

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



WRIA 9 Implementation Technical Committee Meeting

May 18, 2022 | 9:30 am – 11:00 am

Zoom Link: <https://us02web.zoom.us/j/89069145463?pwd=SUhLOHhTVES2VlhleTFML0x4V3J2UT09>

Meeting ID: 890 6914 5463

Passcode: salmon

9:30 Welcome & Introductions

9:40 Contaminants in juvenile Green/Duwamish Chinook salmon

Presentation followed by Q&A and group discussion

A growing body of research suggests that contaminant exposure for juvenile Chinook salmon in the Green/Duwamish is affecting growth, disease resistance, immunosuppression, and marine survival. This presentation will discuss the state of knowledge on contaminant impacts to Green/Duwamish Chinook, including surveys and time-trend analyses of legacy contaminants and chemicals of emerging concern.

Sandie O’Neill,
Washington Department
of Fish & Wildlife

10:30 Green/Duwamish Habitat Conditions: B-IBI

Presentation followed by Q&A and group discussion

The benthic index of biotic integrity (B-IBI) is commonly used to quantify the biological conditions of streams. The index is developed from metrics measuring various aspects of benthic macroinvertebrate diversity and community structure. This presentation will discuss current B-IBI scores and trends since 2012 in the Green/Duwamish at watershed and subwatershed scales. This analysis was undertaken in support of the WRIA 9 2023 Status & Trends report.

Kate Macneale, King
County Science and
Technical Support
Section

11:15 Round Robin Updates – ASYNCHRONOUS

Slide deck activity

- **Pre-meeting prep (5 minutes)** – Please find a slide deck with instructions on slide 1 at this link: https://docs.google.com/presentation/d/1labfj9upZbRTRco7wm8DBUQrunZa7K7hB_ddmr9XTPQ/edit?usp=sharing. Use your slide to include relevant updates from your jurisdiction, project, or team. Feel free to make the slide your own with photos or maps of project sites.

All

11:30 Adjourn

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

Participant list:

Alexandra Doty, Amani Moyer-Ali, Andrea Carey, Bella Solano, Beth Sosik, Chris Gregersen, Chris Korwel, Cleo Neculae, David Lindley, Debbie Meisinger, Halley Kimball, Iris Kemp, Jeff Stern, Jennifer White, Josh Kahan, Josh Hopkins, Kate Macneale, Katherine Lynch, Katie Beaver, Kerry Bauman, Kollin Higgins, Louisa Harding, Marc Marcantonio, Matt Goehring, Matt Knox, Rowena Valencia-Gica, Sandie O'Neill, Suzanna Smith, Thaniel Gouk

Round-table Updates and Reminders

Read through our **WRIA 9 ITC June round robin** slides at this link:

https://docs.google.com/presentation/d/1labfi9upZbRTRco7wm8DBUQrunZa7K7hB_ddmr9XTPQ/edit?usp=sharing. Includes relevant updates from WRIA 9 staff, Puget Sound Partnership, Forterra, King County, Covington Water District, City of Kent, WDFW, and Mid Sound Fisheries Enhancement Group.

Contaminants in juvenile Green/Duwamish Chinook salmon ([slides to come; will post here](#))

WDFW has been conducting contaminant studies since 1989, including adult Chinook and coho salmon (from 1992 onward) and juvenile Chinook salmon (from 2013 onward). Sandie presented research on legacy contaminants (PCBs, PBDEs) and chemicals of emerging concern (CECs, e.g., pharmaceuticals) on juvenile Chinook sampled from the Middle Green, Lower Green, and Duwamish. Contaminant burdens and potential for adverse impacts to salmon growth and survival are highest in the Duwamish, and higher than levels observed in most other Puget Sound watersheds. Read more about the work of [WDFW's Toxics Biological Observation System \(TBiOS\) Team](#), the [Toxics in Aquatic Life Vital Sign](#), and the [contaminants in juvenile salmon indicator](#).

Further questions? Contact Sandie O'Neill at sandra.oneill@dfw.wa.gov.

Discussion

- Kollin – could date of sample be used as a proxy for length of time spent in the Duwamish?
 - Sandie – not accurately; a fish that's caught in the Duwamish in May could have been there since March or it could have just arrived at the estuary. Most/all of these samples were collected in May-June. Our Green/Duwamish sampling is limited. We would love to develop more partnerships for sampling assistance.
 - Chris – we will be doing extensive sampling in the lower Green in 2023 and would be happy to provide sampling assistance.
- Thaniel – interested in CEC/drug impacts to salmon and whether CEC levels have changed over the past couple years with an increase in riverside encampments.
- Jennifer – were there potential PCB improvements from 2013 to 2018 samples?
 - Sandie – no improvement at Kellogg Island, some improvement at Seattle Waterfront. DDTs have improved and are low.

- Jennifer – how were otoliths processed with composite samples?
 - Sandie – we collected 215 unmarked fish and had otolith chemistry (edge analysis) done individually to determine natural vs. hatchery origin and look at residence time. We are planning to start looking at individual fish and plotting residence time in the estuary vs. PCBs. The longer they spend, the more they accumulate. Each individual fish either has a saline signal or not. Composite samples are average of days until saline signal, which is a coarse measure of residence time. We are still working on this analysis, in collaboration with Jessica Lundin (NOAA) who is looking at the relationship between days in the estuary and growth impacts for individual fish.
- Matt – we are basically losing the entire fry life history phase of chinook; fry outmigrants are very unlikely to return as adults. Have you thought about ways we could differentiate fry vs. parr in contaminant analyses?
 - Sandie – we would love to look at residence time of fish in upper parts of the system too. The otolith microchemistry should differ by subbasin.
- Chris – have you considered trials with hatchery fish held in cages or net pens at various locations to develop a baseline contaminants level?
 - Sandie – we haven't done caging experiments but would love to; we are currently data rich and capacity limited. We have sampled at the hatchery and are fairly confident that hatchery fish pick up some contaminants coming into the lower Green (though not as much as Duwamish/nearshore). We don't think downstream high points are due to upstream contaminant levels.
 - Kollin – Soos Cr hatchery fish would likely differ from Palmer hatchery fish.

Green/Duwamish Habitat Conditions: B-IBI ([slides here](#))

Stream macroinvertebrates are good indicators of habitat and water quality because their communities are diverse and complex, relatively “faithful” to their location, relatively long-lived, and composed of taxa with varying sensitivities to stressors such as excess fine sediment, altered hydrology, contaminants, elevated nutrients, and invasive species. The Benthic Index of Biotic Integrity aggregates 10 metrics developed from stream macroinvertebrate samples. Highlights from the Green/Duwamish: the best-scoring sites are in Newaukum and Coal Creeks; the worst is in Springbrook Creek tributary. The sites improving quickest are in Walker, Big Soos, and Newaukum. There has been a recent decline at the Deep Creek site. Overall, B-IBI scores are improving at 24% of sites and staying stable at most others, despite increased urban development. You can find more information on Kate's slides linked above, in this recently completed report: [Stressor Identification and Recommended Actions for Restoring and Protecting Select Puget Lowland Stream Basins](#), and in [the B-IBI Implementation Strategy](#). B-IBI scores for specific sites are available in the Puget Sound Stream Benthos database: <https://pugetsoundstreambenthos.org/>

Further questions? Contact Kate Macneale at kate.macneale@kingcounty.gov.

Discussion

- Kollin – where are the Newaukum sites with improvements located in comparison to the Middle Green revegetation efforts led by Josh Kahan?
 - Kate – the B-IBI monitoring site is downstream of the Newaukum plantings.
- Josh – have you mapped riparian revegetation and open space acquisitions to correlate with B-IBI sites and scores?
 - Kate & Beth – not in a way that we can analyze statistically. A general observation for the region (not WRIA 9 specifically): when we look at the NLCD data and the amount of vegetation in the functional riparian zone, we have not seen detectable improvement at the landscape level.
- Kollin – do you have any theories around Deep Creek's decline? I know there was some flooding impacts close to where it comes off the hillsides and hits the flats. Deep Creek is isolated from the Green in its own little bubble and is less developed than the rest of WRIA 9.
 - Kate & Beth – we haven't dug deep into specific sites yet, so the jury is still out but we will report back. Site notes do seem to indicate water flow changes at that site.
- Kerry – have retention/detention requirements for new developments improved flashiness?
 - Kate & Beth – we are working on a project now to try to get at that. Data are limited. We are trying to figure out whether recent urban development is just a different beast than previously. We haven't seen clear improvements in flashiness metrics over time. But locations of flow gauges don't always align well with locations of B-IBI sites, so it is fuzzy.
- Cleo – can you speak to some limitations of interpreting data at individual locations? For instance, in Soos Creek, most of the monitoring locations are in forested/rural areas, which are downstream of urbanization. What are the spatial limitations (i.e., local versus upstream) of understanding these data? In other words, if we see excellent scores in undeveloped areas, can we infer that scores are excellent in upstream urbanized areas?
 - Kate – Soos Cr is the opposite of the city development patterns we typically see: Soos has development upstream and forested land downstream. We think this is a testament of the buffering capacity of a stream itself, to be able to maintain a diverse macroinvertebrate community downstream when upstream conditions are not as good. It would suggest to me that flow, water quality, and contaminants are not issues. The Big Soos Cr site has a nice range of sediment sizes that give the macroinvertebrate community a better chance of holding on; it doesn't seem to have the fine sediment issues that upstream sites do.