

## Lake Washington Ship Canal Temperature and Dissolved Oxygen Issues – Proposed Consultant Scope of Work

### PURPOSE

The Lake Washington/Cedar/Sammamish Watershed (WRIA 8), with its partners, is seeking lasting solutions to water quality impairments regarding water temperature and dissolved oxygen (DO) in the Lake Washington Ship Canal (LWSC). This effort will involve three primary elements that need planning and facilitation support:

1. Compile and develop a “state of knowledge report” summarizing and synthesizing what is currently known about temperature and DO conditions in the LWSC. This report, no more than approximately 20 pages, will be compiled from existing sources and should serve as a resource for “best available science” for local jurisdictions and other stakeholders.
2. Convene Steering Committee – Convene and facilitate a meeting of key stakeholders (Steering Committee) to share information on the state of the science, identify information gaps, and discuss emerging issues regarding temperature and DO issues in the LWSC. The purpose of this meeting will be to determine the scope of any technical questions that are barriers to developing concepts and feasibility-level proposals. The Steering Committee will review the state of knowledge and determine next steps (e.g., initiating a feasibility study of concepts and alternatives, or convening a science panel to identify steps to shore up existing knowledge). Steering Committee will be composed of representatives from WRIA 8, U.S. Army Corps of Engineers (Corps), NOAA, Washington Department of Fish and Wildlife, Muckleshoot Indian Tribe, Washington Department of Ecology, and Seattle Public Utilities. The local business sector, including businesses and industries along the LWSC and Lake Union, should be included. Some contact info will be provided; others, especially local business interests, will need to be identified.
3. Develop concepts and feasibility-level (10% design) proposals (including planning level cost estimates), in collaboration with key stakeholders, to improve temperature and DO conditions for salmon in the LWSC.

### Background

Temperature is one of the most important environmental influences on salmonid biology. Data collected in the Lake Washington Ship Canal (LWSC) shows periods in most years during late spring and summer when high temperatures affect the behavior and survival of migrating salmon. These high temperatures are caused by solar energy heating the surface of Lake Washington. The heated water forms a layer in the upper part of the water column. The LWSC is only 30’ deep in places, and because the thermally stratified layer is often 30’ or more in thickness, salmon cannot swim into deeper, cooler waters while migrating to escape the high temperatures.

Because salmon need cold, well-oxygenated water for optimum health, high temperatures in the LWSC during key migration periods can block or delay passage, lead to reduced growth and increased

susceptibility to predators, parasites and infectious diseases, affect reproduction, and sometimes directly result in fish kills.

Every salmon in WRIA 8 must pass through the LWSC twice in its life, both as a juvenile migrating out to sea and as an adult returning to spawn, and may encounter lethal or near-lethal temperatures that influence its behavior and reduce its chances of survival. This proposal will directly result in a recommended preferred alternative to reduce effects of high temperatures/low dissolved oxygen concentrations in the LWSC. Stakeholders will understand what technologies and engineering solutions are available to improve conditions during key migratory periods, at what costs.

### Project outline

The potential project, executed in three phases, would address elevated water temperatures in the LWSC by seeking and implementing a long-term solution to the problem. **THIS RFP IS FOR PHASE 1 ONLY.**

#### Phase 1:

- 1.1 Synthesize existing temperature and dissolved oxygen data and other information and its effects on salmonids as it is specifically related to the LWSC. Local information to synthesize will include reports from thermal tagging studies performed by the Corps and others, the LWSC Water Quality Science Panel recommendations (2012), UW Capstone student posters, false lockage experiments (2016-2014), and the SR520 LWSC Water Quality Improvement Report (August 2011);
- 1.2 Determine existing data gaps;
- 1.3 Host workshops with key stakeholders
- 1.4 Develop 2-3 concepts and feasibility-level proposals, including planning-level cost estimates, in collaboration with key stakeholders, to produce lasting solutions to temperature and dissolved oxygen problems affecting salmon in the Lake Washington Ship Canal.

#### Phase 2: **(Future -- not included in this scope of work)**

- Vet proposals, choose a preferred option, and develop funding sources.

#### Phase 3: **(Future -- not included in this scope of work)**

- Construct and monitor the preferred option.

### Funding

The WRIA 8 Salmon Recovery Council has allocated funding for Phase 1. The U.S. Army Corps of Engineers' "Planning Assistance to States" program may be a funding source to cost-share development of the feasibility analysis report as a product of Phase 1 and 2. The Corps' Continuing Authorities Program is another cost-share funding program, among other potential funding sources, that is a possible candidate for implementing Phase 3.