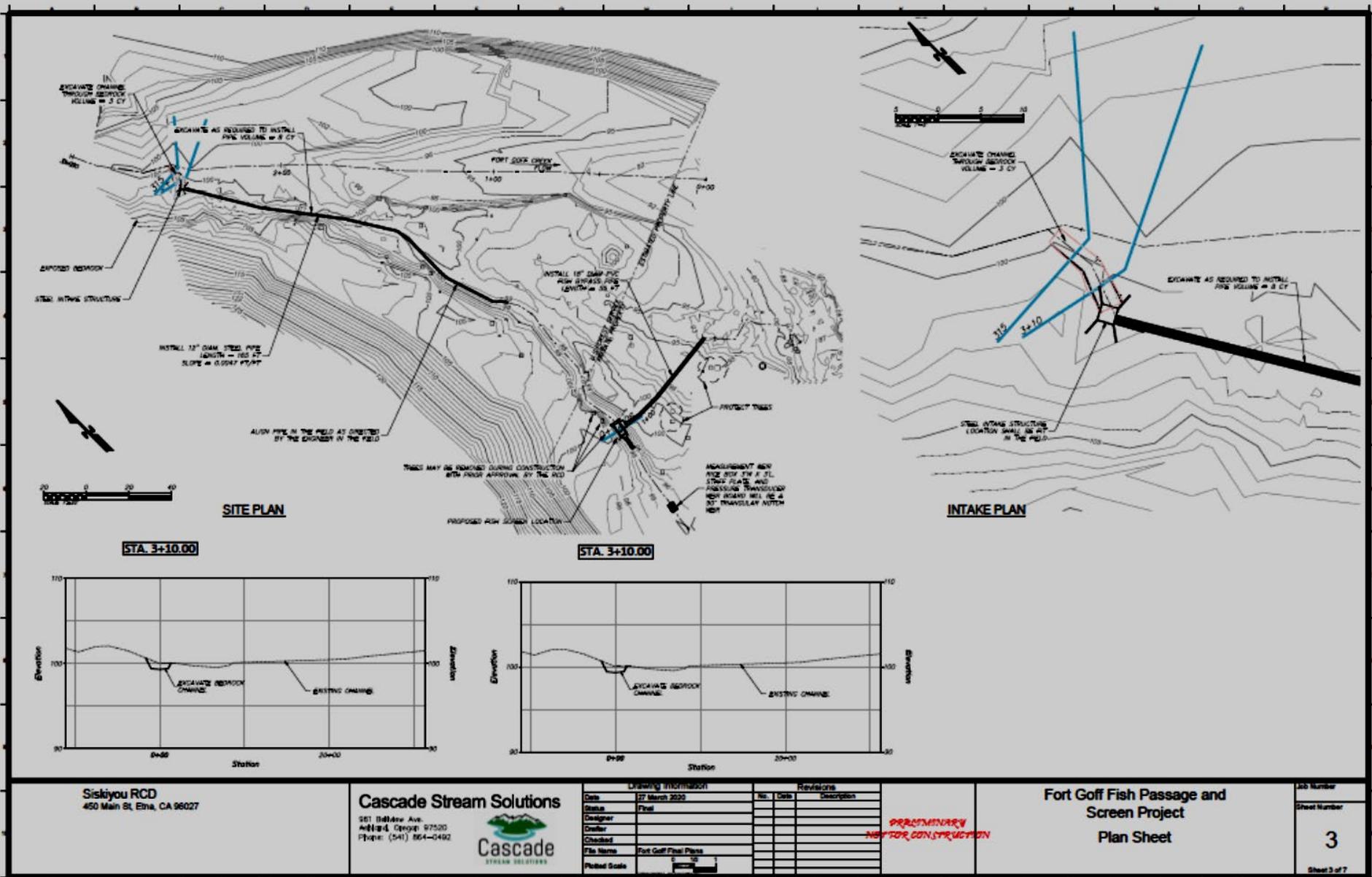
**Revisions**

No.	Date	Description

*PROVISIONAL  
NOT FOR CONSTRUCTION*

**Fort Goff Fish Passage and Screen Project**  
**Construction Extents and Demolition Sheet**

Job Number	
Sheet Number	2
Sheet 2 of 7	



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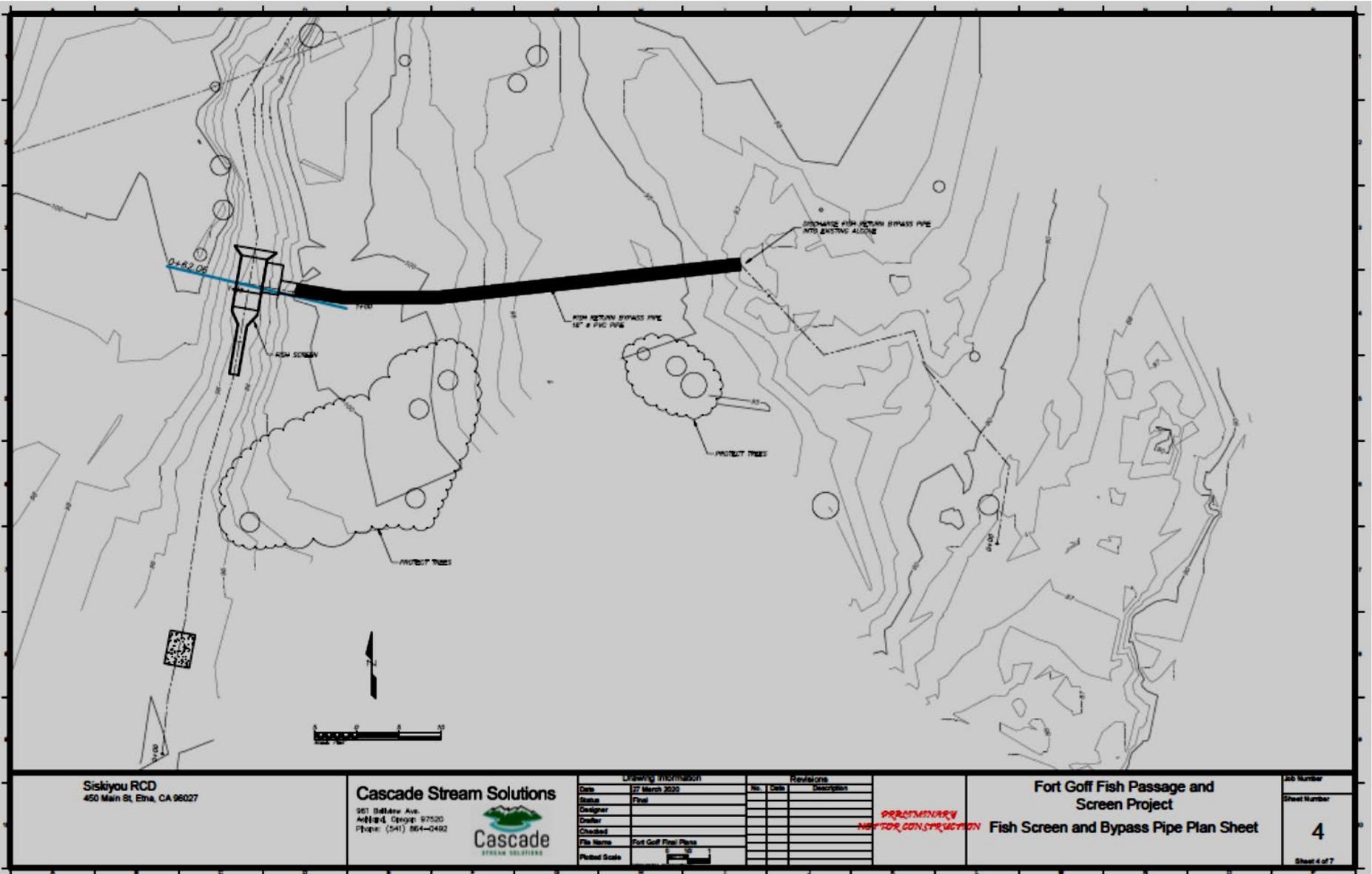


Drawing Information		Revisions	
Date	27 March 2020	No.	1
Status	Final	Date	
Designer		Description	
Checker			
Checked			
File Name	Fort Goff Final Plans		
Plotted Scale	1" = 20'		

PROVISIONARY  
NOT FOR CONSTRUCTION

Fort Goff Fish Passage and  
Screen Project  
Plan Sheet

Job Number  
Sheet Number  
**3**  
Sheet 3 of 7



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Drawing Information

Date	27 March 2020
Status	Final
Designer	
Checker	
Client	
File Name	Fort Goff Final Plans
Plotted Scale	1" = 10'

Revisions

No.	Date	Description

PRELIMINARY  
NOT FOR CONSTRUCTION

Fort Goff Fish Passage and Screen Project  
Fish Screen and Bypass Pipe Plan Sheet

Job Number

Sheet Number

4

Sheet 4 of 7

## **Appendix B: Best Management Practices**

### **General**

- Establish and maintain construction area limits as well as the minimum area necessary for completing the project and confine disturbance to this area.
- Deposit and stabilize sediment or soil removed from site in a stable area outside of the 100 year flood plain.
- Stabilize disturbed area by planting, spreading slash, or using wattles to reduce erosion.

### **For Diversion during Construction**

- Design diversion structure to efficiently capture and carry design flows in such a manner as to avoid or minimize erosion of streambanks, ditches, and adjacent areas.
- Regularly inspect diversion structures at suitable intervals to identify maintenance needs and situations that could lead to future overtopping or failures.
- Do not flush or otherwise move sediment from behind diversion structure downstream

# Appendix C: Aquatic Conservation Strategy

## Introduction

The Forest Plan contains the components, objectives and standards and guidelines for consistency of projects with the Aquatic Conservation Strategy (aquatic conservation strategy) (Forest Plan, page 4-25). The Record of Decision (ROD) for the Forest Plan (USFS, 1995) is the guiding document for Forest projects; the Forest Plan ROD incorporates aquatic conservation strategy standards and guidelines from the ROD 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 Forest Service and USDI Bureau of Land Management, 1994b).

The Aquatic Conservation Strategy has four components: 1) Key Watersheds, 2) Watershed or Ecosystem Analysis, 3) Watershed Restoration, and 4) Riparian Reserves. Within riparian reserves are standards that prohibit and regulate activities that retard or prevent attainment of Aquatic Conservation Strategy objectives (Forest Plan, page 4-106). This analysis documents the consistency of the project with the Aquatic Conservation Strategy objectives at the site scale and the 5th field watershed scale. The consistency is analyzed at the short-term (during implementation up to the first one to two years) and the longer-term scales (greater than two years).

## Key Watersheds

Since Fort Goff Creek is not Key watershed so this subject would not be further discussed.

## Riparian Reserves

For the purposes of this analysis ‘Riparian Reserve’ includes the interim riparian buffers along intermittent and perennial streams (stream course riparian reserves) and inner gorges. Active landslides, toe zones of dormant landslides and steep-weathered granitic lands are also geologic riparian reserves and for this report they would be collectively referred to as ‘unstable lands’ to avoid confusion. There are no unstable land riparian reserves in the project area.

Interim widths of stream course riparian reserves prescribed in the Forest Plan were used for this analysis. The interim width of the stream course riparian reserves in the project area is 340 feet on each side of the channel of Fort Goff Creek. The entire project is within the stream course riparian reserve of Fort Goff Creek.

## Watershed Restoration

This is not a watershed project per-se. The purpose of the project is to protect threatened and sensitive populations of fish from being entrained into a water system where they could be injured or killed. The project would eliminate or reduce the need (reduce the frequency and size) of a diversion dam structure that currently is constructed nearly all the way across the channel in coho critical habitat each year.

## Watershed or Ecosystem Analysis Recommendations

The Fort Goff Creek watershed is included in the Seiad/Grider/Thompson Ecosystem Analysis completed in 1999 – in that analysis, there were no recommendations specific to fish passage and fish exclusion screening.

The Ecosystem Analysis states that salmon and steelhead had not been well assessed in much of the analysis area. It is likely that the unscreened diversion was not known at the time.

## Analysis of Compliance with Aquatic Conservation Strategy Objectives

### 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.*

The analysis of aquatic and riparian habitat indicators in the Fort Goff Creek Fish Exclusion Screening Environmental Assessment (May 2020) indicates that the project would have no to negligible effect on quality, quantity, or suitability of aquatic and riparian habitats. The project would maintain the distribution, diversity, and complexity of watershed and landscape-scale features that create and sustain aquatic and riparian habitats.

The project would MAINTAIN aquatic conservation strategy Objective 1.

### Objective 2:

*Maintain and restore spatial and temporal connectivity 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.*

The project would not affect connectivity between watersheds because all project elements are within the Fort Goff watershed and water distribution to the private systems would not significantly change as a result of the water system modifications. The project would have negligible effect on lateral drainage network connections because there would be minor new disturbance of streambanks and no change in channel constraint. The project would not affect longitudinal connectivity because no obstructions would be placed in the channel – the project would eliminate the need for an annually constructed or reconstructed diversion dam, or greatly reduce the size of a diversion dam that may still be needed to direct flow to the point of diversion.

The project would negligibly affect refugia post-construction because there would be very minor modifications of a small area of bedrock channel and a small area of streambank. The proposed action would slightly decrease areas of available and quality refugia during construction, when the diversion pool is de-watered, the stream is pushed to one side of the channel, and fish are captured and relocated. The proposed action would improve refugia function as soon as construction is completed by preventing entrainment of salmon and steelhead into existing water systems. The project would restore spatial connectivity for juvenile fish and other aquatic organisms by preventing entrainment into private water systems where they could be injured or killed.

The project would MAINTAIN and RESTORE aquatic conservation strategy Objective 2.

### Objective 3:

*Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.*

The project would slightly alter a small area of bedrock channel (two cubic yards) in order to deepen a channel to the headgate. Removal of this small amount of bedrock would not affect the channel characteristics (other than to slightly deepen an existing pool) or affect streamflow and sediment regimes. There would be only minor new disturbance of streambanks because the headgate would be

constructed in the same area as the current diversion structure (and other large concrete pieces) is located, and because installing the fish return bypass pipe into the channel would cause minor short-term disturbance to a very short (about 12 feet) section of streambank.

The project would MAINTAIN aquatic conservation strategy Objective 3.

#### **Objective 4:**

*Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that retains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.*

The project would have negligible effect on water quality because: (1) there would be only about 0.25 acre of new ground and vegetation disturbance that would recover in the short-term – so increases in runoff and sedimentation from newly disturbed areas would be minor, (2) there is dense riparian vegetation downslope from where most of the new ground disturbance would occur that would filter out fine sediments, (3) none of the disturbance is on unstable ground, (4) no toxic materials would be introduced into surface waters, (5) equipment would be serviced and refueled away from the stream and hydrologically-connected areas, there would be spill kits on site, and leaky equipment would not be permitted, and (6) excavated soil would be moved to an approved disposal area that is not hydrologically-connected.

Turbidity may be negligibly increased during the first few rain events after project implementation due to dust and loose soil washing off areas that can't be fully hydrologically disconnected at the end of project implementation.

Water temperature would not be measurably affected because there would be negligible reduction in stream shading, no increase in air/water interface area over existing conditions, and negligible change in diversion rate into the private water systems over current capacity. Water conveyance through 165 feet of steel pipe could increase or decrease water temperature but probably not significantly more or less than the contact with air under current condition in the open ditch. The fish return bypass pipe could also affect water temperature in Fort Goff Creek. The net effect of all the piping and the fish screen is unlikely to measurably affect water temperature in Fort Goff Creek. Any negligible change in water temperature due to proposed actions would not result in adverse effects to fish and other aquatic organisms because maximum water summer temperatures in Fort Goff Creek are well within the suitable range for native fish and other aquatic organisms.

The project would MAINTAIN aquatic conservation strategy Objective 4.

#### **Objective 5:**

*Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the regime include the timing, volume, rate, and character of sediment input, storage, and transport.*

The project would have negligible effect on sediment regime because: (1) there would be only about 0.25 acre of new ground and vegetation disturbance that would recover in the short-term, (2) there is dense riparian vegetation downslope from where most of the new ground disturbance would occur, (3) none of the disturbance is on unstable ground, (4) excavated soil would be moved to an approved disposal area that is not hydrologically-connected, and (5) weed-free straw would be scattered to provide immediate ground cover after construction is concluded.

The project would MAINTAIN aquatic conservation strategy Objective 5.

**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.*

The project would have negligible effect on frequency and magnitude of peak flows because the amount of water diverted at peaks flows would be negligible compared to the peak flows. Therefore, flows sufficient to create and sustain aquatic and riparian habitats, and to move sediment, wood and nutrients would not be affected.

Base flows in Fort Goff Creek would be negligibly affected because water would simply be diverted through different means, and because amount of diverted water would be restricted to reasonable use and continually monitored with a measuring weir.

The project would MAINTAIN aquatic conservation strategy Objective 6.

**Objective 7:**

*Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows.*

The project would have negligible effect on frequency and magnitude of peak flows because the amount of water diverted at peaks flows would be negligible compared to the peak flows. The project would negligibly affect current area of peak-flow inundation. There is no floodplain in the project reach. The channel in the project reach is constrained.

The 165 feet of piping would slightly reduce water table recharge due reduction of water that is currently lost into unlined ditch, but the reduction in water table recharge would be negligible. There are no wetland meadows in the project area. Negligible change in water table resulting from piping would not affect water table under adjacent dry meadows.

The project would MAINTAIN objective aquatic conservation strategy Objective 7.

**Objective 8:**

*Maintain and restore the species composition and structural diversity of plant communities in riparian areas.*

Much of the project would be implemented using existing road and turnouts. The project would cause new ground and vegetation disturbance on about 0.25 acres. Most of the vegetation that would be removed or trampled along the ditch line is grass, forbs, brush, saplings, and invasive ivy and Himalayan blackberry. Much of the vegetation that would be removed or trampled in the course of installing the fish return bypass pipe is invasive ivy and blackberry. Vegetation, such as it is, would recover in the within a few years or less.

Equipment and vehicles that leave established road surfaces would be cleaned of soil, seeds, vegetative matter, and other debris that could contain noxious weed propagules prior to entering project site. All materials such as soil and vegetation removed from the project area would be deposited at an approved location to prevent the spread of invasive weeds.

The project would MAINTAIN aquatic conservation strategy Objective 8.

**Objective 9:**

*Maintain and restore habitat to support well-distributed populations of native plant and invertebrate riparian dependent species.*

See discussion in Objective 8 regarding the species composition and structural diversity of plant communities. Short-term vegetation and ground disturbance on about 0.25 acre would have negligible effect on invertebrate populations. (See statements in the cumulative effects section below regarding populations).

The project would MAINTAIN aquatic conservation strategy Objective 9.

**Cumulative Effects**

The proposed action would insignificantly increase cumulative effects to habitat for special status aquatic species in the short-term because the instream, riparian, and watershed habitat indicators would be negligibly affected beyond the site-scale. There are no other present or reasonably foreseeable actions planned in the Fort Goff Creek watershed. Short term degradation of a miniscule amount of habitat at the site-scale, and the potential loss of a few individuals of special status aquatic species would be cumulative with past, present, and future impacts to these populations, but would not decrease population viability of any of the species, or lead to a trend towards listing or loss of population viability.

**Summary and Conclusion**

The Project would maintain and restore all aquatic conservation strategy objectives.

## Appendix D: Operations and Maintenance Plan

### Middle Ditch Irrigation System: Fort Goff Creek

This plan is intended as a guideline for the operation and maintenance of the Middle Ditch diversion system on Fort Goff Creek, which is located on river-right approximately 0.75 mi. upstream of the confluence with the Klamath River. The water users have sole responsibility for the operation and maintenance of the diversion system including the fish screen facility. The plan is for a drum screen facility of 1.56 cubic feet per second, a bypass return system, and water conveyance infrastructure. Water delivery is required year-round for domestic and livestock watering purposes, with agricultural irrigation water being diverted from April 1 to October 1 of each year.

#### DIVERSION INFRASTRUCTURE INVENTORY

##### Water Conveyance System

- Constructed conveyance channel
- Hand-stacked rock wing dam, if necessary
- In-take structure
- 12 in. conveyance pipe (approx. 162 feet)
- Earthen ditch system (approx. 80 feet)

#### CONVEYANCE SPECIFICATIONS & FISH-SCREEN, BYPASS

- Constructed Conveyance Channel – An approximate 40 ft. long conveyance channel, that is 2 ft. wide and by 6 inches deep, delivers water to the in-take structure.
- Hand-stacked wing dam – Less than 1 ft in height, no more than 50 percent of wetted channel width rock berm, constructed by hand on an as-needed basis, to direct a portion of low flows into the in-take. The dam construction would be overseen by a biologist deemed qualified by NOAA Fisheries to ensure that no redds are disturbed during construction and that fish passage is maintained.
- In-take – A steel box set in the active channel of Fort Goff Creek, it has an opening parallel to streamflow to allow water to be diverted. The intake has three sets of slots for setting overflow plates and orifices. Reference in-take design specifications for details of the in-take, The in-take would be set up by the design engineer during the first full year of operation for 3 separate conditions: 1) High spring run-off flow; 2) summer base flow; 3) winter stockwater and domestic flow. The design engineer would record the setting of boards and orifices for all three conditions, give the diverters an on-site tutorial of the settings, and provide the record to CDFW.
- Conveyance Pipe – A smooth-walled, 12 in. diameter steal pipe connects to the in-take and runs approximately 167 ft. before being discontinued to protect mature trees established along the conveyance system.
- Fish-Screen – It is a 3 ft. long by 2 ft. diameter stainless steel wedge-wire? drum, and powered by a paddle wheel and drive chain assembly.

The fish screen would be operated in accordance with NOAA and CDFW fish screen criteria. The acceptable range of water levels upstream of the fish screen shall be etched into the wall of the screen bay for guidance. In the first year of operations, the design engineer would check that fish screen criteria are met for the 3 conditions listed under the in-take section above. The design engineer would show the proper settings for boards and orifices to the diverters and report the settings to CDFW.

- **Bypass Return** –Diameter: 18 in.
- Slope: 0.0023 ft/ft
- Bypass Flow: 0.50 cfs
- Depth: 0.35 ft.
- Velocity: 2.7 fps

**Measuring Station** – An SB-88 compliant measuring station would be located directly down ditch of the fish screen. It consists of a three-foot wide, pre-concrete measuring box; staff gage; pressure transducer and recorder; and measuring weir. The precast measuring box would be a Briggs Rice Box that is three feet wide by three feet long. A staff plate would be fixed to the measuring box at the upstream end of the concrete box. A pressure transducer set in a stilling well would be located about 3 channel widths upstream of the weir. A Bluetooth enabled Onset Hobo MiroRX water level station would record water levels and calculate flow rates using a rating curve developed by a qualified professional engineer. Flows would be downloaded on a bi-weekly to monthly basis through a Bluetooth connection. The measuring weir would consist of a 90-degree v-notch weir set in the upstream box track. The v-notch weir would have a sharp edge metal plate crest with a width of about 3/8 inch. A qualified engineer, contractor, or professional would install the pressure transducer, develop a calibrated rating curve, and educate the water right holders on California State Water Resources Control Board SB-88 monitoring and reporting protocols. The water right holders are responsible for submitting an annual Statement of Water Diversion and Use, which, based on total diverted flow, may alter their yearly monitoring and reporting requirements. The water right holders are responsible for the long-term management and maintenance of the measuring station. They can contact the Siskiyou RCD for information related to general repairs and for technical assistance with the water level station.

In the instance that any part of the screen infrastructure is damaged or requires repairs, the water-right holders should contact the screen manufacturer for replacement parts. The water-right holders can also contact the Siskiyou RCD for direction on infrastructure repairs and replacement parts for the screen and conveyance infrastructure.

## SCREEN FUNCTION

- The maximum diverted flow through the screen is 0.75 cfs, and it is designed with a maximum approach velocity of 0.40 ft/s, with a 0.50 cfs bypass rate and a 1.56 cfs total capacity. The screen is designed to operate a minimum submergence of 65 percent and a maximum submergence of 85 percent.
- The paddle wheel would rotate at a rate of about 1 turn per 2 minutes. This rate can be adjusted by switching out the gearbox.

## **OPERATION PROCEDURES**

### **Spring Irrigation Increase\***

1. Prior to opening the in-take, clean the in-take and remove debris from the conveyance system (if accessible) and earthen ditch system.
2. Any work done within the stream channel shall be done by hand or using heavy equipment placed outside the wetted channel. The work shall be overseen by a biologist deemed qualified by NOAA fisheries so as to not disturb redds or block fish passage.
3. With down ditch flashboards and slide gates closed, slowly open the in-take and allow the surface water elevation in the screen bay to reach 75 percent submergence on the drum.
4. Open the fish bypass slide gate to its required limit.
5. Slowly release water down ditch and adjust the in-take to maintain a minimum of 65 percent submergence on the drum. The fish-screen should be operational at this time.
6. Adjust the fish bypass slide gate to the required level, thereby allowing passage back to the stream.
7. Inspect the bypass outfall to ensure that flow is unobstructed to the stream.
8. Adjust the in-take for desired water delivery and re-inspect the drum screen to ensure proper function is maintained.
9. \* The design engineer should oversee the first spring irrigation turn-on. The design engineer would record the setting of boards and orifices in the intake and at the fish screen during spring high flow conditions, give the diverters an on-site tutorial of the settings, and provide the record to CDFW.

### **SUMMER BASE FLOW**

1. The design engineer should check the diversion intake and fish screen at summer base flow during the first year. The design engineer would record the setting of boards and orifices in the intake and at the fish screen during summer base flow conditions, give the diverters an on-site tutorial of the settings, and provide the record to CDFW.

### **Daily**

1. Inspect in-take for debris racking. If necessary, clean debris from the in-take using a hand rake.
2. Check the diversion infrastructure and fish-screen system for proper function and potential mechanical failures. Replace and repair system components if needed.
3. Adjust head to maintain desired water delivery.
4. Adjust fish bypass to maintain required return flow.

### **END OF IRRIGATION SEASON REDUCTION\***

1. At the end of the irrigation season, reduce flow to domestic and livestock water needs. Ensure that enough water is diverted at all times to meet fish bypass return requirements.
2. Clear organic material and debris from the in-take, conveyance system, fish screen, paddle wheel and bypass. This effort should be completed daily during the fall to protect from potential fish stranding and entrapment.

As best as possible, secure the diversion system to protect from damage (trees, woody material, other).

\* The design engineer should oversee the first end of season reduction. The design engineer would record the setting of boards and orifices in the intake and at the fish screen during end of season reduction, give the diverters an on-site tutorial of the settings, and provide the record to CDFW.

### **SHUTDOWN PERIOD**

1. Notify CDFW personnel of any intended dates to shut down the diversion system and have a qualified biologist on site for potential fish relocation.
2. During periods of diversion shutdown, ramp down diverted flow to allow fish to migrate through the bypass return. It is important to make sure fish do not become stranded during flow reduction. This process should take place over the course of multiple hours and would need to be overseen by a qualified biologist. Once all fish exit the conveyance system, firmly close the intake and all slide gates.
3. If the screen needs to be removed for any reason and water delivery is required, install a temporary screen over the in-take. Discuss with CDFW personnel beforehand.

### **MAINTENANCE PROCEDURE**

#### **Pre-Season**

1. Inspect conveyance channel, in-take, conveyance system, fish-screen, control gates and bypass return for malfunctions and damage. Repair or clean as needed. Have a qualified biologist on site to determine that fish would not be stranded in the conveyance channel or system.
2. Inspect the screen's rubber seals for gaps, tears, or wear which allow openings greater than 3/32 inch. Repair as needed.
3. Lubricate all bearings and joints, and check oil levels in gearbox—fill as needed. Use appropriate oil as determined by the design engineer.
4. Lubricate the drive chain with approved oil, as determined by the design engineer.

#### **DURING SEASON**

1. Lubricate fish-screen joints and bearings monthly.
2. Complete weekly inspections of the fish-screen gearboxes for leaks; repair and refill as required.
3. Add approved oil to drive chain well as needed.
4. Check the depth of flow at the bypass outlet weekly to be certain that the depth of 0.35 feet is met. Check that the fish have a clear and safe path from the bypass outlet to the main flow of the creek.
5. Complete regular inspections of in-take and conveyance system for debris.