

# Civil Harmony Case Study

## *Effects on fish population and migration in the Harmony Ditch*

### **What was the client's issue presented to WWC?**

WGFD (Wyoming Game and Fish Department) in coordination with the private landowner and irrigator who own and operate the lands and ditch affected by the project, studied fish entrainment in Harmony Ditch, during the 2006 and 2007 irrigation seasons. Harmony Ditch is the lowest elevation irrigation diversion on the Nowood River. WGFD sampled all water passing into the canal with a fine mesh net during 144 h in 2006 and 320 h in 2007, capturing 5,995 fish consisting of 13 native and 3 non-native species. Species of greatest conservation need captured included burbot, flathead chub, mountain sucker, and sauger. Sportfish captured included brown trout, burbot, channel catfish, stonecat, sauger, and smallmouth bass. WGFD estimated Harmony Ditch entrained 55,415 fish in 2007. Not only did the Harmony ditch have a significant impact on the native fish population, but the irrigation diversion dam was also a barrier to fish migration.

From a landowner's perspective, the problem was achieving the irrigation goals of the operation, without being detrimentally affected by the screening and passage goals of WGFD.

### **How did WWC brainstorm and collaborate with the client to find a solution?**

The work of WWC was the second outsourced attempt by the State to solve this problem. As such, WWC worked with WGFD to review concepts that a previous consultant had identified and evaluated. Additionally, WGFD specified that the project remains at its existing diversion location. In the end, a two-phase, irrigation-friendly design was initiated. Phase I was to install the screening facility, and the second phase was to install the diversion dam and technical fish ladder in the following year. The solution was transparently shared and adapted to meet the needs of the irrigation facility owner.

### **What was the solution chosen by WWC?**

Between Phase I and Phase II of construction, the Owner had a third party consultant review the project and they recommend that the screening and diversion facilities be relocated upstream to eliminate the need for a traditional concrete irrigation diversion dam and fish ladder. Instead, a Natural channel design grade control structure was thought to be feasible.

This solution was designed, permitted and constructed over a span of two years, with the first year of service being 2018.

**Why did WWC feel the solution chosen was the best choice?**

WWC was the best choice because we had an excellent team of practical and local experience. WWC partnered with an expert in fish passage and screening, One Fish Engineering, and later with a natural channel design firm, 5 Smooth Stones.