



July 30, 2020

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 Bellevue
 Bothell
 Clyde Hill
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 Mercer Island
 Mill Creek
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 Newcastle
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 Sammamish
 Seattle
 Shoreline
 Snohomish County
 Woodinville
 Woodway
 Yarrow Point

Cedar River Council
 Forterra
 Friends of the Issaquah
 Salmon Hatchery
 Greater Seattle Chamber
 of Commerce
 Mid-Sound Fisheries
 Enhancement Group
 Mountains to Sound
 Greenway Trust
 Northwest Marine Trade
 Association
 Sno-King Watershed
 Council
 Trout Unlimited/
 Water Tenders

Alderwood Water and
 Wastewater District
 King Conservation District
 National Oceanic and
 Atmospheric Administration
 US Army Corps of Engineers
 Washington Departments:
 Ecology
 Fish and Wildlife
 Natural Resources
 Washington Association of
 Sewer and Water Districts

Katherine Cousins
 Fish Biologist and LWSC Master Pan Project Manager
 United States Army Corps of Engineers
 4735 E. Marginal Way S, Building 1202
 Seattle, WA 98134

RE: Comments on Lake Washington Ship Canal Master Plan update

Dear Ms. Cousins,

Thank you for the opportunity to provide input for updating the Lake Washington Ship Canal (LWSC) Master Plan. We are writing on behalf of the Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Salmon Recovery Council (Council). The WRIA 8 Council is comprised of 28 local governments and representatives from businesses, community groups, concerned citizens, and state and federal agencies working collaboratively since 2000 to recover Chinook salmon, listed as Threatened under the Endangered Species Act (ESA). The WRIA 8 Council guides implementation of the *WRIA 8 Chinook Salmon Conservation Plan* (WRIA 8 Plan) including habitat goals and recovery actions that support long-term, sustainable, and harvestable runs of Chinook salmon in the watershed. The WRIA 8 Plan is approved by the National Oceanic and Atmospheric Administration (NOAA) as a component of the *Puget Sound Salmon Recovery Plan*. Although Chinook salmon are our primary focus, many of our objectives are intended to benefit other salmonids including coho, sockeye, and steelhead.

The LWSC and Hiram M. Chittenden Locks (Locks) are essential to our region's economy, transportation, and salmon recovery efforts. For salmon recovery, conditions at the Locks and in the LWSC present key constraints, which should be identified and addressed in the LWSC Master Plan. The Locks physically separate the freshwater LWSC from saltwater in the Puget Sound creating extremely abrupt changes in salinity, temperature, and dissolved oxygen conditions for migrating salmon. The Locks increase vulnerability to predation from pinnipeds (seals and sea lions) capitalizing on salmon blocked, slowed, or trapped at the Locks and associated facilities.

Improving salmon habitat conditions at the Locks and LWSC is of paramount importance to recovery efforts in the WRIA 8 watershed. Every salmon in WRIA 8 must pass through the Locks and LWSC twice in its life, both as a juvenile migrating out to the sea and as an adult returning to spawn. Recovering sustainable and harvestable salmon populations, supports local, state, and federal investment of more than \$130 million in habitat restoration since 1999

and will increase numbers of Chinook salmon – the primary food source of endangered Southern Resident orca. Protecting and supporting salmon recovery is imperative to meet federal trust responsibilities under treaties between the U.S. government and two federally recognized tribes that protect tribal rights to conduct subsistence and commercial fishing activities.

In addition to migration constraints, juvenile salmon survival is impacted by conditions at the Locks and LWSC. Recent studies suggest predation by introduced invasive warmwater fishes may be a key limiting factor (R. Tabor, unpublished data). These predators can exhibit increased metabolism in the warm waters of the LWSC. High levels of artificial light pollution at the Locks and throughout the LWSC adversely impact juvenile salmon survival by altering behavior in ways that make them more susceptible to predation and increasing the length of time predators actively feed (Tabor et al. 2004, Celedonia et al. 2008, Tabor et al. 2017).

The 1994 LWSC Master Plan did not adequately address the role of the LWSC and Locks in supporting salmon recovery and overlooked several crucial limiting factors for salmon health and survival. Since the finalization of the 1994 Master Plan, Puget Sound Chinook were listed as Threatened under the Endangered Species Act, steelhead are now functionally extirpated from the watershed, and sockeye populations have plummeted. Annual Chinook counts continue to be below the 25 year average of 9,700, and the 2019 sockeye count of under 18,000 fish was the lowest on record. To achieve the primary goals of the LWSC Master Plan update, it is essential that the updated 2021 LWSC Master Plan includes a comprehensive assessment of how the Locks and LWSC affect salmon health and survival and a description of the need for planning and salmon-related infrastructure improvements, outreach programming and monitoring.

Facility Repairs and Infrastructure Upgrades

Locks facility improvements and upgrades that support fish passage and migration should be central to planning and implementation of the LWSC Master Plan including:

- Complete design and replacement or removal of the saltwater drain intake exclusion structure as a permanent solution to keep fish from becoming trapped and killed.
- Upgrade and modernize the fish ladder to improve adult salmon migration and help minimize risk of pinniped predation.
- Address issues with intermittent failure of the freshwater attraction valve in the ladder system delaying migration or trapping salmon in the ladder and increasing risk of predation.
- Design a system for monitoring flows and gate openings so issues with the attraction flow and fish passage barriers can be promptly identified and addressed.

- Assess the effectiveness of the design and configuration of recently installed smolt flume upgrades at the Locks, which are an important improvement for juvenile fish passage.
- Continue regular operations and maintenance work that supports fish passage, including scraping barnacles from the Locks filling culverts.

Salmon Habitat and Migration

Structure and operation of the Locks drives physical, biological, and chemical conditions experienced by migrating adult and juvenile salmon. We request consideration and analysis of habitat alterations and recovery needs including:

- Identify solutions to decrease water temperatures and increase dissolved oxygen directly upstream of the Locks and in the LWSC to reduce these critical barriers to salmon health and migration.
- Identify solutions to address abrupt changes in salinity, temperature and dissolved oxygen conditions at the Locks and impacts to migrating salmon.
- Identify solutions to prolonged Chinook holding at the salt-water drain just upstream of the Locks. Currently, this area provides a limited cold-water refuge for migrating salmon as they journey to their natal streams.
- Employ commonsense reductions in nighttime artificial lighting at the Locks and throughout the LWSC to reduce non-target, unintentional, and often unnecessary impacts of light pollution on salmon and other biological resources.
- Increase natural habitats and engineered habitat enhancements (e.g., overhanging vegetation) along the shores of the LWSC and downstream of the Ballard Locks to improve habitat and water quality conditions for migrating juvenile salmon.
- Consider impacts of climate change on future Locks operations and fish passage needs.

Outreach and Monitoring Salmon Populations

The Locks serve as an important facility for educating local residents and visitors about salmon biology and recovery efforts. Annually, more than 1.25 million people from across the globe visit the Locks, making them one of the top tourist destinations in the greater Seattle region and an invaluable source of education for people of all ages. The LWSC Master Plan should highlight the continued important educational function of the Locks and LWSC, including:

- Continue and enhance coordination with partners (tribes, local governments, etc.) and support monitoring salmon populations.
- Improve outreach and education facilities to enhance visitor experience and educational opportunities, such as the current effort to upgrade the fish ladder viewing window area.

- Continue support and grow partnerships with outreach and education programs at the Locks.

Thank you for the opportunity to provide input on updates to the LWSC Master Plan. We appreciate the Corps' ongoing partnership in recovering salmon in WRIA 8, and we strongly support the Corps' Seattle District in developing, updating, and annually requesting funds to implement a comprehensive suite of prioritized Locks and LWSC facility improvement projects, which will improve fish passage and salmon survival. We look forward to continued coordination to improve salmon survival and migration and enhance education and outreach programming to raise public awareness of salmon as an important natural and cultural resource at the Locks and LWSC.

Sincerely,



John Stokes
Chair, WRIA 8 Salmon Recovery Council
Councilmember, City of Bellevue



Mark Phillips
Vice-Chair, WRIA 8 Salmon Recovery Council
Councilmember, City of Lake Forest Park

Cc: Jon Hofstra, Ship Canal Operations Manager, Army Corps of Engineers
Jason Mulvihill-Kuntz, WRIA 8 Salmon Recovery Manager
WRIA 8 Salmon Recovery Council

References:

Celedonia, M.T., Tabor, R.A., Sanders, S., Damm, S., Lantz, D.W., Lee, T.M., Li, Z., Pratt, J.M., Price, B.E., and Seyda, L. 2008. Movement and habitat use of Chinook salmon smolts, northern pikeminnow, and smallmouth bass near the SR 520 bridge, 2007 acoustic tracking study, annual report (No. WA-RD 694.1). Washington State Dept. of Transportation.

Tabor, R.A., Brown, G.S. and Luiting, V.T., 2004. The effect of light intensity on sockeye salmon fry migratory behavior and predation by cottids in the Cedar River, Washington. North American Journal of Fisheries Management, 24(1), pp.128-145.

Tabor, R.A., Bell, A.T., Lantz, D.W., Gregersen, C.N., Berge, H.B. and Hawkins, D.K., 2017. Phototoxic behavior of subyearling salmonids in the nearshore area of two urban lakes in western Washington state. Transactions of the American Fisheries Society, 146(4), pp.753-761.