

HABITAT COMMITTEE REPORT

Fish Passage Center Comparative Survival Study

The Habitat Committee (HC) was briefed by Dr. Charlie Petrosky, Endangered Species Act Program Coordinator for Idaho Department of Fish and Game and Council Scientific and Statistical Committee member, on the Comparative Survival Study, a two decade (1996-2000) time series study that monitors the life cycles of salmon and steelhead on the Columbia River (see attachment 1). The Comparative Survival Study provides salmonid life stage survival and passage estimates relative to riverine and marine environmental and hydrosystem variables. The information gathered from this study is a requirement of NOAA's 2010 Biological Opinion on Columbia River hydropower operation. The Comparative Survival Study develops smolt-to-adult return rates, juvenile survival rates, and travel times for specific routes of passage throughout the Columbia River hydropower system. Since 2006, the Comparative Survival Study has incorporated information from the court-ordered spill program affecting the Federal dams of the Columbia River.

A few key findings from this review are as follows:

- There are ever stronger indications that spill is positively related to ocean survival (in addition to in-river survival). The multi-year Comparative Survival Study builds on existing lines of evidence demonstrating the benefits of spill as a potential tool for recovery, and shows that spill benefits salmon regardless of ocean conditions.
- In-river environmental variables such as flow and spill, along with ocean variables, explained most of the variation in smolt-to-adult return rates and marine survival rates.
- Increased spill has resulted in faster juvenile fish travel time, higher survival rates between dams, higher ocean survival, and higher smolt-to-adult return rates. For Chinook salmon in particular, increased spill was by far the primary driver that increased in-river survival.
- Passage of salmon through dam powerhouses was related to lower ocean survival and lower smolt-to-adult return rates, which suggests that significant delayed mortality is occurring with powerhouse passage routes.

The Northwest Power and Conservation Council program established a goal of a 2-6% smolt-to-adult return rate to ensure recovery of Snake River spring/summer Chinook and steelhead. However, this goal is not being met under the current spill schedule. To achieve an average 4% smolt-to-adult return rate, the study suggests that 85% juvenile survival rates through the hydro system are necessary, given current ocean survival rates. In turn, spill levels of 55-60% at all projects are projected to meet these juvenile survival rate goals. The current Court order requires about 40% spill, and this has been shown to increase survival, but more is needed to achieve recovery goals. Using the Corps of Engineers dissolved gas model, it appears that the 55% spill level may be achievable within existing gas cap constraints.

These preliminary conclusions are based on an extrapolation of existing data; there is limited empirical data at the higher spill levels. An adaptive management experiment that monitors the

effects of higher spill regimes is necessary to determine if these predictions are realistic. Given that current measures are not meeting the smolt-to-adult return rates necessary for recovery, the next logical step is to determine whether spilling at these higher levels within current gas cap constraints meets the goal. If recovery level smolt-to-adult return rates are not achievable with a maximum spill program, dam breaching remains a final option.

In summary, the HC feels that an experiment to test the effect of increased spill levels on smolt-to-adult return rates is promising, especially as an effective alternative to dam breaching. Achieving the Northwest Power and Conservation Council's targeted smolt-to-adult return rate goal of 2-6% (average 4%) is projected to more than double adult returns of Snake River salmon to the mouth of the Columbia River, and presumably would benefit other Council-managed stocks that originate in the Columbia Basin.

Lower Columbia Salmon and Steelhead Recovery Plan

The HC understands that the Council has asked for an extension to provide comments on the draft Lower Columbia Salmon and Steelhead Recovery Plan. This plan includes information arranged into three management unit plans, including the Oregon Lower Columbia Conservation and Recovery Plan, the Washington Lower Columbia Salmon Recovery and Fish and Wildlife Subbasin Plan, and the Endangered Species Act Salmon Recovery Plan for the White Salmon River Subbasin. National Marine Fisheries Service (NMFS) has indicated that a comment deadline extension is possible.

NOAA Habitat Blueprint

The HC received a presentation from Mary Yoklavich (NMFS, Southwest Fisheries Science Center) with Korie Schaeffer (NMFS Southwest Region) on NOAA's Habitat Blueprint. The purpose of the Blueprint is to provide a framework for NOAA to act strategically across programs and with partner organizations to improve coastal and marine habitat.

NOAA's Conservation Vision for this effort is to ensure "healthy habitats that sustain resilient and thriving marine resources, communities and economies." The Blueprint's key components are to establish long-term habitat focus areas, approach habitat science systematically and strategically, and strengthen policy and legislation.

The Blueprint will be used to prioritize habitat activities and interests across NOAA. The first short-term objective was to develop Regional Habitat Initiatives, which are already underway in each NOAA region. One goal of the Regional Habitat Initiatives is to find immediate opportunities to apply place-based science to management. The two Pacific coast initiatives are the Southern California Bight Habitat Assessment and the Puget Sound Habitat Initiative.

For the Southern California Bight, NMFS and partners will assess deep-water demersal species and habitats, particularly rockfishes and corals, in and out of areas that have been closed to bottom-contact fishing gear. The initiative began in January 2012.

For Puget Sound, the Initiative objectives are designed to address the loss of estuarine wetlands, riparian habitat, and impacts on threatened Chinook salmon and steelhead. NMFS will work with partners to develop new strategies to conserve salmon habitat, as well as to integrate scientific modeling and monitoring with regulatory and restoration programs. While efforts will focus on

habitat restoration in the near-term, NMFS will provide a critical scientific framework for long-term recovery.

While no new funding is provided to launch and sustain these Initiatives, these efforts may help leverage new funds in the future. Further information on these Initiatives and the Blueprint are available at <http://www.habitat.noaa.gov/blueprint>

Fukushima/Tsunami/Invasive Species/Earthquake Testing

The HC heard updates about consequences to the West Coast from last year's Japanese tsunami. Increasing volumes of tsunami debris have been appearing on the West Coast, and at a faster rate than originally expected. Tsunami debris poses a safety risk to fishing vessels, wildlife, and potentially to human health, and contributes to the threat of aquatic invasive species. In early June a 66-foot, 165-ton dock washed up on the beach near Newport, Oregon after a 5000-mile journey from Japan; and on June 16, a Japanese fishing boat, suspected to be tsunami debris, washed ashore near Ilwaco. The dock was heavily colonized by mussels, barnacles, crabs, oysters, seastars, seaweed and many other species, some of which are known invasive species for the eastern Pacific.

On a somewhat related topic, California legislation passed in 2006 (AB 1632), requires seismic surveys of earthquake faults near operating nuclear power plants. The need for such surveys has intensified as a result of the Fukushima nuclear disaster. In California, seismic surveys are planned around the Diablo Canyon Nuclear Power Plant in San Luis Obispo County. These surveys will use high intensity airguns, hydrophones towed by a vessel, and bottom-placed geophones. Because of the loud noises generated by these tests, there are concerns over barotrauma impacts to fish eggs, larvae, and adults, as well as invertebrates and marine mammals, such as whales. California Department of Fish and Game is in consultation with Pacific Gas and Electric, project proponent, to develop a monitoring program and address potential impacts to marine resources and marine protected areas.

Invasive Species Impacts on Mud Shrimp

New information indicates that a serious invasive species issue has developed that threatens the ecological integrity of a keystone estuarine shrimp. Blue mud shrimp (*Upogebia pugettensis*) occur in intertidal tideflats throughout the Pacific northwest, where they excavate burrows in the soft sediment. The shrimp provide an important food source for juvenile salmon in West Coast estuaries. However, large numbers of the shrimp have recently been parasitized by an Asian invasive copepod that castrates the adult shrimp and makes them unable to reproduce. Blue mud shrimp are now thought to be extinct in many estuaries. Initial efforts are underway to create a "hatchery" program for Blue mud shrimp to conserve the remaining populations, and to reintroduce them to the estuaries after the parasite has died out. However, debris from the Japanese tsunami could complicate this effort and worsen the situation (for more information, see "An introduced Asian parasite threatens northeastern Pacific estuarine ecosystems" (John W. Chapman, et al., 2011, <http://tinyurl.com/cwwp7w2>).