GOAT CREEK CULVERT REPLACEMENT

The Goat Creek crossing currently has a large culvert that is perched above the SFSR under typical flow conditions and acts as a migration barrier to the listed species. All listed species are present in some life stage in the SFSR near Goat Creek (Krassel District files). The existing culvert acts as a small dam and causes sediment to accumulate on its upstream end. Detailed descriptions, plans, and maps for the Goat Creek culvert replacement are at the end of this document and in Current CD:\support documents\roads\SFSR Goat Cr Bridge.

REQUIRED MITIGATION

All mitigation is incorporated as part of the federal action. For the Goat Creek culvert replacement, this includes the following items. Many project design features, BMPs, and erosion control measures will be similar to those used during the Fourmile culvert replacement (Appendix 4 of Faurot & Burns 1999). These items will be captured through the project plans, project design, and contract package. If monitoring of activities associated with this project should identify unanticipated effects to fish or fish habitat, the activity will be suspended by the District Ranger until corrections are made.

- Prior to construction, Goat Creek will be diverted well above the project area because of concerns regarding the volume of seepage in the construction area and ability to adequately dewater the site and maintain stable conditions during excavation.

- The creek will be conveyed around the construction area via a rigid pipe or some other means capable of containing both the flow anticipated during the operating season and higher flows in the event of a storm.

- Silt fences, straw bales, and other erosion control materials will be in place prior to the start of any ground disturbance (excavation).

- Fill areas will be covered with a geotextile to protect vegetation in areas along the creek to be covered with fill (if any are necessary).

- Sediment retaining materials will be placed at the end of the new channel immediately upstream of the confluence with the SFSR to reduce delivery of sediment to the river.

- Excavation will begin of the upstream (Goat Creek) side of the fill, after the installation of erosion control materials.

- Excavation at the confluence with the SFSR will occur after installation erosion control materials.

- Sediment collected by straw bales, etc. will be removed from the channel to the extent possible without causing resource damage, as determined by a journey-level fishery biologist or hydrologist.

- A settling basin will be constructed, or portable one used, that is able to handle the volume of water anticipated, and that provides filtering capability. Dewatering of the excavation site (of ground water from the excavation) will be done by pumping water to the settling basin and the basin cleaned out when full of sediments. Sediment will be transferred to one of two waste sites (see next item).

- Waste and excavated material will be hauled to the lower landing on the 474E road, about 1 mile south of the project site, or to the Reed Ranch borrow site, about 12 miles north of the project site.

- All fill will be removed back to the natural vegetation (where protected).

- The new channel and flood-prone area will be constructed and tied into Goat Creek at a location identified by a journey level hydrologist or soil scientist.

- The new channel will be built to the general depth, width, and sinuosity specifications for an A-type channel (Rosgen 1994). Specifications are identified in *Goat Creek Channel Dimensions* document by Tom Crawford (Appendix 3). The new channel will be excavated and washed to remove any excess fine material prior to introducing flow.

- All large wood encountered during excavation will be retained and incorporated into the new channel, unless a journey-level fishery biologist or hydrologist directs otherwise.

- Once Goat Creek is diverted into the new channel, a stable bank and channel at the point of diversion will be constructed. The bank will be constructed adequate to withstand high stream energy associated with a bend in the channel that will result at the diversion point. The channel will have adequate dimensions and profile (including gradient control structures, log/rock vein, etc.). The original Goat Creek channel will be plugged to ensure this stream is not recaptured during high flows.

- Because of the large volume of material to be excavated on the river side of the fill (between the outlet/wing walls and the SFSR), a high level of mitigation will be needed to reduce sediment delivery because of the close proximity to the river. Excavation is anticipated to be completed from underneath, because of the tunnel, but if this changes, a journey level hydrologist/soil scientist and the engineering staff will jointly develop an erosion/sediment control plan to be incorporated into the final contract package.

- All disturbed areas will receive mulch and seeding during the appropriate time of year for successful results, including the waste repositories.

- Erosion control materials will be removed by a journey level hydrologist or soil scientist when sites have revegetated.

- Journey level hydrologists/soil scientists will provide on-site implementation and effectiveness monitoring during project implementation.

- To the extent feasible, use any excavated plants in the stabilization of the new channel and banks. Stockpile such material in a cool, shaded site and keep moist. Retain as much of the root mass as possible during excavation and transport. If possible, locate an additional source of plant material and root wads to supplement vegetation needs no available on site.

- The new road surface at the crossing will be paved to a width of 14 feet (3 inches deep), with a ¾ inch aggregate base 18 feet wide (8 inches deep).

- The contract package for the Goat Creek culvert replacement will be reviewed by a journey level fishery biologist or hydrologist or soil scientist prior to it being awarded to ensure all mitigation items that are not being implemented by Forest force account crews are included in the contract package.

Sediment that has accumulated at the culvert will be removed during culvert replacement. Replacement of the culvert with an arch bridge will restore access to Goat Creek spawning and rearing habitat by eliminating the present barrier (NMFS 1993). In addition, the crossing area will be increased, and the hydraulic capacity increased from 1000 to 4000 cfs (Draft project plans, Charlie Showers, Appendix 3).

A review of the draft project plans noted several concerns and recommendations (D.Gordon, watershed specialist, Goat Creek Culvert Replacement comments below). These related to stream and groundwater management during construction, activities near the SFSR that may deliver sediment, and plant sources for revegetation of disturbed areas. These are addressed in the federal action description for the project in this BA, in the mitigation section.

During project implementation, sediment could be delivered to the SFSR. Use of effective, extensive BMPs (Appendix 4 of Faurot & Burns 1999), pre- approved by a journey level hydrologist or fish biologist, will minimize the amount of sediment mobilized during activities and avoid effects to listed fish and critical habitat. Mitigation measures developed in previous consultations with NMFS avoided short-term sediment loading associated with other sediment-disturbing activities on the SFSR Road (NMFS 1993). These measures have been proven in other studies to reduce sedimentation (Burroughs and King 1989, Megahan et al. 1992, and Swift 1986), and will help avoid potential sediment delivery to stream channels.

Replacement of the culvert with an arch bridge will restore natural sediment transport in the Goat Creek system, eliminating the current sediment accumulation. Removal of road fill at the culvert would also reduce the existing mass failure risk (Burns 1992). Restoration of fish passage to Goat Creek, removing road fill and accumulated sediment in the culvert area, and restoration of natural sediment transportation patterns are provisions in the overall SFSR Road Reconstruction Project (Burns 1992).

In general, culvert removal, even with associated risk of short-term downstream sediment mobilization, is the best remedy for restoring fish passage (Reeves et al. 1991). Removal of culverts at Cabin Creek on the SFSR was completed in 1993 as part of the original SFSR Road

Reconstruction Project. Fifty to seventy-five chinook salmon were observed migrating upstream in the mouth of Cabin Creek during August 1998 (N. Hershenow, hydrological technician, Payette NF, pers. comm.). Some of the fish continued upstream to spawn in Cabin Creek. Similar results are anticipated at Goat Creek.

Sediment reduction and very little sediment movement have been associated with other culvert removal activities and associated excavation and removal of fill material at Cabin Creek on the SFSR Road (USFS 1992-1998, Appendix 4 of Faurot & Burns 1999). Site visits during the Fourmile culvert replacement found sediment –control mitigation items in place and project activities being carried out as planned. To date the new channel is functioning as expected, however the new arch has not gone through a high flow period, so its performance under such conditions hasn't been evaluated (D. Gordon, soil scientist, Krassel Ranger District, pers. comm.).

Source: ATTACHMENTS Salmonids Effects Determination Criteria Northwest National Fire Plan Project Design and Consultation Process.

Source: Appendix 1- Us Department of Interior
https: www.blm.gov/or/fcp/files/Attachments_2005.doc
U.S. Department of Agriculture, Forest Service, and U.S. Department of Interior, Bureau of Land Management, Gen Tech Rep **PNW-GTR-405**. 14 Northwest **Forest** Plan, 1994. Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth **Forest** Related Species Within the Range of the Northern Spotted Owl.