

# **Klamath River Restoration Grant Program**

## **Appendix E – High Priority Projects**

### **Araujo Dam Fish Passage and Water Quality Improvements Project**

This project will replace an existing diversion system with a suitable, fish-friendly water delivery system. In order to meet the needs of the Araujo Dam water users and to assist in salmonid restoration and improve water quality in the Shasta River the following activities shall be proposed: 1) design and install a system that will still provide continued agricultural water to the Araujo Dam water users while providing fish passage, 2) design and install a new fish screen at the diversion location and 3) remove existing flashboard diversion dam.

### **Shasta River Water Association Fish Passage and Water Quality Improvements Project**

This project will replace an existing diversion system with a suitable, fish-friendly water delivery system. In order to meet the needs of the Shasta Valley water users and to assist in salmonid restoration and improve water quality in the Shasta River the following activities shall be proposed: 1) design and install a system that will still provide continued agricultural water to the Shasta Valley water users while providing fish passage, 2) design and install a new fish screen at the diversion location and 3) remove existing flashboard diversion dam.

### **Grenada Irrigation District Fish Passage Improvement Project**

This project will replace an existing diversion system with a suitable, fish-friendly water delivery system. In order to meet the needs of the Grenada water users and to assist in salmonid restoration and improve water quality in the Shasta River the following activities shall be proposed: 1) design and install a system that will still provide continued agricultural water to the Grenada water users while providing fish passage, 2) design and install a new fish screen at the diversion location and 3) remove existing flashboard diversion dam.

### **Fall Flows Enhancement Program**

Adult Chinook salmon access is limited in the Scott River watershed by stock water diversions that continue after irrigation season ends. This project would be an extension of the Scott River Water Trust. Chinook can enter Scott Valley when the USGS gage is at 25-30 cubic feet per second (cfs). These flows shall be achieved through use of alternative sources for watering stock or reimbursing operations for not diverting stock water. This project will make agreements that will secure up to 7 cfs for instream benefit in the Scott River watershed after irrigation season for up to 75 days in the fall.

### **Enhancement of Critical Rearing Areas through Improved Flows**

This project would seek to negotiate opportunities to lease/purchase water for instream benefit in critical rearing areas in the Scott River Watershed. This would be an extension of Phase II of the Scott River Water Trust. By April 2007, three or more negotiations will be explored to the point of contract. This project shall secure 5 cfs from the later half of the irrigation season to the end of irrigation season in critical over-summering areas.

### **Mid Klamath Tributary Fish Passage Improvement Project**

This project would coordinate crews of local volunteers under the guidance of a senior fisheries biologist to annually provide fish passage on Aikens, Slate, Red Cap, Camp, Stanshaw, Sandy Bar, Rock, Ti, Dillon, Elliot, Swillup, Independence, Titus, Little Horse, China, Thompson, Fort Goff, Portuguese, Grider, Walker, O'Neil, and other creeks with alluvial fish passage issues. A goal of this project is a voluntary program where local residents are educated on fish passage needs and encouraged to maintain fish passage in future years.

### **Cold Creek Fish Passage Improvement Project**

Cold Creek is a tributary to Bogus Creek which is known to be a major spawning and rearing tributary for steelhead, coho and Chinook salmon in the mainstem Klamath River. There is a seasonal diversion located on Cold Creek that is currently impeding movement of juvenile salmonids during the summer months. This project would relocate the existing diversion approximately 200 feet upstream; install a screen and bypass channel; a pipe to transfer water; construct a boulder weir that will also provide fish passage; and install a head gate/measuring weir.

### **Seiad Creek Fish Screen Project**

Seiad Creek is an important fisheries tributary to the mainstem Klamath River. This project is to install fish screens at four unscreened diversions on Seiad Creek.

### **Ti Creek Channel Restoration Project**

In the 1964 flood, the lower half mile of Ti Creek was severely degraded as the creek diverted into a new high gradient channel, impeding coho and steelhead passage to approximately four miles of anadromous fish habitat upstream. This project would design, engineer and implement channel restoration by restoring the creek to its historic low gradient channel, including side channel pool habitat critical for juvenile salmonids over-summering in Middle Klamath River refugia.

### **Crawford Creek Fish Ladder**

This project would install a fish ladder with baffles to provide anadromous fish passage above the Highway 96 cement box culvert on Crawford Creek. This project would open up 3,100 feet of low gradient habitat for coho and steelhead.

### **Tectah Creek Instream Restoration Creek**

Tectah Creek, a tributary to the Lower Klamath River, supports populations of coho salmon, fall-run Chinook salmon, steelhead, cutthroat trout, and other non-anadromous species. Habitat within Tectah Creek has been substantially degraded from legacy land management practices that have resulted in increased sedimentation, clearance of large woody debris (LWD) from the stream channel, and harvest of LWD that would naturally be recruited to the stream. The result has been the minimization of habitat complexity within the stream; complexity essential to support viable populations of anadromous salmonids. The purpose of this project is to increase habitat complexity within the stream channel, primarily by introducing LWD to increase the overall diversity of habitat as well as to stimulate scour to remove fine sediment from lower portions of the stream.

### **Little Horse Creek Culvert Replacement**

The existing culvert at the China Grade Road crossing on Little Horse Creek was severely damaged in the 2006 flood. It is still 80% plugged and needs to be replaced by a bridge or an open bottom arch culvert. This project would open up approximately one mile of coho and steelhead habitat.

### **Marble Mountain Ranch Water Conservation Project**

Marble Mountain Ranch diverts up to 3.5 cfs from Stanshaw Creek for the purposes of hydropower generation, domestic use and irrigation. Stanshaw Creek is a cold water tributary that possess excellent habitat/refugia at the confluence. This project seeks to reduce diversion volume through piping the entire diversion. This project will also convert from flood to pressurized irrigation to reduce diversion demand. More efficient hydro-systems and/or return the diverted water volume used for hydro-power to Stanshaw Creek above the anadromous reach shall be explored. The project shall begin with an investigation in existing conditions/demands and review of alternatives resulting in a selected alternative for installation. In order to provide benefit this project will have to maintain a minimum 1.5 cfs stream flow at Highway 96 either by conservation or returning flow after hydro-generation use.

### **Unscreened Diversions on the Shasta River Mainstem and Parks Creek**

Install fish screens at unscreened diversions located on the Shasta River and on Parks Creek in Siskiyou County. This project calls for the installation of fish screens on the three remaining unscreened diversions on Parks Creek and one major unscreened diversion known to exist on the Shasta River. The Shasta River provides critical habitat for adult and juvenile salmonids. Parks Creek is an important cold water tributary to the Shasta River and provides valuable rearing habitat for fisheries in the watershed.

### **Fort Goff Creek Grade Control / Baffles**

The existing culvert at the Highway 96 crossing on Fort Goff Creek is a barrier. Fish passage for coho and steelhead could be restored to four miles of high quality habitat by creating grade control structures below the culvert and/or baffles in the culvert. This project would provide grade control and/or install baffles at the new structure.

### **Fish Passage Through Diversion Improvement in the Scott River Watershed**

This project would eliminate at least 12 fish barriers in the Scott River watershed (within over summering sites). All sites shall be located within stream reaches currently used by Chinook and/or coho salmon and shall be considered the highest priority diversion sites to be reconfigured. This project would provide fish passage either by re-profiling the diversion ditch, conversion of the diversion structure to one that provides fish passage, or changing/adding the point of diversion. Priority sites proposed for this project are on the following streams: Scott River (3 sites), Shackelford Creek (2 sites), French Creek (3 sites), East Fork (2 sites), Etna Creek (1 site), Big Slough (1 site).

### **Rail Creek Fish Passage**

Rail Creek, tributary to the East Fork of the Scott River is a steelhead and coho stream. A reservoir levee established in 1964 prevents fish passage on Rail Creek. This project shall provide fish passage that will allow access to 0.9 miles of cold water anadromous habitat located above the reservoir to coho and steelhead. The project will also incorporate a diversion ditch (Rail Creek ditch) into the proposed fish passage channel design and install a fish screen on the ditch that meets DFG/NOAA fish screening criteria. The ditch (up to 8.0 cfs) will be piped 1,700' to the point of use to reduce diversion volume to

provide more flow to the fish passage channel (ensuring at least 1.0 cfs in fish passage channel during low flow period). The fish passage channel will allow adult and juvenile access.

### **Shasta River Diversion Improvement and Fish Screen Installation**

The water released from Lake Shastina has cold temperatures and is potential over-summering habitat for coho. There are two diversion dams that impede fish passage during irrigation season. These diversions are also unscreened. This project would do the following:

- Survey design and replace two fish passage barriers with boulder vortex weirs on the upper Shasta River.
- Survey design and install a head gate, fish screen and measuring weir on two unscreened diversions located on the Shasta River.

### **Lewiston 4 and Dark Creek Channel Rehabilitation Projects – Trinity River**

This project shall:

- Increase rearing habitat for anadromous salmonids in areas of highest intensity natural spawning in the Trinity River by modifying channel banks and floodplains, constructing side channels, incorporating large woody debris, and revegetating floodplains and channel margins.
- Increase spawning habitat and channel complexity through the addition of coarse sediment.
- Reduce stranding by removing riparian berms, filling dredge ponds and sloping floodplain and gravel bar surfaces to drain to the river.
- Remove instream barriers such as relic gabion weirs to enhance sediment routing and access to spawning and rearing habitat.

### **Ullathorne Creek Fish Ladder**

The existing culvert at the Highway 96 crossing on Ullathorne Creek is a barrier to all anadromous fish species and life stages and is blocking approximately one mile of high quality cold water habitat. This project would install a fish ladder leading up to the culvert and baffles in the existing culvert to prevent a velocity barrier at higher flows.

### **Stanshaw Creek Fish Ladder**

The existing culvert at the Highway 96 crossing on Stanshaw Creek is currently blocking one mile of steelhead habitat above the culvert. This project would install a fish ladder below the culvert and install baffles inside the culvert to allow fish passage.

### **Scott River Tributary Gaging Program**

Stream flow gages have been in operation on various tributaries to the Scott River since 2002 (East Fork, South Fork, Kidder Cr., Shackleford Cr, and Mill Creek). A gage was installed in another key tributary (Sugar Creek) in 2005. These gages provide valuable stream flow data needed for the development of a Scott River Water Balance Model, verification of the Water Trust and other water conservation programs. These gages were originally installed by the California Department of Water Resources (CDWR) and the U.S. Fish and Wildlife Service (USFWS). In 2005 the RCD took over operation of the three gages installed by the USFWS, and plans to continue operation as long as funds can be secured. The three remaining gages (East Fork, South Fork, and Kidder) are still being operated by the CDWR. However, budget limitations annually put the gages in jeopardy, and the gages are some times shut down for

periods of time. During the water master season of 2006, the RCD and CDWR have been cooperating to keep those gages in operation. This project would provide funding to operate these gages.

### **Shackleford Creek Confluence Restoration**

Shackleford Creek is a prolific tributary to the Scott River that provides excellent spawning and rearing habitat (estimated 11 miles of anadromy). The Scott River confluence with Shackleford Creek is located at the base of Scott Valley, making the stream excellent potential refugia for fish in the Scott River seeking cold water during summer months. The limiting factor is that the confluence of Shackleford Creek disconnects due to a gravel bar deposited at the mouth.

Shackleford Creek enters the Scott River perpendicular to flow. During high flow the streams negate each other's velocities and bed load deposits at the mouth in the low flow channel. This project would allow/encourage Shackleford Creek to run parallel to the Scott River for a reach, and then connect after a downstream meander (five feet of fall). The realignment would allow both Shackleford Creek and the Scott River to flow parallel with each other, eliminating the requirement that Shackleford Creek flow over deposited gravel bar. The realignment would allow an historically natural channel to be reoccupied and increase the duration of connectivity of Shackleford Creek allowing earlier access of adults at a lower flow volume than currently occurs (about 20 cfs at DWR Shackleford Gage). The objective with Shackleford Creek and other cold water contributors is to hold connectivity with the Scott River to the period of year (early to mid-July) where the Scott River temperatures become lethal.

### **Farmers Ditch Fish Passage**

Currently funding has been provided for one vortex weir to replace a gravel push up dam with a fish passage friendly diversion structure at a location on the Scott River. However, DFG engineering has identified the need for a second weir to increase durability of the new structure. This project is to add funding to the currently funded project to address new engineering concerns. This will allow for year round fish passage where it is currently lost by the first of August. The area is utilized by Chinook, coho and steelhead.

### **Diversion Demonstration Project on Shackleford Creek**

Shackleford Creek is a prime spawning and rearing reach. There is currently a diversion that blocks fish passage from July until November. The point of diversion shall be relocated to the point of use using a pump system and the irrigation system shall be converted to a pressurized irrigation during the second half of the irrigation season. This project would allow the 0.9 cfs of water to stay in the stream for an additional 0.7 miles (in an area of known Chinook, coho and steelhead use) and only half of the amount of water would have to be diverted at the new location under a pressurized system to satisfy the agricultural need.

### **Scott River Head Gate and Measuring Weir Installation program**

This project would install head gates and measuring devices on 14 diversions in priority locations including the Scott River, Patterson Creek, Sugar Creek and Etna Creek (in areas of known coho and steelhead use).

### **O'Neil Creek Fish Passage and Rearing Enhancement Project**

Current replacement of the State Highway 96 culvert at O'Neil Creek with a bridge in 2006 has opened up new habitat for salmonids. However, this project may not result in expected benefits if the alluvial blockage below the bridge is not addressed. This project would design, engineer and implement

reconfiguration of the alluvial blockage with an excavator. Further, this project would seek to modify the Klamath River floodplain at the mouth of the creek to create a deep side channel pool with complex habitat for over summering juvenile coho and other salmonids.

### **South Fork Clear Creek Fish Passage Enhancement**

Coho, Chinook and steelhead fish passage is currently blocked to approximately 1.2 miles of high quality habitat above two log jams on the South Fork of Clear Creek. This project would notch the log jams to allow for fish passage using manual methods, including chain saws and grip hoists.

### **Scott River Fish Screen Construction and Maintenance Program**

There are five known diversions that are currently unscreened within the Scott River Watershed. All diversions are within known coho and steelhead areas. This project would screen four of those five diversions. Funding for screening the fifth diversion has already been secured. All four diversions would receive a head gate and measuring weir as well a fish screen that meets DFG/NOAA fish screen criteria. Fish screen maintenance shall be conducted to ensure that the screens are maintained/properly operated and by-pass flows are present.

### **Storm Damage Repair of Vortex Boulder Weirs in the Scott River Watershed**

Six boulder weirs in the Scott River watershed were damaged during the floods of 2006. This project would either repair the existing weir or add a second weir to spread energy over wider range. The sites are all within coho and steelhead rearing/spawning areas and two are within Chinook spawning areas.

### **Spawning Gravel Demonstration Project in the Scott River Watershed**

There are several key stream reaches on Etna Creek, Kidder Creek and South Fork of Scott River that possess good water quality for over summering salmonid habitat but have very little appropriately sized gravel for spawning. This project shall install constrictors and import spawning gravel to reestablish spawning areas. The treatments shall depend on access and natural potential to provide gravels. Five areas will be treated in this project to develop spawning habitat for anadromous fish species.

### **Fish Screens and Feasibility Study of Montague Water Conservation District (MWCD) Infrastructure**

The main objective of this project is to investigate existing conditions/affects of MWCD's infrastructure and propose/install improvements that either reduce or eliminate impacts to anadromous fishery habitat of the Shasta River watershed.

### **Tom Martin Creek Fish Passage and Rearing Enhancement Project**

This project would modify the Klamath River floodplain at the mouth of Tom Martin Creek to create a deep side channel pool with complex habitat for over summering juvenile coho and other salmonids.

### **Summer Rearing Habitat Improvement**

Instream fish habitat structures shall be installed in the Scott River watershed creating and/or maintaining pools and providing cover and/or woody debris in over-summering areas where temperatures are acceptable for anadromous fish but habitat components are limiting. This project will install 16-20 instream habitat structures in critical over-summering areas

### **Pump Station and Fish Screen Improvements Project on the Shasta River**

This project shall upgrade and make modifications to an existing pump station and install a new fish screen (if deemed necessary) at a location on the mainstem Shasta River.

### **Fish Screen and Fish Passage Improvement Project**

This project shall install properly functioning fish screens on the mainstem Klamath River above the Interstate Highway 5 Bridge.

### **Little Shasta River Fish Screen and Passage Improvement Project**

This project shall install a fish screen and improve to fish passage on the Little Shasta River. The Little Shasta River is a tributary to the Shasta River.

### **Manley Fish Screen and Fish Passage Improvements Project**

This project shall install of a fish screen and improve fish passage at a small diversion on Oregon Slough. The Oregon Slough is a small tributary of the Shasta River and enters the river below all fish barrier diversions the Shasta River.

### **Instream Flow Assessment Methodology on the Shasta River**

This project will assist the Department in evaluating and comparing several instream flow assessment methodologies for the purpose of facilitating compliance with the Fish and Game Code, providing outreach to landowners, and leading to recovery of anadromous fish populations in the Shasta River watershed.