FINAL REPORT
FOR
CULVERT REPLACEMENT AT SOUTH FORK ANKER CREEK
CONTRACT # P0010366

PROJECT LOCATION:
The project is located in the Fieldbrook Valley, approximately 15 miles northeast of Eureka (Figure 1), on Anker Road (County Road #4M762). The project may be located on the USGS Arcata North Quadrangle Map, Section 26, Township 7N, Range 1E (Lat. 40°57'40"N, Long. 124°01'45"W). The affected watershed spans both the Arcata North and Blue Lake Quadrangle Maps and may be seen in (Figure 2).

PROJECT PURPOSE:
The purpose of this project was to replace the existing 4.5-foot diameter culvert under Anker Road at PM 0.12, with a concrete and metal box culvert with grade control weirs to facilitate fish migration.

The existing culvert was identified as a total barrier to all salmonids (including species listed under ESA) and adult coastal cutthroat trout. It received a priority ranking of #9 in the Final Report: Humboldt County Culvert Inventory and Fish Passage Evaluation, Ross Taylor, April 16, 2000. The existing culvert was a 4.5-foot diameter, 62 foot long corrugated metal pipe installed at an overall (4.5%) grade. The flowline of the culvert had a severe belly in it, and had been lined with concrete.

Upstream of the culvert there are approximately 0.92 square miles of drainage area and 4,000 feet of potential salmonid habitat. The watershed is steep, dropping from 1800 feet to 160 over a distance of 15,300 feet. In an average year, the creek dries up completely by the end of July, but immediately reestablishes flows after the first rains of the season. In the vicinity of the proposed project, the creek bedload consists of 3" to 8" cobbles in a well-graded gravel substrate, with dispersed woody debris. Immediately below the gravel substrate is a hard clay pan that is observable along the banks of the creek.

The project removed an existing migration barrier, making the lower reach of SF Anker Creek available to salmonids.

FISH PASSAGE ANALYSIS:
The South Fork of Anker Creek is potential habitat for Coho Salmon, Steelhead, and Cutthroat Trout. The existing culvert was perched with an approximate 5.0-foot jump required to access the outlet. This presented a full barrier to all ages of migrating salmonids. Of equal importance was the velocity barrier imposed at fish migration flows. The combination of jump and velocity barred all fish access to the upper reaches of the creek. The undersized nature of the culvert also lead to numerous instances where the culvert plugged and the stream flowed over the roadway.

The new box-culvert has filled with creek bed-load providing a series of pools and riffles with natural bottoms. Each weir has a jump of 6" to allow juvenile and adult salmonid migration.

PROJECT DESCRIPTION:

The project consisted of excavating and removing the existing 4.5-foot diameter culvert and installing a 70’ long 15'x 6'4” concrete and steel hybrid. The culvert bottom is concrete with weirs at 10' intervals. The weirs have low flow notches that create 6" drops. A corrugated metal box culvert caps the concrete base.

Dimensions of the box culvert were determined by using streambed simulation methodology and field observation of the creek channel. The new span is several feet wider than the top width of the stream at ordinary high water. The flowline of the new culvert is 2 feet below that of the old culvert at the inlet and 2.8 feet lower at the outlet. In addition, the new culvert was designed to pass a 100-year flood. This insures the passage of high flows and debris and reduces the potential for sediment inputs resulting from culvert failure.

A total of five rock weirs are installed in the stream bed above and below the new culvert to take up the remaining grade difference between the new and the old culvert. Each of the weirs was constructed with several courses of large rock below grade and embedded into the stream banks, topped by large 1-2 ton rock at the final flow line elevation. Each weir was designed to take up an additional 6" of the grade difference between old and new.

Before construction began a qualified fisheries biologist captured the salmonids within the project area and relocated them outside of the project limits. There were a total of (12) fish captured in the process. Coho, Steelhead and cutthroat were all found in the plunge pool below the old culvert.

When construction began, the water in So. Fork Anker Creek with the exception of the old plunge pool was sub-surface.

The culvert was excavated in two parts to allow the roadway to remain open to traffic. After the upstream portion of the existing culvert was excavated a temporary flat car was placed over the excavation. The downstream portion was then excavated. This allowed the contractor to construct the concrete base and assemble the multi plate box culvert while traffic passed overhead. The multi-plate culvert was assembled on the concrete stem walls of the box and back-filled with the excavated material that was stock piled nearby. The inlet and outlet were armored with ½ ton RSP to protect against possible scour. The roadway section was constructed with aggregate base material and paved with asphalt concrete.

EROSION CONTROL PLAN:

The erosion control plan included silt fences, sediment dams, rock covering for bare slopes and seeding of bare ground upon project completion. RSP was placed at the inlet and outlet of the box culvert.

TIMING OF EQUIPMENT OPERATIONS:
Construction began on September 9, 2002 and the project was finished on November 5, 2002.

The following is a brief chronological description of project activities performed:

Dates, 2001 & 02	Description of Work Performed
10/01 - 06/01	Preliminary design and permitting
09/09	Fish Removal
09/09 - 09/13	Culvert excavation and flatcar bridge installation
09/17 - 09/20	Grade culvert foundation and begin forming and rebar
09/23 – 09/27	Pour concrete base, begin forming and rebar for walls
10/04	Pour walls and weirs
10/09	Strip forms
10/14 – 10/18	Assembled 15’ multi-plate box culvert
10/21 – 10/30	Placed and compacted backfill/embankment
10/28	Removed flatcar
11/04-11/05	Base and paving

PROJECT COSTS:
The project costs have been broken out into three main categories as follow:

Engineering		$ 12,057.00
Materials		$ 28,635.00
Construction		$130,414.00
	Project Total	**$171,106.00**
F&G Grant Funding		$148,611.00
County Cost		$ 22,495.00