2024 WRIA 8 Monitoring and Assessment Priorities

Each year, the Lake Washington, Cedar, Sammamish Watershed (WRIA 8) solicits proposals for the King County Flood Control District's Cooperative Watershed Management (CWM) grant program and other funding opportunities focused on monitoring priorities. WRIA 8 recommends funding for projects that align with the watershed's Chinook Salmon Conservation Plan (link: WRIA 8 2017 Plan Update), advance understanding of critical issues in salmon recovery, and inform science-based management actions. WRIA 8 welcomes proposals that align with our funding principles and address the high priority monitoring and assessment needs identified in this document.

WRIA 8 Monitoring & Assessment Funding Principles

1. Prioritize proposals that directly inform or advance actions and best management practices to recover Chinook salmon in WRIA 8. However, WRIA 8 will also consider proposals that inform or advance multispecies benefits and best management practices to recover other salmon species and/or support overall watershed health.

2. Leverage multi-agency collaboration, cooperative partnerships, in-kind resources, or other support to advance salmon recovery. We are particularly interested in encouraging new partnerships and expertise informing salmon recovery in WRIA 8.

3. Maintain ongoing and long-term monitoring efforts, particularly where a failure to implement the proposed work would result in a meaningful data gap.

4. Communicate findings with WRIA 8 partners and other audiences to promote use of best available science in salmon recovery strategies; encourage awareness and environmental stewardship; and/or guide integration of salmon recovery priorities into local and regional planning, regulations, and permitting.

5. Demonstrate careful planning including a robust study design and data management plan to facilitate future uses and application of findings; clearly defined and measurable goals and objectives; appropriate sequencing relative to other monitoring work; and use of reliable methods with a high likelihood of achieving objectives.

2024 WRIA 8 Priority Monitoring & Assessment Needs

Salmon Population Status, Habitat Use, and Survival

This topic is focused on evaluating salmon populations over time and in priority systems. There is also a need to supplement baseline monitoring with more targeted assessments of population parameters including the timing and location of juvenile survival bottlenecks in Lake Washington, Lake Sammamish, Sammamish River and the Lake Washington Ship Canal.

Monitoring & Assessment Needs

- Spawner surveys on Chinook bearing systems, prioritizing the Cedar River.
- Juvenile outmigrant surveys on Chinook bearing systems, prioritizing the Cedar River.
- Expand the network of PIT tagging and tag detection antennas to improve annual estimates of freshwater survival and help identify locations of high juvenile mortality during outmigration through Lake Sammamish, the Sammamish River, Lake Washington, the Lake Washington Ship Canal, and Ballard Locks (e.g. the saltwater drain screen). Additional PIT tag antennas could also help improve understanding of the migration patterns and survival of adult salmon returning to freshwater.
- Enhanced monitoring of juvenile passage (e.g. using acoustic tagging technology) in and around the Ballard Locks and smolt passage flumes.
- Assessments of potential delayed juvenile mortality following outmigration of the Ballard Locks.

Impacts and Mitigation of Poor Water Quality on Salmon Health and Survival

High water temperatures and low dissolved oxygen can impede migration and cause stress responses that affect reproductive success, increase vulnerability to disease and parasites, and increase levels of pre-spawn mortality in adult salmonids. High water temperatures and low dissolved oxygen can also block juvenile outmigrants or change their patterns of migration and increase vulnerability to predators. With climate change projected to continue to increase water temperatures over time, we seek to better understand and mitigate high water temperature and its effects on salmon health and survival in WRIA 8.

Monitoring & Assessment Needs

- Build off ongoing work of the Lake Washington Ship Canal Roundtable to identify and evaluate solutions that reduce impacts of high temperatures and low dissolved oxygen conditions on salmon in the Lake Washington Ship Canal. Priority monitoring and assessment needs include the following:
    - Examine how various cold water supplementation scenarios can affect patterns of flow in the Ship Canal.
    - Continue to evaluate more refined scenarios to better understand

benefits of cold-water supplementation for salmon migration through the Ship Canal.
        - Acoustic tracking of adult salmon movement in the Ship Canal associated with simultaneous meteorological, temperature, and flow data.
        - Tracking of juvenile salmon migration into the Ship Canal from Lake Washington across a range of temperature and flow conditions.
- Evaluate opportunities to reduce or eliminate thermal barriers in Lake Sammamish and the Sammamish River, create cool water refugia, and/or enhance/protect existing groundwater resources in these systems. Priority monitoring and assessment needs include the following:
    - Acoustic tracking of adult salmon movement in the Sammamish River associated with simultaneous meteorological, temperature, and flow data.
- Evaluate interactions between high temperatures, low dissolved oxygen, disease and resulting impacts on salmon health and survival. Evaluation should relate to potential mitigation of any identified impacts.

Impacts and Mitigation of Predation Risk

Projects to increase understanding of predation impacts on salmon health and survival and test mitigation strategies. We are particularly interested in investigations of predation by nonnative piscivores and benefits of habitat improvements to reduce predation efficiency and impacts. This category can also include projects focused on strategies to reduce pinniped predation on adult and juvenile salmon at the Ballard Locks.

<u>Monitoring & Assessment Needs</u>

- , Develop, evaluate, and monitor mitigation strategies to reduce impacts of predators on juvenile salmon in Lake Washington, Lake Sammamish, and the Lake Washington Ship Canal.
- Identify areas suspected to have elevated predation impacts on salmon and where limited information is available, for example the lower Cedar River and lower Issaquah Creek, and the Sammamish River.
- Better understand the role of lake nearshore habitat conditions (e.g., invasive aquatic vegetation, human infrastructure) on predator assemblages and/or predation efficiency to inform possible management strategies (e.g., removal of invasive aquatic vegetation, shoreline habitat restoration, predator removal efforts) for reducing impacts of predation on salmon survival.
    - Evaluate strategies or approaches to reduce ALAN impacts on salmon, including alternative lighting technologies (e.g., the use of different lighting spectra, reductions in the amount of lighting, or the use of shielding and shaping to adjust the direction of lighting) or approaches to encourage public behavior change.
    - Studies to better understand the influence of ALAN and interactions between ALAN and other types of habitat modification on salmon behavior, health, and survival (e.g.,

predation by nonnative fish species and birds).

- Evaluate strategies to reduce effects of pinniped predation on adult and juvenile salmon at the Ballard Locks focusing on actions recommended at the 2023 Technical Workshop on pinniped predation on salmon at the Ballard Locks.

Monitoring Project Effectiveness and Monitoring to Support WRIA 8 Habitat Goals

Assessments to determine whether restoration projects or approaches are achieving their intended outcomes for salmon and their habitats. We are particularly interested in specialized monitoring that fills key knowledge gaps and/or supports partners with otherwise limited resources needed to conduct this work. For example, when a novel approach is used or when outcomes are uncertain or not well understood.

Monitoring & Assessment Needs

- Assessments of lake shoreline or other lentic habitat restoration project benefits for salmon recovery (e.g., remove bank armor, increase overhanging vegetation, add engineered log jams, reduce lighting impacts, and restore more natural littoral habitat and aquatic vegetation and flow condition).
- Opportunity analysis to support WRIA 8 goal of increasing natural lake edge habitats south of Interstate 90 (I-90) in Lake Washington and throughout Lake Sammamish to support juvenile Chinook rearing and migration. Current (2017) WRIA 8 goals are to double the length of natural bank profile (e.g. without a bulkhead, with a slope and substrate matching natural lakeshore contours) along Lake Washington and to increase the length of natural lake shoreline along Lake Sammamish.
- Evaluate the geomorphic resilience of constructed off-channel habitats within the Cedar River and other Chinook-bearing tributaries and determine what characteristics most influence the use of off-channel habitats by juvenile salmon.

Data Synthesis with Management Applications

This topic is focused on synthesis documents summarizing scientific evidence on specific subjects the Technical Committee identifies as having high importance for salmon recovery in WRIA 8.

Other Uncertainties or Emerging Concerns

WRIA 8 will also consider proposals that address critical uncertainties or issues of emerging concern that are not explicitly included in the topics above. Proposals must have a clear and compelling link to inform or advance salmon recovery efforts. Examples include the impacts of pathogens and diseases, synthetic chemicals, stormwater discharge, and other water quality impairments on salmonid health and survival.