Ice Harbor and Lower Granite Locks and Dams Adult PIT Tag Systems

Ice Harbor and Granite Dams, Washington

Owner: USACE, Walla Walla District

Description: Concerns about declining salmon runs on the Columbia and Snake Rivers in the Pacific Northwest have generated environmental and political pressure at the regional and national level to improve fish survival around the dams. The Portland and Walla Walla Districts of the USACE are using a variety of physical and operational methods to improve salmon transit and survivability at their Columbia and Snake River dams. One of the most promising methods involves installing data sensing equipment within fish ladders to gather quality data on fish passage and survival through the system. Research and development of this technology led to the fabrication of the Passive Integrated Transponder (PIT) tag. Fish injected with PIT tags are automatically recognized by detecting/recording devices strategically located within collection facilities at hydroelectric dams. Their tags are detected and decoded in situ - eliminating the need to sacrifice, anesthetize, handle, or restrain the fish during data retrieval. When a tagged fish passes through an antenna containing electronic interrogation coils, its unique PIT tag code, along with the date, time, and location of its passage, is sent to a central database.

Approximately one million out-migrating juvenile salmon are injected with PIT tags each year, out of a typical total of 90 million. When the tagged adult returns to the Columbia River system to spawn, it is again automatically detected at the interrogation sites within the fish ladders as it travels up-river. These data detections are added to the previous information contained in the database about that individual fish to provide additional data of its history and its migration.

INCA Engineers, Inc., A Tetra Tech Company (INCA) provided design services, on a fast-track basis, for fish ladder modifications for antennas and support facilities at three separate fish ladders for the Ice Harbor and Lower Granite Dams. INCA began work on this project with site visits to meet with fisheries agencies to clearly define the requirements for the work prior to beginning design. INCA then provided plans and specifications for installation of PIT Tag monitoring of adult fish passage through the fish ladders. Tasks included modification of existing weir orifices in the fish ladders to accommodate installation of government-furnished PIT Tag antennas; installation of transceiver cabinets to house antenna electronics; design of electronic rooms to house PIT Tag system electronics; installation of power and fiber optic cables between the electronics rooms and the transceiver cabinets; and installation of power and fiber optic communications between the existing project services and the new electronics rooms. A partnership between the Corps (the project owner), Pacific States Marine Fisheries Commission (the operators of the PIT Tag detection system), Bonneville Power Administration (the funding agency), as well as Digital Angel (the developer of the electronic technology and provider of the antennas and key electronic components) was instrumental in the successful completion of these designs as well as timely construction and successful operation.