



# Creating a Healthy Ship Canal for Salmon



### Project Duration

2020  2025

Phases 1 & 2



### Estimated Total Project Cost

TBD

### Current Funding Sources

- King County Wastewater Treatment Division
- WRIA 8 Salmon Recovery Council
- Boeing



### Project Status

Phase 2: Feasibility



### Project Goal

Act urgently to improve juvenile and adult salmon's health and survival in the Ship Canal by lowering water temperatures, increasing dissolved oxygen, and reducing abrupt transitions between those conditions and Puget Sound.



## Cooling Local Waters to Help Salmon Make it Home

### PROBLEM

Each summer, sockeye, coho, and threatened Chinook salmon battle worsening conditions on their journey through the heart of Seattle. Because of lethally hot water temperatures in the waterway just upstream of the Ballard Locks, only a fraction of salmon reach their spawning grounds in the Cedar and Sammamish Rivers. These Pacific Northwest icons are on a path to extinction in and it's happening in Seattle's own backyard.

Lake Washington sockeye salmon, once the largest sockeye run in the Lower 48, have not returned at numbers needed to support a fishery since 2006 and are on the verge of collapse. Chinook salmon are listed as "Threatened" under the Endangered Species Act. Over \$125 million have been spent restoring fish access and habitat upstream in the basin of the Ship Canal. This may be in vain if water temperature in the Ship Canal continues to increase.

High water temperatures have been a problem in the Lake Washington Ship Canal for more than two decades, and the problem is only getting worse. During the June 2021 heat wave, when Seattle reached a record-breaking 108°F, dead sockeye were found around the Ballard Locks fish ladder. Climate change is causing increasing average annual temperatures and extreme weather events. These issues will continue to worsen as the impacts of climate change persist.

The warmer water also provides favorable conditions for invasive fish that eat young salmon. There are some areas in the Ship Canal with colder water, but they don't have enough oxygen for the fish to survive. Also, migrating salmon must transition between cold saltwater and hot freshwater within a few hundred yards, causing delayed or blocked migration, increased susceptibility to diseases, fungi, and parasites, and even death.

### APPROACH

To tackle this complex problem, Long Live the Kings (LLTK) and the Lake Washington/Cedar/Sammamish Watershed (WRIA 8) Salmon Recovery Council convened the Lake Washington Ship Canal Roundtable. This group of public agencies and private organizations is working urgently to improve juvenile and adult salmon health and survival in the Ship Canal by lowering water temperatures, increasing dissolved oxygen, and reducing abrupt transitions between those conditions and Puget Sound. This effort builds on over two decades of research and management related to the problem.

Phase 1, completed in July 2022, aligned partners around this mutual goal, brainstormed potential solutions, and prioritized potential solutions for further analysis. In Phase 2, the group will complete a conceptual feasibility analysis, pursue hydrodynamic modeling, develop and execute strategies to implement solutions, and support ongoing work.

# Creating a Healthy Ship Canal for Salmon



“Seattle’s on the verge of being a museum of its former self.”

— SEATTLE TIMES COLUMN ON NEW SALMON MIGRATION VIDEOS REPLACING LIVE SOCKEYE AT THE BALLARD LOCKS

## POTENTIAL SOLUTIONS

The Lake Washington Ship Canal is a unique challenge for salmon passage: a human-made environment in the most urban watershed in Washington State. Typical restoration actions, like planting trees for shade, aren’t enough, and they aren’t practical solutions in this highly developed area. Saving these beloved salmon runs requires innovative ideas and community-wide investment.

To tackle this complex problem, LLTK and WRIA 8 are working with a network of community organizations and public agencies to lower water temperatures and help salmon pass safely through the Ship Canal. This effort builds on more than two decades of research and management actions related to the problem.

We are seeking ways to create a continuous pathway or connected pockets of water within the Ship Canal where water temperatures and oxygen levels are within the healthy range for salmon, allowing them to migrate freely. Urgent short-term solutions are needed to support the salmon runs while a long-term fix is in progress. These actions could include changes to



operations and redesigning fish passage at the Ballard Locks. Experts agree that as Seattle’s summers get warmer, we will need to pursue multiple strategies to prevent the loss of these salmon runs now and for generations to come.

## STRATEGIES TO IMPLEMENT

The Ballard Locks at the Ship Canal are an iconic Seattle tourist attraction, an official historic landmark, and transit more than 45,000 vessels annually, equating to \$1.2 billion in annual economic activity.

Managing the Ship Canal for the benefit of salmon is complex. A network of regulators, managers, governments, and stakeholders are responsible for the many uses and users of the Ship Canal and its surrounding areas.

The scale of the problem and eventual solution necessitates a collaborative and innovative approach. Public-private

partnerships have the potential to make solutions more cost-effective.

One example is a public partnership with a private district energy network. Cold water pumped from the depths of Lake Washington, or another source, would be used to provide energy-efficient, heating and cooling systems for customers.

The outflowing water would then be redistributed to cool the relatively warmer Ship Canal. This well-established approach, like a utility district, pairs a revenue model with the solution in a way that could generate economic value and environmental benefits.

## PROJECT STATUS

Phase 1, completed in July 2022, focused on reviewing the science, aligning partners around a mutual goal, and prioritizing solutions for further analysis.

In Phase 2, which began in 2023, the group is completing an initial feasibility analysis, pursuing water temperature modeling, developing strategies to implement solutions, and supporting ongoing work.

Phase 3 will put our solutions into action.