Meeting Minutes
Nisqually River Council Meeting
January 15, 2021
Online Meeting

Attendees:

NRC Members:

Chris Barnes – City of DuPont
Anne Baxter – Dept. of Ecology
Dan Calvert – Puget Sound Partnership
Amy Cruver – Pierce County Council
Stacey Dixon – UW Pack Forest
Cathy Hamilton-Wissmer – JBLM
Dani Madrone – City of Olympia
Darrin Masters – WDFW
Glynnis Nakai – BFJNNWR
Rene' Skaggs – Pierce Cons. District
David Troutt, chair – Nisqually Indian Tribe

CAC Members:

Phyllis Farrell
Howard Glastetter
Paula Holroyde
Ed Kenney
Karelina Resnick
Lois Ward

Guests:

Roger Andrascik – NLT/NSS
Jesse Barham – City of Olympia
Jeff Barney – Pierce County
Warren Bergh – NLT/NSS
Michele Buckley
Brian Combs – SPSSEG
Chris Ellings – Nisqually Indian Tribe
Lloyd Fetterly – NLT/NSS
Julie Fonseca de Borges – NPS-RTCA
Eric Grossman – USGS
Daniel Hull – NRNC
Sela Kalama – Nisqually THPO
Kathleen Mix – NLT
Martin McCallum – NLT/NSS
Ryan Munes - BFJNNWR
Linda Murdfeldt
Julie Rector – City of Lacey
Etsuko Reistroffer – NSS
Eric Rosane – Nisqually Valley News
Shannon Shula – Thurston County
Larry Stickney
Nate van Arendonk – USGS
Ashley Von Essen – Nisqually Indian Tribe
George Walter – Nisqually Indian Tribe
Jeff Zahir

Staff:

Jeanette Dorner – NLT
Julia Fregonara – NRF
Justin Hall – NRF
Emily McCartan – NRF
Maya Nabipoor – NRF
Sheila Wilson – NRF

1. **Call to Order, Introductions, Approval of Minutes and Agenda**
   David called the meeting to order at 9:03am. Minutes were approved, as was the agenda for the day.

2. **Committee Reports and Updates**
   <u>Advisory Committee Reports:</u>
   CAC Report – Phyllis Farrell

CAC met on Tuesday and discussed upcoming environmental legislation, the management of Alder Reservoir during recent high rains, and a recent federal court settlement requiring the EPA and Department of Ecology to reduce nonpoint pollution from agricultural and other rural runoff.

The CAC presented a proposal to the NRC to request testing of existing RAP piles in Thurston County, to collect field data about water and soil contamination. Thurston County has recently approved RAP storage in the Nisqually Sub-Area, but RAP is currently stored in several other locations in the county, which would allow an opportunity to test underneath those piles to determine if and how leachate is reaching soil and water. The literature review commissioned by Thurston County prior to the Nisqually policy change noted that most RAP leachate studies were based on laboratory column tests, and that there was an unmet need for field tests to learn more about how the material reacts in a real-world environment. A university may be able to assist in doing a study. Members noted that this proposal to study local RAP piles is consistent with the position the NRC has shared with Thurston County in previous letters, advocating for thorough scientific evaluation of the impacts. No objections were noted. Amy Cruver suggested sending a similar letter to Pierce County Council for consideration. Staff will prepare a draft letter to bring to the NRC.

Chair Report – David Troutt
Several legislative initiatives are moving forward, including the I-5 Nisqually bridge project. Many state officials have been receptive to the proposal, which will require major infrastructure investment from the federal government as well. While it will require design work, partners are confident the project can and should move quickly, particularly because of the risk that a high-water event poses to the freeway. The current northbound bridge is also weight-limited (cement trucks and other vehicles over 21,500 pounds per axle are restricted from using it: https://www.wsdot.wa.gov/commercialVehicle/Restrictions/bridgelist.aspx).

The Legislature is also looking at updates to the Growth Management Act, and David is advocating for changes to address protecting and restoring environmental resources alongside the next 20 years of expected development. The current GMA is not working to preserve and recover environmental resources fast enough for salmon, orcas, and other species. Salmon are on a trajectory to extinction if changes are not made quickly. In addition, the Puget Sound Partnership's Salmon Recovery Council is discussing a major, coordinated public outreach effort to raise awareness about these needs.

Staff Report – Emily McCartan
The final draft Nisqually Watershed Stewardship Plan update has been circulated to all members via email. Any further edits can be sent to Emily. NRC adoption will be requested at an upcoming meeting. Emily is working with several partners on tracking and implementing Streamflow Restoration grants. A graduate student from the University of Colorado is doing a practicum project to evaluate the Nisqually Stream Stewards program and compare best practices from other watershed volunteer engagement organizations. Former Stream Stewards can expect to be contacted to share input, and updates will be available as this project continues.

Allied Program Reports:

Nisqually Land Trust – Jeanette Dorner

NLT has closed on the Miller property. Staff had their first quarterly stewardship activity last Wednesday, in torrential rain at Lackamas Flats. Volunteer events are continuing, and accomplishing a lot in spite of group size limitations for social distancing.

Nisqually River Education Project – Sheila Wilson

482 students have attended live salmon dissections with NREP on Zoom. Teachers have said it is a highlight of the year. A video is up on YouTube at https://youtu.be/zXjMx0fCTBQ. Teacher workshops for the CLAMSS NOAA grant are continuing, with content about tribal treaty rights, reviewed and approved by Willie Frank, and upcoming sessions on healthy forests. Winter water quality monitoring will take place with at-home test kits distributed to students, similar to this fall. 787 students participated in water quality this fall, using at least some of the components. Student GREEN Congress will be held virtually with a keynote from Evergreen faculty member Carri LeRoy and series of lessons for teachers to implement on their own schedule.

Thurston Subarea Plan Update – Shannon Shula

The Nisqually Subarea Plan is likely to be considered next after Grand Mound is finished, with no set timetable yet due to staffing and pandemic constraints. The NRC is anxious to see the Nisqually Subarea plan move forward. When the comment period on the BOCC docket becomes available, the NRC could send a comment to the board asking that Nisqually be given higher priority.

Nisqually River Foundation – Justin Hall

Justin is reaching out to the legislators representing the watershed with the biennial funding request to continue supporting the NRC. The NRF's annual budget is still in development. Partners had a preliminary meeting on the NRF's Muck Creek Streamflow Grant, working to develop a strategy and projects aligned with overall basin recovery goals for streamflow, wetlands, and salmon.

Community Forest – Justin Hall

Community forests across the state are requesting funding from the Legislature for the Community Forest Acquisition Program, which was created last year with no funding attached. Mount Tahoma Trails huts in the Nisqually Community Forest are closed, but trails are open for skiing and snowshoeing. Harvested TK board feet on 35 acres in the community forest. Justin will present in the future about it. More lands are in need of treatment for overly dense forest. Nisqually root wads have been purchased for restoration projects in rivers around the state.

3. **Lower Nisqually River and Delta Compound Flood Modeling Study**

Eric Grossman, U.S. Geological Survey

Permission was given to record this presentation. Contact info@nisquallyriver.org for a link to the recording. Eric leads a team at USGS which is conducting advanced modeling exercises combining river flow, tides, and storm surges over time to predict compound flooding. Infrastructure and ecosystems at risk from floods in the Nisqually Valley include

the delta and estuary habitat, Nisqually Indian Tribe assets, Wa He Lut Indian School, I-5 and rail corridors, and local residents. Tidal influence on water levels is projected to move significantly upstream by next 100 years, part of a "coastal squeeze" phenomenon created by climate change. As increasing rainfall and runoff from upstream meets sea level rise (SLR) from below, flood pressures in coastal areas is also increasing.100 year floods are expected to increase in magnitude by 25% by 2040, and will recur more frequently. The expected trajectory of sea level rise has also accelerated significantly since forecasts done in 2018. Polar ice caps are melting much faster than projected, and low-end projections of SLR are now obsolete. Projected climate change increases weather intensity, including winds that drive waves and flooding on the coast. Understanding how these dynamics interact during this complex adjustment period is an important part of this research. This model looks at estimates of SLR from 2.5 feet (very probable) to a high-end estimate of 5 feet.

Phase 1 – Nisqually Delta Sediment

Researchers conducted comprehensive modeling of sediment movement in the Nisqually estuary, especially in the restoration area. Is there enough sediment reaching the delta and distributing to allow marshes to stabilize and grow to keep pace with sea level rise? They found a clockwise pattern of flow through the estuary with only 29%-41% of sediment delivered by the river accumulating in the restoration area – less than hoped. At that rate, projected low estimates for SLR will inundate the estuary before marshes are established. If the flow through the delta was less restricted by the I-5 bridge, it could improve sediment distribution to recover marsh and keep pace with sea level. A paper with these findings will be published soon.

Phase 2 – Compound Flood Model

This new model encompasses the Nisqually Reach, delta, floodplain, and river up to McKenna. It is a complex model at a very fine resolution (100m offshore, 5-10 meters upstream) to examine water levels, velocities, and sea level variables. This model accounts for a wider range of tidal and sea level factors than FEMA floodplain modeling, which sets one sea level and varies river flow. The model was sensitivity-tested on Nooksack and other tidally influenced Puget Sound rivers and found to capture tidal influence on rivers well. Model predictions were validated with instrument measures, water level gradients and stage discharge relations from Thurston County. Currently, the model has run a simulation of the February 2020 "Super Bowl Flood" (~10-year event), and validated with photos and videos from the actual event to measure water levels against fixed landmarks. The modeled prediction was within 6-12 inches of observations, and corresponded well on timing. Drone surveys captured patterns of flooding on the landscape that look similar to model projections after flood peak.

Exposure and Vulnerability for Nisqually Valley Infrastructure

Photographs comparing 2002 and 2019 show that the oxbow meander near Wa-He-Lut school has moved 100 meters in 17 years. If that linear rate continues, it will reach I-5 by 2050. However, with flooding predictions in this area, that rate could accelerate, endangering the freeway.

The model allows predictions about increased flood severity with sea level rise. A current 2-year peak flow (bankfull, not flooding), shows that area of inundation moves further upstream in both McAllister and Nisqually River with 1 meter of SLR. Simulating the February 2020 flood (10-year event) and 1996 (flood of record) with 1m SLR shows similar inundation, suggesting the system has a little more capacity. With 30cm of SLR, an event similar to 2020 would flood the southbound onramp of I-5. Current estimates give a 50% probability of that much SLR by 2055 (meaning it is possible by 2040 and very likely by 2065). The potential for erosion and scour, stressing the freeway, also increases with SLR, which increases the time for floods to recede and means water sits on the landscape for longer. Modeling data is still preliminary and will go through peer review process.

Next Steps:

- 30-year hindcast and 80-year forecast
- Evaluate extreme value distributions and recurrence of compound water levels
- Integrate UW-CIG projections of increasing lowland rainfall intensity and USGS groundwater model
- Integrate TPU reservoir operations
- Define adaptation alternatives and flow scenarios reflecting watershed goals and risk tolerance
- Run model simulations of preferred alternatives
- Adapt model for new science and guidance (change in runoff, rate of SLR)

Ultimately, these models can help evaluate management options. Habitat restoration can be designed to reduce flood hazards (USGS is applying this in Nooksack). The Nisqually floodplain has opportunities to route flow through historic channels across the valley and reduce flooding in other locations while helping recover flow and sediment distribution to the delta.

Summary:

1) Sediment deficiency limits recovery of Nisqually delta marshes, partly because of restriction in flow through I-5 corridor which adds to flood hazards and channel instability.
2) Sea level rise and stream flooding are projected to increase and affect compound flooding in complex ways, with flood events becoming more frequent.
3) The lower Nisqually River is sensitive to tides, sea level rise, storm surge, channel instsability, and higher flood risk.
4) Compound water levels from both sea level rise and higher stream flows will exacerbate the flood exposure of I-5 and the floodplain.
5) Adaptive management opportunities may exist to reduce flood hazards (such as distributary channel restoration).

Discussion:

- The Legislature provided funding in 2018 to study this part of the I-5 corridor. This science is key to understanding the risks to I-5 and identifying restoration opportunities that can reduce flooding impacts for the freeway and private property in the valley. Putting I-5 on piers and reconnecting channels across the delta can significantly reduce

flood impacts, and this model can help evaluate those alternatives. Modeling can also look at various management practices for TPU, including sediment transport.

- Hope to see dam management options considered in future studies. Howard noted that during the 2020 flood, TPU's reservoir was 2 feet below capacity before the flood hit, requiring them to raise outflows. David noted that Nisqually did not reach flood stage in recent events where most other South Sound watersheds did. TPU's next license and operations may look different when revised through adaptive management. The Alder Dam license is up for renewal in 2037. The process usually begins with assessments and studies up to 10 years prior to the renewal date.
- There are two important issues for sediment in delta recovery: how much sediment comes down the river, and how it gets distributed. This modeling helps understand how the distribution of sediment and water interact with I-5 and the restoration area. If we can increase sediment loading in the river below Alder Dam but don't address channel connectivity or distributary issues caused by I-5, how would that affect the estuary? – These are the right questions to ask. This model can assess individual projects and cumulative impacts, but the timing component is also very important. If subsided marshlands in the delta had been restored first, before the tidal levees were removed, would that have built up the grade more quickly and given the marshes a head start? Maybe not, but it might be a consideration further up the floodplain.
- SPSSEG has researched marsh nourishment projects elsewhere that bring in sediment. Is that something considered? – USGS could model it.
- Are there any successful ways of moving sediment trapped behind dams? – Several major studies have been done, including several in the Netherlands. Science shows punctuated high flows are needed to move sediment, suggesting it may aggrade lower riverbeds and increase flood risk while the sediment loads move through. Can it be dredged and transported? – Cost and capacity are the main limitations. Most efficient thing is to reconnect the natural processes that used to do it. It may increase risk in short term but create longer term stability.
- 2015 was a drought year with a glacial outburst flood, which created measurable sediment accretion from that short event. Could that suggest creative ways to move sediment through the dam? – Modeling sediment is very complicated, but could definitely experiment with adding more sediment load at the top of the watershed and see how it propagates through the system. There is interest in studying this in preparation for the FERC relicensing.

4. Hydrogeology and Salmonid Habitat in the Muck Creek Basin

Brian Combs, South Puget Sound Salmon Enhancement Group

Muck Creek is a tributary of the lower Nisqually River, with a significant portion of the basin on JBLM. 40% of the basin is residential, 25% is JBLM (open lands modified for military practice), 17% agricultural and 16% undeveloped (agricultural and residential categories have some overlap). A significant portion of the basin was historically prairie, with 28% of current land cover as grasslands, 21% Evegreen forest, 17% mixed forest, 7% wetlands (major loss from historical condition). 20% of the basin cover is developed, and that portion is increasing.

Muck Creek salmonid species:

- Nisqually winter chum, uniquely adapted to enter streams based on winter flows. The Muck prairie streams are seasonal, unlike many other Puget Sound forest streams which flow year round. The chum salmon have evolved to enter the streams late in the winter when flows are available, one of the latest returns in the Pacific.
- Winter steelhead (anadromous) and rainbow trout (resident) – genetic exchange happens between these populations, so residents are an important part of the gene pool for steelhead. Genetic exchange depends on flows being high enough to connect resident populations with the anadromous fish.
- Coho salmon are present but not in high numbers, especially compared to historic populations.
- Cutthroat trout
- Occasional Chinook and pink salmon – not established as an annual spawning run, but use the creek if there is enough flow during their spawning seasons.

Hydrogeology:

Muck is a "prairie" stream. The landscape and stream are co-evolved with tribal management over last 10,000 years using fire to provide open areas for game and crops. Both this fire regime and the geologic history of the prairie areas are critical to forming the ecological functions. The basin has variable soils and geology, including glacial outwash (gravel, well-drained) which makes the streams intermittently dry. Bluffs and springs in the upper basin are critical for stream recharge. Surface water and wetlands occur in clay and silt areas of the landscape where infiltration is slower.

SPSSEG will soon be publishing a consultant report on hydrogeologic influences on surface water flow in the basin, reviewing past studies and integrating more recent data. Lidar analysis shows evidence of glacial outwash channels which significantly influence the ground and surface water conditions. Springs are located at the border of glacial till (hard, compacted, less drained) and recessional outwash. Peat areas, which take thousands of years to form, are critical for recharging groundwater aquifers and streamflows. Groundwater tends to flow out of the Muck Creek basin and into the Clover Creek basin, contributing to the observation that reaches in lower Muck Creek go dry in late spring through early summer, and don't recharge with surface flow until late fall and winter. Chum have evolved to respond to those late-returning flows. Chum, steelhead, and coho spawning area is concentrated in the lower reach, which is more forested and has more consistent flow. Low gradient, drier, and intermittent flows occur further upstream, and it is not clear if adult salmon can reach them regularly.

Monitoring wells were recently installed at 4 sites on JBLM, including at the lowest area where the stream tends to go dry and connectivity becomes a problem for adult salmon. North Fork and South Fork monitoring sites are very close together, but North Fork recharges much faster. Piezometer data from the very dry period in fall 2019 show a delayed response in groundwater recharge and surface flow returning, corresponding with a poor spawning year for chum. A major habitat goal for salmon is to see the flow season extended on both ends so all three species (coho, steelhead, chum) can access higher reaches.

Habitat overview:

1. Lower reaches (on JBLM): primary salmon spawning area, forested, spring fed, with habitat in decent condition including some logjams.
    - Chambers Dam on JBLM is an old dam which has blocked fish passage for many years. It is slated for removal by JBLM in the next year, which should be followed with a stream channel restoration plan to improve it for salmon.
2. JBLM prairies: more open, low gradient, low tree cover. Invasive reed canary grass is prevalent, in places choking out the stream and physically blocking fish passage.
3. Muck-South Creek (North and South Fork) Confluence: totally dry in the late spring and summer, but carries significant flow when it recharges. Lots of reed canary grass. Restoring wetlands would be important way to stabilize salmonid rearing habitat.
4. Upper basin: resident trout and salmonid habitat, potential for large scale wetland restoration. Numerous springs occur in this area.

Goals for functional habitat in Muck Creek include improving connectivity by removing dams and improving surface flow and, most critically, improving water storage through beaver dams, wetland restoration, and reversing ditching and diking. Large areas (500-600 acres) of historical wetlands have been lost or degraded, which are restoration opportunities. Riparian plantings and changing stormwater management to infiltrate and retain water are also important strategies for habitat function. Finally, land use management is critical to address as population is growing fast in this basin. SPSSEG's studies aim to inform habitat improvement recommendations and identify what we know and what questions remain about hydrogeology in the basin. The NRF, SPSSEG, and Nisqually Tribe are collaborating on a Streamflow Restoration grant, which will address data gaps, delineate functional process reaches, and develop a water and habitat strategy for restoring the basin to achieve goals for salmon and streamflow.

Discussion:

- How much of the Muck Creek basin is outside of Urban Growth Areas (UGA)? – Most of the basin is not in a UGA, outside of Roy. Expanding UGA would hamper habitat restoration. Having a restoration strategy in place is one way to help local governments plan for growth without negatively affecting ecosystem function. Setting limits on growth areas has been a topic of discussion in state salmon recovery work groups.
- Is leachate from the LRI landfill affecting salmon in Muck Creek? – Brian does not have water quality data on hand, but it is very important.
- What was the historic chum salmon population? – Historically, chum were the Nisqually's the most significant portion of the spawning population, with over 30,000 returning in some years. Late chum are returning up to 3 weeks earlier than they did 20 years ago. Predation could be one factor, but so is long-term drought and lack of surface flow. Chum will spawn in the mainstem if they don't have access to Muck because of low flows, but their productivity is much lower.
- Is groundwater data continuous through time? – SPSSEG's shallow piezometer wells gave multiple readings per day. They were removed last fall because of vandalism (human or deer), after the system had gone dry for the season. Monitoring stations

were reinstalled for this year, which has had very different fall precipitation and could provide a good opportunity to examine changes in water level table.

- USGS may be able to assist with modeling that would dovetail with streamflow grant project. Greg Hood with USGS can help with canary grass assessment.

5. **Salmon Recovery Update** – *Chris Ellings*
   Estuary Salmon Recovery Program is sponsoring a Nearshore Restoration Summit, over three weeks in March, covering restoration and planning on different shore forms (beaches, deltas, and embayments/pocket estuaries). Presentations will include research science and planning for restoration and recovery, as well as social science research on human/environmental interface. Flyer is available.

   The Nisqually Tribe and Long Live The Kings are beginning their pilot study on the use of Christmas trees, to supplement herring spawning habitat, an application of a traditional widespread tribal practice using trees and cedar boughs. Eventually hope to see if this technique could boost herring populations where eelgrass habitat has been lost.

The meeting was adjourned at 12:00pm.

Next meeting: Friday, Febraury 19, 2021
Online