



The Lower Snake River Juvenile Salmon
Migration Feasibility Report/
Environmental Impact Statement



Surface Bypass and Collection

Information
on surface
bypass and
collection
prototype test

The U.S. Army Corps of Engineers (Corps) continues to study ways to improve juvenile salmon passage through the hydropower system on the Snake River. As part of this effort the Corps released the Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement (FR/EIS) in December 1999. These information sheets discuss specific topics covered in the FR/EIS. The entire FR/EIS can be found on line at <http://www.nww.usace.army.mil>. For more information contact Dave Dankel, Walla Walla District Corps, at (509) 527-7288, dave.a.dankel@nww01.usace.army.mil.

Surface Bypass Collectors

The Corps has recently focused on surface bypass and collection technology. This technology takes advantage of the natural behavior of smolts to migrate at shallow depths to collect downstream migrating fish in the dam forebay and bypass them around the dam, or collect and transport them downstream in trucks or barges. A prototype surface collector was constructed at Lower Granite Dam in 1996. The design was based on a successful surface-oriented bypass system currently in use at Wells Dam on the mid-Columbia River. Modifications were made in 1998 to make the prototype collector deeper, and to include a behavioral guidance structure to guide fish to the entrance of the device.

With current passage systems, salmon must dive down deep toward the turbine intake before being guided by submerged screens up into a bypass channel. The test structure in place at Lower Granite Dam is 375 feet long with a series of vertical slots located in front of one half of the powerhouse. It collects surface-oriented fish and directs them through the vertical slots into a collection structure where they pass through the dam by means of a low-volume spillway.

Based on results from 4 years of development and testing of a partial powerhouse prototype at Lower Granite Dam, a permanent surface collector could be designed and built to pass 50 to 60 percent of the fish approaching the powerhouse. A permanent collector, in combination with existing intake screens, would safely pass about 90 percent of the fish through non-turbine routes. Survival rates for passage through the combined system would be in the high 90 percent range. It is generally believed that the surface bypass collector is less stressful to fish because they do not experience the pressure changes associated with screen bypass systems.

Behavioral Guidance Structures

Another potential improvement in juvenile fish passage is the Behavioral Guidance Structure, also being tested at Lower Granite Dam. While the surface collection measures aim to keep more juvenile fish near the surface, the goal of the behavior guidance structure is to direct fish horizontally. Just as they tend to stay near the surface, the migrating fish also favor the shoreline where the water velocity is highest. The behavioral guidance structure is a wall 80 feet deep sloping to 55 feet deep at the upstream end to conform to the contour of the reservoir bottom. It is 1,100 feet long and floats. Fish react to the wall as if it were the shoreline, and initial tests indicate that it was successful in guiding approximately 80 percent of fish away from the turbine intakes and toward either bypass structures or the spillway.



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Alternative 3, Major System Improvements

Alternative 3 would incorporate a full-length surface bypass collector at Lower Granite Dam, which is the first dam juvenile fish encounter, thus the logical point to collect the fish. This new collection technology, in combination with existing

bypass screens, would increase collection capability at Lower Granite Dam to 90 percent or higher and minimize the number of dams, bypass systems, and reservoirs that juvenile fish encounter. This bypass collector would span the powerhouse and work in conjunction with the existing extended submerged bar screens to divert fish from the turbines.

