Investigating Migratory Processes using Program ROSTER

Rebecca A. Buchanan
John R. Skalski
Columbia Basin Research
School of Aquatic and Fishery Sciences
University of Washington
Seattle, WA

The Passive Integrated Transponder (PIT) tag revolutionized salmon marking studies, providing a plethora of information about salmon migration and survival with minimal degree of fish handling, tag failure, and cost. The extensive PIT-tag detection network in the bypass systems and fish ladders throughout the hydropower system allows us to address broad-scale questions about survival processes across multiple migratory life stages. However, most PIT-tag analyses are restricted to the juvenile portion of the migration.

Program ROSTER (River Ocean Survival and Transportation Effects Routine), developed by the University of Washington, combines analysis of juvenile and adult detections to estimate juvenile inriver survival through the FCRPS, ocean survival, adult upriver survival, SAR, transport-inriver ratios, and differential mortality ('D'). With this information, we can begin to address questions such as:

1. Are ocean survival and adult upriver survival related to juvenile migration history (e.g., transported vs. inriver)?
2. Does smolt transportation affect the age structure of returning adults?
3. What are the relative contributions of juvenile, ocean, and adult mortality to overall SAR?

To date, we have analyzed PIT-tag detections from both wild and hatchery spring/summer Chinook salmon and steelhead from the Snake River Basin. We have plans to analyze data from PIT-tagged sockeye in coming years. Program ROSTER can also be used to analyze data from releases in the Upper Columbia River.

Effective management of salmonid fisheries demands efficient analysis of all available data. Program ROSTER is a tool designed to take advantage of the wealth of information available from PIT tags in the Columbia Basin. Program ROSTER is freely available at www.cbr.washington.edu/paramest.