

GREEN/DUWAMISH AND CENTRAL PUGET SOUND (WRIA 9) IMPLEMENTATION TECHNICAL COMMITTEE



WRIA 9 Implementation Technical Committee Meeting

March 18, 2026 | 9:00 am – 12:00 am

[Click here to join the meeting](#) or call in (Teams audio only) [+1 425-653-6586](tel:+14256536586), [635155264#](tel:+1635155264)

Meeting ID: 267 369 441 130 43

Passcode: m8ZZ6RF9

9:00 Welcome & Introductions

9:20 Assessing the value of freshwater habitats through juvenile Chinook salmon prey availability and foraging opportunities

Chris
Gregersen, King
County

We propose to compare invertebrate prey availability and juvenile Chinook diets across multiple river-floodplain habitats in the lower and middle Green River during the juvenile rearing period (Feb-June). We will also evaluate how prey availability and Chinook diets vary through time during the spring rearing season and in response to changing environmental conditions.

10:00 Tracking Juvenile Chinook Salmon Use of the Duwamish River with Passive Integrated Transponder (PIT) Tags

Julia Kobelt,
University of
Washington

We propose tagging at least 8,000 hatchery juvenile Chinook salmon in tandem with WDFW employees. We will then sample to detect PIT-tagged fish in priority areas of the Duwamish and nearshore Elliott Bay by shore and by boat. Our proposal adds a second year to Duwamish mobile monitoring and increases the number of fish that have PIT tags to be detected in the near and long term.

10:40 Lower Duwamish Invasive Assessment & Control

Whitney
Bowman,
EarthCorps

We propose to evaluate selective control techniques for nonnative cattails at Salmon Cove Park, which contains a significant patch of mixed native and nonnative cattails (*Typha latifolia*, *T. angustifolia*, and *T. × glauca*). We will also map presence of nonnative cattails and perennial pepperweed (*Lepidium latifolium*) along River Mile 0 to River Mile 10 of the Duwamish.

11:20 Addressing Stormwater Impacts on Chinook in Runoff-Impaired Watersheds

Melissa
Driessnack,
Washington
State University

We propose to evaluate sublethal impacts of stormwater containing 6PPD-quinone to early life stages of Chinook to document exposure outcomes and assess the effectiveness of a filtration treatment in mitigating toxicity. Fish will be sampled at the eyed, hatch, and swim-up stages for morphometrics and qPCR, then followed into the juvenile phase to assess effects on smoltification. Our recent work with Chinook indicates that successful smoltification depends on achieving a critical size, and sublethal growth impacts are likely to produce functionally significant life-history consequences.

12:00 Adjourn

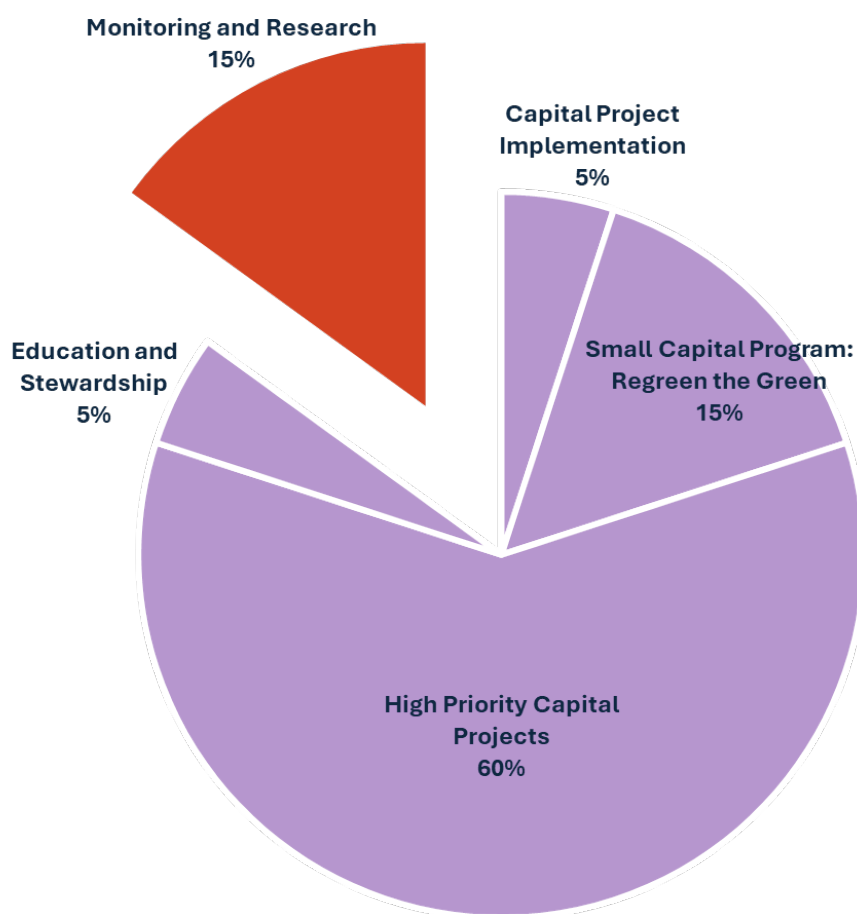
WRIA 9 ITC web page: <http://www.govlink.org/watersheds/9/committees/ImpleTechCmte.aspx>

Participant list:

Alicia Kellogg, Ash Gould, Chester Bennett, Chris Gregersen, Christa Heller, Erik Rigaux, Heidi Watters, Iris Kemp, Jen McIntyre, Johnny Billecci, Julia Kobelt, Julian Douglas, Kerry Bauman, Kollin Higgins, Marc Marcantonio, Marta Olson, Matt Goehring, Matt Knox, Melissa Driessnack, Michael Scheu, Mike Perfetti, Nate Malmborg, Nelson Salisbury, Nik Novotny, Rowena Valencia-Gica, Suzanna Smith, Tyler Patterson, Whitney Bowman

Monitoring & Research Proposals

Through FCD Cooperative Watershed Management grants, WRIA 9 funds capital projects, revegetation projects, education and stewardship projects, and monitoring and research projects at the percentages shown in the figure below.



This funding supports:

- Status & trends (noncompete) data collection used to track salmon population status, watershed health indicators, and Salmon Habitat Plan targets

- Enhanced effectiveness monitoring to understand how Chinook are using restoration projects
- Research to address known data gaps and emerging questions

In 2026, approximately \$678k is available to fund monitoring and research in WRIA 9. The 2026 Request for Proposals sought projects that target better understanding of

- habitat characteristics associated with longer residence times and higher growth rates in juvenile Chinook salmon,
- the effectiveness of different riparian planting methods for initial site preparation/invasive control, plant selection, spatial location and soil conditions, and maintenance; and
- Chinook salmon fry survival/mortality in the Duwamish River

The topic list above is not all-inclusive of monitoring and research needs within the watershed; WRIA 9 welcomed proposals outside these specific topics.

Six proposals were submitted to the 2026 grant round: two noncompete status & trends projects and four competitive research projects. A brief project summary and Review Team/ITC discussion are included for each project below.

Thank you to project sponsors, Review Team members, and ITC members!

Lower Green & Duwamish Large Wood Survey – status & trends

This project adds to a dataset of large wood surveys in the Lower Green and Duwamish and tracks progress towards the WRIA 9 Salmon Habitat Plan large wood target: 425 pieces per mile by 2030. Large wood surveys will follow the previously established protocols from 2004, 2013, and 2022 surveys.

Green River Screw Trap – status & trends

This project continues annual support of the Green River screw trap, which has operated since 2000 and provides important “fish out” data on multiple salmonid species, including abundance, size, and timing of outmigrating juvenile Chinook. The WDFW staff operating this trap also support PIT tagging efforts to track juvenile Chinook movement and residence time in Green/Duwamish habitats. USACE and Tacoma Water also contribute funding to maintain the trap and this critical time series.

Assessing the value of freshwater habitats through juvenile Chinook salmon prey availability and foraging opportunities

This project would analyze juvenile Chinook diets, invertebrate prey availability, and environmental conditions (water temperature, dissolved oxygen, conductivity, river flow)

across a range of habitats in the Middle and Lower Green. Collaborative studies are currently being proposed in WRIAs 8 and 7 by the same research team. The project's goal is to inform habitat restoration planning by defining the value of habitat types in terms of prey availability and foraging success across space and time.

Q&A:

- What assumptions are involved in using diet composition to associate with habitat/environmental conditions?
 - Fish move around – there is an assumption that the diet at capture reflects the habitat in which they are caught. Previous Snoqualmie study addressed by holding fish in cages within specific habitats, also tested lavage vs. dissection.
- Potential to use movement/residence data from previous PIT tag studies or, in the absence of hard data, model spatial extent of where foraging happened prior to capture based on swim speed for size of fish?
 - Yes, leveraging PIT tag information to key in on habitats used and movement among habitats. Want to associate fish location data with foraging success and growth potential in various habitat types.
- Are you measuring velocity and depth, two important variables for prey delivery and forage capture success? Hydraulic model potential – looking at velocity sheer zones especially in the very constrained Lower Green. Reference new literature coming from Utah researchers.
 - Current proposal is a first step to build foundation. Will measure velocity in currently proposed work. Measuring at a broad-scale and at the scale necessary for watershed-scale comparisons (WRIAs 7, 8, & 9). Would be interested in looking finer scale via collaboration or in a later study.
- What about sediment?
 - Sediment important, thinking in terms of habitat & prey. Hoping to look at sediment and benthic invertebrate production patterns.
- Chinook use a diversity of habitat types at different stages of their life cycle. How will results from this study make a difference in restoration project design and implementation? Shouldn't we restore lots of different types of habitats wherever we can?
 - All habitats are important but importance can vary spatially and temporally and for different life histories. For example, which habitats perform the best for helping fry grow vs. parr grow could be different. Paired habitat types or distance between habitat types could be important. If there are multiple habitat creation options at a potential project site, need to know which habitat type(s) would be most beneficial for fish encountering that project site to inform design.
- Will the study look at water fertility levels (nutrients in specific locations including from carcasses)?
 - It will not but if significant differences in prey/diet and environmental variables are found, we can pursue questions like that in the future.

- Will the study look at differences between drift foraging and cruise foraging (floodplain backwaters and wetlands where there is limited drift)?
 - Methods include drift sampling vs. tow sampling to quantify prey based on volume.

Tracking Juvenile Chinook Salmon Use of the Duwamish River with Passive Integrated Transponder (PIT) Tags

This project would build on the Duwamish PIT tag sampling currently underway, funded by a 2025 WRIA 9 CWM research grant. It would add a second year of sampling to provide a pink year/non pink year comparison, extend the spatial scope of sampling to Elliot Bay/nearshore, and improve sampling methods based on lessons learned from year 1. Working with WDFW and consulting with Chris Gregersen (King County PIT tag lead), the project would tag 8k juvenile Chinook and conduct pole seine, river seine, and trawl surveys to monitor tagged fish movement and residence time at Duwamish and nearshore sites. Final site selection will include WRIA 9 and PIT tag Advisory Team input.

Q&A:

- Could study expand upstream to Codiga Farms or add more Duwamish sites like Cecil Moses? If sampling Elliott Bay, suggest Seacrest Park. Previous study in early 2000s suggested Green River Chinook head south usually. Recommend sampling both directions in nearshore.
 - Value input and will consider as site selection is finalized. One aim is to increase detection probability, trying to visit sites where Chinook have been documented. Spanning sites from Duwamish to nearshore could give insight into residence time in Elliot Bay.
- Will tagging and sampling be timed to past study results showing fry in Duwamish January through March? What habitat characteristics will project measure?
 - Timing depends on when fish get large enough to tag – generally early to mid March. Lower size limit for tags is 45-50 mm. Did an experimental trial with new lighter tags in 1k fish with 99.7% survival. The first couple weeks of year 1 study underway show great detection capability with the PIT seine for small tags – can't get much smaller with current technology. Will measure point samples in field for water depth, temperature and will consider overall design of sites like Chinook Wind vs. DRPP.
- What about sampling for ghost tags/adding a sampling event for ghost tags?
 - First sampling event of year 1, identified a ghost tag in Turning Basin from a Chinook tagged in 2024. Surveying specifically for ghost tags is outside the scope of proposed project, but expect to encounter and document them throughout season as they are found.
- How much does flow/tidal exchange impact sampling? Potential to impact detection ability?
 - Aiming to sample at slack tide with assumption that fish are more mobile at lower flow speeds. Not sure about impact to detection ability.

- Does project incorporate spatiotemporal info from past Ruggerone study? When fish would be expected where?
 - Will revisit that specific study. Generally sites proposed were based on that and other past studies to maximize likelihood of Chinook encounters. Want to sample all across full rearing period to capture any change between then and now – in the 20+ years since the past studies, multiple habitat projects have been implemented in Duwamish.
- Have you considered lengthening the net to increase sample area? King County has larger seines that could be used if anchoring the net is possible.
 - Great to have a variety of net/seine options to maximize detection potential across habitat types. Longer net would create more drag. Currently exploring the potential for anchoring.

Lower Duwamish Invasive Assessment & Control

This project would map non-indigenous cattail and perennial pepperweed in the Duwamish and test a variety of selective control techniques for non-indigenous cattail. Non-indigenous cattails are a Class C noxious weed (control recommended) that alter marsh habitat, spread aggressively, hybridize with indigenous cattails, inhibit growth of other plants, and reduce dissolved oxygen levels. Perennial pepperweed is a Class B noxious weed (control required) that outcompetes indigenous species, alters salinity, and degrades habitat. Most mapping data for perennial pepperweed is old (2000-2012) and, although non-indigenous cattail is present in the Duwamish, it has never been mapped. This project will test selective control methods with four treatment types: manual control, cut and dab, foliar application, and a no-treatment control.

Q&A:

- Scope of project limited to lower 11 miles and to banks? Pepperweed is known issue and called out in Salmon Plan in offchannel habitats too. Recommend mapping the WSDOT mitigation site – known pepperweed site and likely seed source.
 - Will map off-channel habitat in proposed scope. Limiting to lower 11 miles was a choice in terms of project scope, budget, and staff capacity.
- Does study design include sufficient replicates for statistical comparison among treatment types?
 - No, difficult to get enough replicates with small spatial scale within scope.
- Why these two species and what is the impact to Chinook salmon?
 - Pepperweed required for control but not being tracked – need to know the extent of presence. Trying to protect indigenous cattails. Trying to create opportunity for watershed scale approach. Not sure of magnitude of impact to Chinook, but both impact riverbank ecosystems and degrade for shade and food source. The non-indigenous cattail grow lower down the bank so have higher potential to lower dissolved oxygen and inhibit other indigenous species that produce shade and food sources for juvenile Chinook.
- Recommend partnering with King County Noxious Weeds. Also consider opportunities to document other target species where/when possible.

- Implications of climate change and whether a more climate-tolerant hybrid may naturally replace indigenous cattails over time?
 - Beyond the scope of this study, not sure of climate change impacts to indigenous cattails nor different climate tolerance of hybrids – more research needed.
- Is ID rate 100% for indigenous vs hybrid vs non-indigenous cattails?
 - ID is not 100% especially with hybrids, but measuring key characteristics can get to high confidence; other studies suggest ID success of around 90%. Will only treat species with confident ID.

Addressing Stormwater Impacts on Chinook in Runoff-Impaired Watersheds

This project would build upon previous coho research and existing facility infrastructure at Miller Creek to document impacts of roadway runoff on early life stages of Chinook salmon and support management tools focused on population-level impacts. In year 1, the project would assess growth, survival, and saltwater readiness of Chinook raised on well water vs. stream water. In year 2, the project would assess effectiveness of biofiltration media to prevent toxicity to Chinook.

Q&A:

- How to relate results from Miller Creek to Green/Duwamish – roadway runoff locations and concentrations? Different exposure risks in different habitat types? How do results guide habitat project design, implementation?
 - Biologically relevant model, using Soos Cr hatchery fish, documenting effects like reduced size and smoltification stress. Smaller Chinook, lower in the system, earlier saltwater entry, more contaminant exposure. Miller Creek isn't about the creek itself, represents any site that receives runoff. Mainstem likely has dilution but expect side channel or localized runoff impacts.
- Do any comparisons of contaminants/water quality exist between Miller Creek and Duwamish?
 - Previous studies highlighted urban water input but not analyzed, would love to see more research done.
- Does scope include multiple soil media for treatment?
 - Biggest challenge is the volume of water needed to filtrate. Working on project in Ohop Creek, Nisqually, trying to treat all runoff from a segment of roadway. Will draw from that information. Plan testing multiple media in lab ahead of time to choose a single media (unable to test more than one at field site given facility constraints).
- Expected difference in filtration between proposed method and a naturally vegetated buffer?

- Unknown, and treatments haven't been selected yet – appreciate suggestions and recommendations.
- Suggest early saltwater tolerance tests, not just one at the end of study. Emulate stress on fry-sized early migrants.
 - Previous coho study included some grading of exposure. Matching progression downriver with encountered salinity. Could inform with size data from past studies of Duwamish fish captures and/or with smolt trap size data.
- How do different roadway types (e.g., asphalt, gravel, pot-holed) contribute contaminants to the stream and are different media/buffers better treatments for those types?
 - Great potential study but outside the scope of this project.