

Snohomish Basin Salmonid Recovery Technical Committee
Online Meeting—Zoom
April 6th, 2021 9:00 am - 12:00 noon

Attendees

Emily Davis, Snoqualmie Watershed Forum
Mike Rustay, Snohomish County
Brett Shattuck, Tulalip Tribes
Ashley Kees, WDFW
Daniel Howe, Snohomish County
Frank Leonetti, Snohomish County
Heather Khan, WA Dept. of Ecology
Josh Kubo, King County
Jacob McDermott, Tulalip Tribes
Kirk Lakey, WDFW
Matt Baerwalde, Snoqualmie Tribe
Carson Moscoso, SCD
Ingria Jones, WA Dept. of Ecology
Doug Hennick, WFC
Jessica Blanchett, Hart Crowser/Port of Everett/City of Everett
Larry Lowe, Sno PUD
Luke Hanna, Snohomish County
Ryan Lewis, Snoqualmie Tribe
Stephanie Cotton, Snohomish County
Gretchen Glaub, Snohomish County
Kollin Higgins, King County
Phillip North, Tulalip Tribes
John Klochak, King County
Denise Krownbell, Seattle City Light
Andrea Mojzak, King County
Keith Binkley, Sno PUD
Aimee Fullerton, NOAA
Lisa Tario, Snohomish County
Elissa Ostergaard, Snoqualmie Watershed Forum
Susan O'Neil, ESA
Erin Murray, PSP
Jessica Lange, Sound Salmon Solutions
Stephanie Celt, DNR
Anne Savery, Tulalip Tribes
Erik Stockdale, Snohomish County
Janell Majewski, Snohomish County
Phillip Murphy
Ning Sun, Pacific Northwest National Laboratory (PNNL)
Hongxiang Yan, Pacific Northwest National Laboratory (PNNL)

Introductions, review agenda

Commented [ED1]: I have no idea who this is. Mike?

Emily opened the meeting. Everyone introduced themselves. Emily reviewed the agenda.

Basin updates - Gretchen

Gretchen provided some brief updates.

Reallocation of Return Funds

The Tolt Lower Frew Project closed “incomplete”. This opens up PSAR funds (\$128K) to reallocate to other projects that were not fully funded in past grant rounds. Gretchen proposed fully funding two projects: Woods Creek RR Bridge Removal (AASF) and Woods Creek LWM Prelim Design (SSS). This is PSAR 17-19 funds so it would typically need to be spent by June 2021, but PSP has approved extending that deadline. SSS submitted their Woods Creek preliminary design project in 2018 so there are some cost increases too (\$2,500 for staff costs). Anything we do not reallocate gets returned to the region. Gretchen asked for Tech Comm support to reallocate these funds. There was consensus to support the reallocation.

Andrea Mojzak spoke to the “closed incomplete” status of the Lower Frew project. She explained that due to some delays in securing the project footprint they are not moving forward on preliminary design until that is secured. They are hoping for a bigger project footprint, but currently waiting on City of Carnation for the acquisition. Fortunately, there is still funding to keep the project moving forward in the meantime while returning these funds to the basin.

New RCO Manager

Amea Bahr will be our new RCO manager, replacing Elizabeth Butler. She also supports the Stillaguamish basin.

Covid-19 Impacts

Project sponsors are hitting project delays due to Covid. Gretchen is working on processing extensions for all the sponsors. PSP and RCO have been supporting those extensions. We are thankful for that support so we can keep using the funds the basin has been allocated.

State, House, and Senate Budgets

The legislature has released their capital budgets and it is looking good. The King County Fall City Floodplain Reconnection project looks like it will be fully funded. It also looks good for Snohomish County’s Floodplains by Design project too. The Fish Passage Barrier Removal Board funding line isn’t quite clear yet, but it looks like many of our projects will be below the funding line.

SRC Retreat

There was a recent retreat focused on how we allocate our PSAR funding throughout the region - what is our PSAR funding strategy? The white paper we discussed last month and what the limiting factors are for why Chinook are not recovering in the Puget Sound was considered and discussed. The event was well attended (70+ participants) and well facilitated by PSP. We will talk about next steps and outcomes from the retreat more at the next Tech Comm meeting.

For PSAR funding the region is looking to maintain where things are for the \$30M in PSAR funding distributed across the watersheds. We get \$1.9M every two years for the Snohomish

basin. Each basin gets a slightly different amount. But PSP is looking at creating a 10-year strategic plan which could mean changes to our PSAR capital funding program. They are also looking at creating a project list of “megaprojects” or “top 10 projects” to present to the state. It doesn’t look like we will see changes to the program in the immediate future, but possibly 2-4 years out. Changes in how the PSAR program strategically focuses funding could mean big changes for how we do our own strategizing to fund projects in our basin.

Erin shared the background presentation from the SRC meeting for reference. PSP had hoped to do the retreat in 2020 but it was postponed due to Covid. The conversation has been a long time coming. PSP wants to consider the question: what can we change that is in our control within the board system? There will be another SRC meeting in May to continue the discussion.

Keith, our WRIA7 SRC representative, added that each of the watersheds shared about their accomplishments and challenges. Gretchen did a great job representing our basin. This is a grand triage project because salmon recovery is grossly underfunded. So they want to know where we get the most “bang for the buck”. He felt the retreat was productive and solicited a lot of input from a lot of players with a common interest.

Gretchen added that there was discussion around landowner willingness and sponsor capacity as constraints that persist even if we had all the funding in the world.

Susan commented it seems like a good opportunity consider how we frame the implementation targets, “mega projects” in the basin or other big things within the plan update

Mike noted that we can dedicate a lot of time to discussing this further at our May meeting

Gretchen added that our Status and Trends report was a super helpful communication tool for the retreat.

SRFB 2021

Site visits were held virtually last month and we are compiling scores. The state reviewers are still reviewing. But next month the local review committee should have some recommendations/discussion points to bring to the Tech Comm.

Lower Sky Habitat Status and Trends – Mike, Frank, Luke

Mike provided an introduction and background on this long-term habitat monitoring project, which has been in operation since the early 2000s. Their basic methodology was informed by the EASC - Snohomish River Basin Ecological Analysis for Salmonid Conservation - the technical basis for our 2005 Conservation Plan. This utilized an EDT (Ecosystem Diagnosis and Treatment) modelling approach. SnoCo has coordinated methodologies with King County so that large river data collection is similar across the basin. The Lower Sky project is a large survey effort – 15 miles of mainstem river, not including side channels. Now staff are working to summarize findings in a clear way via the State of the Waters Report.

The team then gave an overview of their survey results as follows.

Commented [ED2]: Mike, do you want to skim this for general completeness and accuracy?

Floodplain

The team maps and classifies floodplain, main and side channels, etc. over time from aerial photos to track channel migration and floodplain changes over time. Since 1984, the Braided Reach has seen increasing mainstem length and increasing sinuosity due to lateral erosion. This translates to more habitat area and connectivity with side channels. Their analysis revealed that over the course of the study period, side channel percentage and area increased in every reach.

Bank Condition

Bank condition, bank stability, and bank materials is important to track because natural streambanks can provide valuable habitat and cover, channel roughness, and migration and erosion. In the Gooseneck Island area, the team observed an increase in bank and island erosion, side channel expansion, and bar deposition.

LWD

LWD pieces and jams are counted and characterized within each reach because they provide habitat and cover, while also influencing geomorphic processes to improve rearing and spawning conditions. The analysis showed a reduction in bar apex jams, and an increase in bank jams/larger jams from bank erosion and projects.

Pools

It's important to measure, count and characterize pools because they provide high quality habitat and cover, and influence channel processes. The number of pools increased between 2004 and 2018 in most reaches except for two. Pool frequency increased in all reaches.

Overall, the analysis showed that conditions have improved for some selected habitat indicators such as wood, jams and bank-affiliated jams, pool quantity, wood-formed pools, and some lateral erosion and side channel occupancy/expansion. Moreover, we can spatially discriminate some of the changes (since 2004) to locations with more active channel dynamics. So, if it follows that the few, slightly-more-dynamic locations with channel adjustments to new channel boundaries (expanded) are the locations with the improvements, then it should follow that other locations with potential to adjust channel location or boundaries (but aren't currently) would be locations to target for restoration with high benefits.

Snohomish County State of Our Waters – Summary Report



| Habitat metric | Trend | Conclusions | Observations |
|------------------|-------|---|--------------|
| LWD | ↑ | <ul style="list-style-type: none"> Jam count increased in all reaches (esp. restoration Side channel) LWD pieces increased (except individual pieces in reach 1) Jam area and volume increased | |
| Bank condition | ↔ | <ul style="list-style-type: none"> Bank condition improved slightly in all reaches. Bank stability decreased in all three reaches. Length of modified banks did not change; some failing locations | |
| Pools | ↑ | <ul style="list-style-type: none"> Count / average area for main channel pools increased in most reaches. Increase in number of wood formed pools in all reaches, as well as bedrock formed pools. Average pool area for rip rap formed pools increased. | |
| Planform changes | ↑ | <ul style="list-style-type: none"> Increase in % side channels (wet/gravel bars) in all reaches, increase in forested islands. Decrease in % wet/gravel bars in main channel Increase in vegetated bars. More side channels = greater habitat capacity and better quality habitat | |

Elissa asked: Are there any active flood districts in Snohomish County repairing levees and revetments, or is it just private landowners doing any repairs? Lisa commented there are several flood districts repairing levees, and the County engages in some levee/revetment repair as well.

Keith asked: Can you loosely describe restoration actions that have occurred along the three reaches? The team provided this answer after the meeting in a follow-up:

- a) Reach 1 work has primarily been at the Habitat Bank (Wetlands Creation?) just downstream from Reformatory Road outside Monroe – Here side channels were created and floodplain area increased relative to past floodplain constriction.
- b) Reach 2 actions have included (over longer time frames) removal of the old railroad crossing just upstream of Monroe, and implementation of the right bank biorevetment in the downstream section of the Goose island side channel that was discussed (and relates to Kollin’s question). Other bio-based actions included a log matrix/weir at one of the higher inflow locations to Haskell slough. That’s what I’m aware of. So certainly not as much in Reach 2.
- c) Reach 3 work has primarily been in the Groenveld side channel on river right just downstream from the Sultan R. confluence, including a 2005? log jam and 2015 log jams and extensive flood fencing funded by the PUD (thanks ARC). There has been other flood fencing and large log placement in another downstream backwater and other minor flood fencing in the gooseneck side channel that was very process-effective for sediment storage and river migration.

Kollin asked: around 10 years ago at a workshop, looking at process-based restoration, some SnoCo Staff adopted a position that biorevetmented stabilized banks were a better bank condition for salmon than a steep eroding bank. Is that position no longer supported by SWM?

Commented [ED3]: The SnoCo team helpfully sent in answers for unanswered q’s like these. I put them in the Meeting Materials folder (“Lower Sky Habitat Questions”) and they may help resolve these highlighted areas. We did also record it if you want to refer to that. Zoom meeting recordings folder → April 2021

- a) It's complicated – and I think we have to acknowledge the specifics of a site - both the risks and the possible outcomes. I would say that simplistically a biovetted bank is better than a steep eroding bank as rearing habitat for fish – densities will be greater. I think Josh Kubo' recent research on fish use of various bank types demonstrates this. As would earlier Skagit research of fish use on various bank/bar types. But for the steep eroding bank, considerations are adjacent uses/infrastructure, risk/hazard, and floodplain “potential.” At a site, one consideration might be just how far an eroding bank might move. In some cases there are natural limits to natural channel migration, so the potential for floodplain engagement and turnover may be very limited and biovetment may be worth implementing.
- b) In the case of the Goose neck side channel bank, what we knew would happen would be a major avulsion and abandonment of the meander bend - as has happened – within a few years. We knew this change in flow routing would reduce the likelihood of additional lateral erosion affecting the landowner and then might obviate the need for any action to stop erosion, but that habitat quality would be impaired in the future in this future backwater. As a result of implementing the bank biovetment, the new backwater still has some of the bio-revetment characteristics, cover, planting, and better rearing, without the near-term risk of more erosion which could have eventually unraveled the project.

Phillip Murphy asked: At what flow water levels are pools observed? Frank said pool surveys are done at summer low flow, but there are inevitably some differences between years and sample dates.

Emily asked: is there any companion fish monitoring to see if/how the changes observed are acting on your hypotheses? Mike said at the county level, no. It's left to the comanagers. We have a screw trap and monitoring of fish use in that reach and of those traps and project specific monitoring where we do some limited beach seining to characterize fish use.

Climate Change, Riparian Management and Forest Canopy Modeling – Matt, Aimee (NOAA), Ning Sun, and Hongxiang Yan (Pacific Northwest National Laboratory)

The research team took an ensemble of global climate models and used them to compare to historic and future temperature and flows in the Snoqualmie basin. The predictions were then used to inform habitat management scenarios to compare how riparian and habitat management might buffer or accelerate the effects of climate change. Then those outputs were plugged into a salmon model which looked at a suite of life history factors to predict a salmon response.

The predictions include increased air temperature and shifting seasons for precipitation from the climate models: more precipitation, and more of it in the wintertime, with more falling as rain. The main model used to predict flow response was DHSVM (distributed hydrology soil vegetation model). The individual-based fish model summarized simulated behavior, growth, and survival of individual Chinook salmon to predict population-level responses to changes in flow and temperature. The model predicts an earlier and more temporally compressed outmigration of smolts. The model also predicts that juvenile Chinook freshwater survival may

increase by the end of this century if fry outmigrate earlier because they will be able to avoid scouring flows.

Main conclusions:

- Riparian restoration can partly, but not completely offset the expected increases to water temperature caused by climate change.
- “Partial restoration” has almost as much benefit as “full restoration”, but ongoing riparian degradation counteracts protection.
- The uplands matter too.
- Basin-scale management of land cover, combined with riparian restoration, has synergistic potential to offer streamflow and temperature benefits to stream systems.

Commented [ED4]: Great—maybe throw those in earlier

Phillip North asked: Is buffer width defined as the undisturbed riparian with the adjacent undisturbed upland vegetation? Hongxiang answered: Buffer width is the riparian area along the river reaches; if it is disturbed forest such as harvested areas in the North Fork Snoqualmie, we define very small or 0 buffer width. The difference is in the location of restoration; the “full restoration” scenario includes all downstream rivers.

Anne asked: Do we know survival of outmigrants if they leave Snoqualmie River early? Josh said there is info on subyearling vs yearling survival based on otolith data. But survival information for early outmigrants is still being determined.

Emily asked: Did the model take density dependent effects and current limited rearing capacity into account or assume that 'future' would include expansion of quality/quantity of habitat? Aimee answered that the model incorporated the current limited carrying capacity and did not assume expansions.

John Klochak asked: Can you reiterate the difference between partial and full restoration? Aimee answered: Our four riparian vegetation scenarios were as follows: (a) Baseline: existing riparian conditions; (b) Least protective: protect existing ≥ 150 -m riparian areas and reduce all others to 5-10 m; (c) Partial restoration: protect existing ≥ 150 -m riparian areas, increase existing 40 to 100-m buffers in forested areas to 150 m, and increase buffers along the mainstem to 20-40m; and (d) Full restoration: all riparian areas become ≥ 150 m.

Commented [ED5]: Since you also include Matt's slide that has this information on it, you could delete this; or delete Matt's slide and accompanying questions below. Pick one.

Heather asked: What time period does the 7DadMax cover? Hongxiang said for GCM (Global Climate Models) used in this analysis, it is 2087-2099; the historical simulation is 1993-2005.

Phillip North asked: Can you describe the actual treatment? The characteristics of your canopy gaps? Hongxiang answered: We used 4 treatments and the treated canopy area ranged from 2% to 15% of the total basin area. Treatment varied on aspect and inclusion/exclusion of the Alpine Lakes Wilderness Area. Canopy gap diameter was 120m. We also only treated canopy in high elevation areas (>932 m), because that is where snow is most likely to fall and accumulate so that is where creation of canopy gaps can have an impact.

Commented [ED6]: A lot of this is from the chat and I'm ok with including that as well as the “vocalized” Q & A, unless it's getting so long and complex that it's unwieldy for you, Alexa. I guess if there is important stuff in the chat, the meeting summary is how we get it out there, since we don't usually share out the chat itself. Just use your discretion. I've just cleaned it up a bit since people tend to truncate language/not use full punctuation in chat. (plus we had two non native English speakers in this meeting)

Ning Sun added: Normally, the variations of treatment in creating canopy gaps include the gap diameter and canopy height surrounding the gap. In this project, though, , we changed the

diameter only, assuming a constant canopy height. It is interesting though the ratio of gap diameter to canopy height is related to the efficiency of the gap on modulating snow and flow regime. More can be found in this paper:

<https://onlinelibrary.wiley.com/doi/full/10.1002/hyp.13150>

Elissa asked: Does the effect lessen as you get closer to the year 2060 because there will be less snow? And when there is no snow, will there still be an effect on temp and flow?

Ning Sun answered: Exactly. Our results show that snowmelt-influenced streams showed greater vulnerability in terms of temperature changes in the future. In historical time, the streams influenced by melt can be more resilient to warming because of the cool melt water -- if snowpack still exist, in warming climate, melt accelerates and those streams influenced by melt may not be affected by warming in some cases.

Matt added: As snowpack is expected to decrease, the modulating effect of snowmelt on stream temperature is expected to decrease as well. What about those areas that generally receive no snow [lower elevation areas, or current high-elevation areas predicted to lose their snow in the future]? Will snowmelt cooling help modulate those stream temperatures as well? Could canopy gaps have an impact? I believe the answer is no; snowmelt cooling won't impact streams at lower elevations. However, canopy gaps could still a future impact on flow in streams that aren't melt-influenced. There will still be an effect on the water balance and flow in these streams because of changes in evapotranspiration when forest is cleared.

Emily summarized: Canopy gaps can help us mitigate the effects of climate change for a while, but not forever. When snow is gone, our effect to modulate stream temperature. by using canopy gaps is done.

Hongxiang added: The 2015 drought is a harbinger of the drought we expect to see in the middle of the 21st century. Under climate change, I do not want to say there will be zero snow but it is definitely showing a declining trend, and on average, the snowmelt cooling effects will be smaller and smaller and the same as canopy gap function.

Elissa asked: Did you look at some of the negative effects of not having forest canopy, such as more erosion, faster and flashier runoff, more sediment in the streams? Are the trade-offs worth it for fish? Matt answered: No, we didn't look at those impacts. Aimee added: for the salmon, increased scour occurred due to climate change and altered precipitation regimes due to warmer temperatures, many juveniles outmigrated early enough to avoid the effects. We didn't look at sediment effects though. Or the impacts of other habitat actions.

Emily added: From working in monitoring forest practices, I can say that if you are making your canopy gaps away from the riparian zone, you won't impact those factors, especially if you are doing selective harvesting and not cutting all the way down the soil. there is a significant amount of research in the disturbance literature demonstrating that beyond a certain distance away from buffers, disturbance effects are negligible.

Commented [ED7]: This is the kind of question I don't think we need to bother to include; it doesn't really add much to the summary, which I think should mostly be focused on giving the reader an overall thrust of the presentation results. If the Q&A helps add to and clarify that, great; if not, I think we can choose to selectively delete rather than capture every single clarification on terms. Mike—do you agree? So that would also mean that we have the discretion to cut out some/all of any of the above Q&A if it's not helpful to understanding the main points.

Commented [ED8]: I thought about deleting this because it didn't make sense as written, but I think I figured it out. But as a general rule, if you can't make sense out of something copied in from the chat, or that you're hearing someone say—just don't bother including it. It's probably fine to leave out.

Lisa commented: I suspect that the groundwater storage of snowmelt (as snowmelt is intercepted by groundwater) will have a really significant impact on the modeling.

Matt added that by using stable isotopes, we can parse out the portion of water in the river that fell as snow or precipitation. He recommended looking into Lillian McGill's work on stable isotopes. Aimee commented that groundwater storage depends a lot on local geology.

Phillip North said: Forest canopy gaps does not need to mean no vegetation. The gaps could be a shrub layer such as huckleberry. Snow can accumulate and be shaded to last longer.

Elissa asked: Can you give a little more detail about the partial riparian restoration scenario, and what that entailed? Aimee said: These riparian scenarios were meant to be "book ends" and something general yet plausible, without getting into very specific details that may not agree with landowners etc. Just meant to be illustrative.

Philip Murphy asked if population growth was included in the model. Aimee responded that no, it was not. Aimee said no.

Roundtable Updates

Heather shared: Ecology DO and Fine Sediment Rulemaking (to provide additional protections for early life stages of salmonids in spawning gravel habitat):

<https://ecology.wa.gov/Regulations-Permits/Laws-rules-rulemaking/Rulemaking/WAC173-201A-Salmon-spawning-habitat>

Ingria shared: The Snohomish (WRIA 7) Watershed Restoration and Enhancement Committee has developed their final draft watershed restoration and enhancement plan. The plan is currently in local review, and the Committee will convene on April 15 for final plan approval. If you have any questions, you can contact me at ingria.jones@ecy.wa.gov or 425-466-6005. More information is available on the Committee webpage here:

https://www.ezview.wa.gov/site/alias_1962/37310/watershed_restoration_and_enhancement_-_wria_7.aspx

Stephanie shared: DNR is working with the Snohomish MRC to put in a proposal for federal funding to remove derelict vessels and material from the Snohomish estuary.

Matt Baerwalde shared: Upper Snoqualmie River Resilient Corridor Plan public outreach sharing is planned this summer. Project completion will be Fall 2021.

Someone shared a topic idea for a future meeting:

Lower Sky Acquisition Strategy by Snohomish County – This is a Floodplains by Design-funded project that uses different flood, fish, and farming GIS layers.

Meeting adjourned.