

Rock Creek

Alternatives Analysis, Fish Passage Design & Construction



Location: Paradise Valley, Montana

Client: Montana Fish Wildlife & Parks (MFWP) Design & Construction

Key Project Elements:

- ❖ Step Pool Channel Design
- ❖ Hydraulic Analysis for Fish Passage & Stability
- ❖ Hydrologic Assessment
- ❖ Demolition Plans
- ❖ Specifications & Bid Document Preparation
- ❖ Construction Oversight

Project Description:

The project is part of a continuing effort by Montana Fish, Wildlife & Parks to restore/reconnect habitat for native Yellowstone cutthroat trout. A large concrete culvert located on Rock Creek, an important spawning tributary to the Yellowstone River, created a velocity and depth fish passage barrier under the abandoned Northern Pacific Railroad line connecting Livingston, MT with Yellowstone National Park.



Restoration Engineering personnel used a hydraulic design and modeling approach combining swimming ability information for the target species (Yellowstone cutthroat trout) with detailed hydraulic modeling of water depths and velocities to assess fish passage characteristics of the barrier and the viability of design alternatives. Additionally, the hydraulic model was used to evaluate the stability of the fish passage solution as well as the effects on upstream water surface elevations and flooding characteristics. Two primary alternatives were identified; (1) retrofitting the existing structure with weir baffles, and (2) complete structure removal and reconstruction as a step-pool channel.



The second alternative was selected, and in fall 2011 the railroad arch culvert was removed and high-gradient step-pool channel was constructed. This alternative provided a diversity of hydraulic conditions and multiple flow paths suitable for fish passage through the entire design flow regime. In the season after construction, tagged fish in the Yellowstone River were documented to have passed through the newly constructed channel and into the previously isolated spawning grounds. Numbers of fish passing have increased each year since the project's completion.

