

Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Salmon Tour

Hiram H. Chittenden (Ballard) Locks Fish Passage Improvements

- The Hiram H. Chittenden (Ballard) Locks, operated by the U.S. Army Corps of Engineers (Corps), are critical to the region's economy, transportation, flood control, infrastructure and environment. The Locks operate primarily as a navigation facility connecting Puget Sound with Lakes Union and Washington and are a popular tourist attraction.
- Every salmon in the Lake Washington/Cedar/Sammamish (WRIA 8) watershed must pass through the Ballard Locks at least twice in its life, both as a juvenile migrating out to the sea and as an adult returning to spawn. Ensuring safe passage through the Locks is of paramount importance to salmon recovery efforts in this watershed.
- WRIA 8 has partnered with the Corps to support operational and structural changes at the Locks to make it safer for fish passage. Many of the operational changes to improve fish survival that have been implemented since the 1990s at the Locks are at risk due to the poor condition of the aging Lock facilities and its low priority for funding. The Corps is required to reduce the impact to ESA listed salmon passing through the Lock and is not meeting many of the minimizing measures called for in the 2008 NOAA Biological Opinion for operation of the Locks.
- What fish passage improvements are most needed?
 - Replace machinery that operates the large lock gates and allows gates to open and close slowly which has been found to greatly reduce the mortality of juvenile salmon passing through the Locks (\$5.2 million).
 - Study and develop a permanent solution to the temporary exclusion structure installed on the "diffuser well" of the fish ladder to prevent adult salmon from becoming trapped and killed (\$700,000).
 - Identify replacement for strobe lights originally installed to deter juvenile salmon from dangerous filling culverts for operating the Locks (cost unknown).
 - Study and develop alternative replacement for the "smolt flumes" originally installed in 2000 to improve juvenile survival as they migrate through the Locks to Puget Sound (cost unknown).
- The Locks regulate the water level of Salmon Bay, the Ship Canal, Lake Union and Lake Washington. Maintaining water levels between 20 and 22 feet of elevation is important for the I-90 and Hwy 520 floating bridges and floating houses. The Locks also protect the water quality of the lakes by preventing the mixing of sea water from Puget Sound with the freshwater of the lakes.

- Annually, almost 1 million tons of cargo and 50,000 vessels pass through the locks. The Ballard Locks are the busiest in the country in terms of number of boats, but many of the boats are recreational, so the Locks are considered low use in terms of tonnage and have not ranked well for funding.
- In early 2012, the Corps lowered the dam safety rating of the Locks to “urgent” (2 on a scale of 1-5, 1 being almost certain to fail under normal conditions) because it could fail in an earthquake and there would be high economic consequences if it did fail.
- The Ballard Locks will be 100 years old in 2016. Much of the equipment and infrastructure at the Locks are long past their design lifespan and is in desperate need of rehabilitation. Reliable operation of the Locks, including the requirement to safely pass ESA listed Chinook salmon and steelhead, requires repair and replacement of the facility’s equipment and infrastructure that is reaching the end of its designed lifespan.
- We ask for support in raising awareness of this issue and requesting federal funding to address the need. A potential source of funding is the Harbor Maintenance Trust Fund.



The upper photo shows a ship moving into the large lock, with “smolt passage flumes” in the foreground. The machinery for the gates that open and close the large lock need replacement for continued safe operation and to allow slow opening and closing of the large lock to reduce mortality of juvenile salmon. The flumes provide a safer route for juvenile salmon over the lock spillway. Due to new safety regulations, the Corps must find an alternative to these flumes by spring 2014.



The lower photo shows dead Chinook and sockeye found trapped in the diffuser well underneath the fish ladder. In June 2008, the Corps installed a quick temporary fish screen on the intake. The Corps estimates it would cost \$700,000 to develop alternatives for a permanent solution.