

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



WRIA 9 Implementation Technical Committee Meeting September 21, 2022 | 9:30 am – 11:30 am

[Click here to join the meeting](#) or call in (audio only): [+1 425-653-6586](tel:+14256536586), [391500205#](tel:+14256536586)

Meeting ID: 290 955 665 86

Passcode: K2SBHB

9:30 **Welcome & Introductions**

9:40 **Gravel and Wood Nourishment in the Green River**
Presentation followed by Q&A and group discussion

Scott
Pozarycki,
USACE

In 1999, the Water Resources Development Act authorized the Howard Hanson Dam (HHD) Additional Water Storage Project (AWSP), a cost share project with the City of Tacoma that included additional water storage at the dam and a suite of habitat restoration and mitigation projects. This included annual gravel and wood nourishment of the Green River downstream of the dam. The purpose of these projects is to restore spawning gravel and large wood to the river downstream of the dam. The gravel nourishment project was initiated in 2003 and wood nourishment was initiated in 2004. The projects are managed by the U.S. Army Corps of Engineers in cooperation with the City of Tacoma.

10:40 **ITC planning: charter updates and 2023 work plan**
Group discussion

All

The WRIA 9 ITC charter outlines ITC roles and responsibilities. WRIA 9 envisions revisiting and updating as needed on a 5-year cycle to align with updates to the Forum’s operating guidelines.

- **Pre-meeting prep** – please review proposed updates to the charter: <https://docs.google.com/document/d/198IDqdG3qWeuf6e3qPR6eYlfrWjBw-2O/edit?usp=sharing&oid=111548699709597744312&rtfpof=true&sd=true>. Feel free to add comments in the draft document or, if preferred, email comments to Iris (ikemp@kingcounty.gov) by Tuesday, Sept. 20.

A core component of the ITC’s role is synthesizing scientific information to guide the implementation of the Salmon Habitat Plan. This work is supported via project updates, presentations on regional and local science, and group discussion.

- **Pre-meeting prep** – what do you want to learn, share, and discuss in 2023? Begin brainstorming on these whiteboards: https://jamboard.google.com/d/1Y5axbEyNYvKxNgRWAJTauWSDapKGiS3eV-a_tnE-WaM/edit?usp=sharing

11:10 **Round Robin Updates**
Slide deck activity

All

- **Pre-meeting prep (5 minutes)** – Please find instructions on slide 1 at this link: <https://docs.google.com/presentation/d/1Cj72TaQ7G16A-wd9ZEaUvUCOB0H0FMcYlaL1irQWh1Y/edit?usp=sharing>. Use your slide to include relevant updates from your jurisdiction, project, or team. Slides are pre-filled with names for convenience; please feel free to combine slides.

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

Participant list:

Chris Korwel, Cleo Neculae, Iris Kemp, Josh Hopkins, Josh Kahan, Julian Douglas, Katherine Lynch, Kerry Bauman, Kollin Higgins, Marc Marcantonio, Matt Goehring, Mike Mactutis, Mike Perfetti, Natane Moore, Scott Pozarycki, Suzanna Smith

Round-table Updates and Reminders

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

<https://docs.google.com/presentation/d/1Cj72TaQ7G16A-wd9ZEaUvUCOBOH0FMcYlaL1irQWh1Y/edit?usp=sharing>. Includes updates from WRIA 9, Puget Sound Partnership, City of Seattle, King County, Covington Water District, and Ecology.

Project meetings for 2023 funding package are underway. If you haven't heard from Suzanna and potentially have projects in need of funding for 2023, please get in touch ASAP! Email susmith@kingcounty.gov.

What projects/information do you want to hear about, share, and/or discuss in 2023?

Contribute to the whiteboarding brainstorm here:

https://jamboard.google.com/d/1Y5axbEyNYvKxNgRWAJTauWSDapKGiS3eV-a_tnE-WaM/edit?usp=sharing. Add sticky notes with your ideas and/or use the stars piled in the lower right corner of each whiteboard to upvote the ideas already listed.

Gravel and Wood Nourishment in the Green River

This project is currently managed by USACE through the Howard Hanson Dam (HHD) operations program. USACE works closely with City of Tacoma, who owns the land and contributes wood to the project. The HHD has been in place since 1962, trapping wood and gravel that would have otherwise moved downstream and resulting in a lack of downstream spawning gravels and large wood debris (LWD). USACE documented post-dam pre-project conditions in 2002, then initiated a project involving gravel and wood placement at river mile (RM) 60, just below the two dams.

The general objective of the project was to restore depleted spawning gravels below HHD and establish functional equilibrium. Specific objectives included loading 3900 cubic yards of spawning size gravel per year on average based on half the estimated annual average annual transport rate (this objective evolved upon ESA consultation to 12,000 cy), that at least 85% of total volume placed would be spawning sized material (half inch to four inch), that gravel nourishment berms would be placed at or near the ordinary high water mark for frequent overtopping and inundation, to use unique shapes and emulate natural processes to encourage erosion of berms at a range of flows (it turned out that erosion needed no encouragement), to mobilize a majority 90% of spawning materials at the bankfull event, and to transport approximately 5500 tons/13,000 tons/15,000 tons in low flow/average flow/high flow years respectively.

Log jams were built in coordination with Tacoma as a feature of the Additional Water Storage Project (AWSP). The jams created bed disturbance and broke the armor layer of the river which

introduced spawning size gravel to the river in addition to the upstream gravel placements. Monitoring data reflect gravel from both sources.

The first year of gravel supplementation was 2003. Gravel came from Puyallup basin quarry for the first 5-6 years, then from the White River basin, and now from the Green River basin. There were initial concerns about fish rejecting out-of-basin gravel, but that has not appeared to happen. No fine sediment issues have been identified either.

Monitoring includes annual evaluation of gravel berm erosion, watershed-scale habitat mapping (pools, LWD, pebble counts) from RM 32-61 every 5 years, intensive monitoring of Palmer reach (RM 56-60) in 2003-2008 and 2010-2011 and 2015 including gravel patch mapping, cross section surveys, pebble counts, aerial photo analysis, channel stability, high flow monitoring, and redd surveys, and a scour study in 2010-2012.

The biggest challenge experienced in this project has been the rapid erosion of gravel at relatively low flows, creating waves of gravel moving downstream quickly and a return to armored conditions after gravel wave passes. Other challenges included the gravel berm backwatering the Palmer stream gage which is used to manage water diversion and spawning issues including spawning in unstable gravel, on the gravel berm, and in the floodplain behind the gravel berm.

Across the lifetime of the project, several different configurations of gravel placement were tested. The 2003 placement inundated quickly at moderate flows and fish spawned on the gravel berm. The 2005 placement was in the middle of the river at low elevation and pink salmon spawned on it. In 2009, USACE tried adding logs to the berm to create stability and slow erosion, but it did not work well. In this placement, the berm was tall and occupied enough of the river to cause water to move into a side channel. Hundreds of fish (mostly pinks) spawned in this backwater which was subsequently dewatered once the berm eroded. Fish access to backwater areas was blocked for subsequent placements. The current configuration which seems to be working well is a tall gravel berm with logs on top that fall into the river once the toe has been sufficiently eroded. Logs are also placed on the upper side of the berm so they float downstream when the water level rises.

A scour study at RM 60.2 found about four feet of gravel moved through the system over one year. Summer monitoring was not sufficient; although winter high flows make surveys difficult, seasonal monitoring was necessary to quantify gravel movement. Accelerometer data suggested that erosion was happening even at lower flows.

Adaptive management strategies implemented over the course of the project so far:

- Increasing gravel size from 4-inch minus to 10-inch minus over 9 years. The smaller size eroded too readily; the larger size is based on what monitoring in upper basin above dam suggests is present.
- Altering location of gravel placement. The initial downstream location was a favored spawning site so shifted to an upstream location downstream of access road to avoid Palmer stream gage.
- Modifying configuration of berm to minimize spawning on berm and remove fish access to side channel.

- Adjusting volume 7k to 17k tons.
- Adding measures to reduce erosion (build taller berm not in middle of river, add logs to berm face and within berm, winter placement) or measures to increase erosion (dig it out) as the situation requires.

Monitoring results show gravel accumulation downstream of the berm in later years of the project, an accumulation of more gravel and deeper deposits of gravel, and substrate conditions that are becoming more comparable to downstream conditions, suggesting that adaptive management strategies have been effective.

Overall, the goal has become to give the river the raw materials to create the conditions it thinks are appropriate. Updated objectives include entraining gravel into the river corresponding to flow conditions (most of gravel in high flow year, half the gravel in moderate flow year, small percentage of gravel in low flow year), maintaining and creating gravel deposits downstream of the placement site, reversing bed armoring by slowly aggrading the stream bed while maintaining pools, and minimizing redd scour caused by unstable gravel deposits.

Placement criteria now include:

- Place sufficient gravel annually to maintain spawning conditions downstream of Tacoma Headworks Dam.
- Base gravel size specification (currently 10-inch minus) on optimal spawning size range and stability in river. Need additional monitoring on this criteria to better understand whether/how it is working.
- Place 15k tons of gravel (based on 10-inch minus size) for entrainment into the river. This is a goal.
- Place gravel to simulate an eroding river bank or terrace.
- Place gravel only at the established upstream nourishment site.
- Place gravel berm footprint downstream of RM 60.3 access road to minimize effects on Palmer stream gage.
- Construct berm such that fish cannot access landward side.

Over 2003-2022, 136,327 tons of gravel has been added to the river and Chinook salmon and steelhead are spawning in the gravel. Palmer reach has lots of spawning.

Large wood placements initiated in 2004 are a companion project to gravel nourishment. The goal is to transport 50% of large wood around the dam. Logs are placed on berm and let wash downstream. Currently, 30-40 logs are placed per cycle with 1-2 cycles per year. Cycles depend on the flow regime as high flows are needed to wash logs downstream and avoid creating jams. Constructed jams downstream catch a lot of the placed wood and have expanded significantly over time. Large logs (12" dia X 20' length) were tagged beginning in 2007. Small wood debris is placed by Tacoma and the Corps annually.

Monitoring results show that total wood and jams per mile have increased in downstream reaches. Tagged wood contribution to reach 2 (just downstream of placement) is about 20-25%, with contribution decreasing in each downstream reach. This suggests that most large logs remain in system and stay fairly close to placement location.

Further questions? Contact Scott Pozarycki at scott.v.pozarycki@usace.army.mil.

Discussion

- Katherine – how do monitoring results impact regulation-setting for gravel size? E.g., a single regulatory standard vs. river-specific standards?
 - Scott – the original criteria came through a WDFW document and became part of the BiOp. We had to bring NMFS, FWS, and the Muckleshoot Indian Tribe together to go through the monitoring results and build a case to justify a larger size.
- Kollin – results graphics suggest gravel placements have impact down to reach 4 but not further downstream. Is there a need for additional/different gravel supplementation patterns?
 - Scott – there are active ongoing conversations, but no actionable plans yet.
- Kollin – have there been concerns over tagged wood being a hazard/liability issues?
 - Scott – there was lots of stakeholder discussion with river recreational groups and conversations with the boating community. Tacoma provides a boat launch at one of the gravel sites, and gravel placements are designed to enable that. Issues of safety have not come up. Once a tagged log ended up in the gorge in one of the favorite rapid runs but it broke a week later so turned out fine.
- Kerry – how do erosion rates compare to naturally-introduced fresh gravel from bank erosion or landslides? Has supplementation alleviated the gravel deficit zone? Do you plan to look at historical cross-sections downstream?
 - Scott – we monitor landslides and aggradations but don't specifically track how those slides provide gravel. It likely depends on the slide and material. We have not made a formal comparison of erosion rates between human-placed and naturally-introduced gravel. Would speculate that human-placed gravel entrains more quickly than a natural landslide. The project is centered on the goal of alleviating the gravel deficit. We don't have historical cross-sections going back that far, so that analysis is not included in the project.

ITC planning: charter updates and 2023 work plan

ITC members walked through proposed updates to the ITC charter. The revised draft will now go to the full ITC for asynchronous comment. If no further edits, the ITC will adopt proposed updates at the October meeting.