

---

## PROJECT DESCRIPTIONS

### **Project: Upstream Passage for Adult Brown Trout at the Red River Fish Hatchery; Aquatic**

**Objective:** The objectives of a fish passage at the Red River hatchery diversion dam structure are to decrease population segmentation in the Red River above the diversion dam, promote brown trout spawning, and increase resident brown trout density upstream of the hatchery diversion dam by providing unimpeded passage for adult brown trout during late summer and fall.

**Description:** Currently, fish from downstream of the hatchery diversion dam cannot migrate upstream of the diversion and upstream fish that migrate or are washed over the diversion cannot return to the population upstream of the diversion. Although aquatic habitat conditions are similar above and below the diversion dam, brown trout are three times more numerous downstream of the diversion dam. Upstream fish passage can be provided at the Red River hatchery diversion dam by constructing a “fish ladder” at the dam along the right bank. The ladder will be a pool and weir type with removable baffles. The ladder will be designed to pass approximately 1/3 of the average daily stream flow during August through November. A passage flow of this magnitude would be very effective at attracting and passing adult brown trout during their migration and spawning period. Removable baffles will expedite cleaning debris from the ladder and render it impassible if fish managers desire to impede migrations above the diversion dam during certain times of the year.

**Spatial Extent of Project:** The project is expected to increase resident brown trout density over a 1.6 mile reach of the Red River. Although adult fish that pass over the modified diversion dam have the ability to swim approximately five miles upstream to a diversion dam barrier near the U.S.F.S. Ranger Station, the greatest response is expected to occur within the 1.6 mile reach of the Red River immediately upstream of the diversion dam.

**Assumptions:** Based on long term monitoring data from Sites LR-8A and LR-16, the current trout density just upstream of the Red River diversion dam is 364 resident trout/acre. Based on best professional judgment of the available habitat and food resources in this reach, it is assumed that upstream densities will increase 50%, or an increase of 182 resident trout/acre. This assumption results in an average of 564 resident

trout/acre in this stretch of river. Densities downstream of the diversion dam are 900 resident trout/acre. It is not assumed that resident trout levels will approach those downstream of the hatchery, because these downstream densities are influenced by nutrient enriched discharge from the fish hatchery.

**Time Frame:** Resident brown trout densities should increase within two to three years following installation of the fish passage structure. It will not be possible to fully assess recovery until five or six years of population data have been collected.

**Chance of Success:** Very high.

**Data Needs:** Baseline fish density estimates exist for this reach of the river, so no further fish population data are needed until fish passage improvements are completed. On-site data requirement for design of passage facilities include river profile and cross sections, flood frequency analysis, August through October flow duration analysis, and a copy of the diversion dam design or measurements of the existing structure.

**Maintenance and Monitoring:** Maintenance can be minimized by operating the ladder only during the brown trout migration and spawning. The fish ladder will require occasional maintenance to remove debris which might impede fish movement over the ladder. Monitoring of fish populations will be conducted through routine annual monitoring efforts for Molycorp at established monitoring Sites LR-8A and LR-16.