

Hood Canal Summer Chum Symposium 2017 – Roadmap to Recovery, The Homestretch

Hood Canal Coordinating Council

June 28, 2017

Where Are We Now?

Scott Brewer (HCCC) opened the symposium with a welcome and overview of the agenda for the day. He provided a four-part summary of the Roadmap to Recovery, starting with information on why we are in the homestretch, followed by “where have we been,” “where are we now,” and “where are we going.”

- Roadmap to Recovery, the Homestretch
 - Summer chum population metrics are trending upward and we need to think about the recovery goals beyond just the Endangered Species Act recovery definition linked to population viability.
 - From recovery planning in the Willamette River (Oregon), “recovery goals may also be established at a level above that required for ESA de-listing.” These broad sense recovery goals included legislative mandates, and economic, social, and cultural values. “...sufficient abundance to allow robust and sustainable harvest or establishment of populations where they have been eliminated.”
 - The Hood Canal Recovery Plan included similar concept of broad sense recovery.
 - Discussions today will continue in future to develop collective broad sense recovery expectations.
- Roadmap – Where have we been?
 - Summer Chum Salmon Conservation Initiative (2000) and Recovery Plan (2005)
 - Hood Canal (HC) and Strait of Juan de Fuca (SJDF) population trends
 - HC declined sharply in early 1980s and SJDF in late 1980s
 - Identified causes: high harvest, habitat degradation, and ocean survival (?)
 - Harvest
 - Much higher before 1992 and Base Conservation Regime implementation
 - Multiple fisheries had been harvesting, including international fisheries
 - Harvest rates since 1992 have remained below Exploitation Rate threshold limits
 - Hatcheries
 - Supplementation since 1992, include reintroductions, spatial structure, boosted production
 - Supplementation largely successful and ended before originally anticipated (12-year) timeframe. Only Lilliwaup is still being supplemented
 - Habitat Protection and Restoration
 - Implementing habitat projects since 1998 aiding in the recovery efforts and will continue to hedge our bets with climate change impacts.
- Roadmap – Where are we now?
 - HC and SJDF populations both trending upward
 - More diversity among subpopulations

- Coming into homestretch
- Why we feel we are in homestretch?
 - Numbers are strong, but there are many other factors to consider
 - Other factors include climate system (e.g., PDO, ocean conditions), climate change
 - PDO; general pattern for summer chum salmon is that during warm phase salmon don't fare as well; during cool phase salmon do better
 - PDO graph shows warm phase since approximately 2013
- Roadmap – Where are we going?
 - Working toward the finish line
 - Still “learning the route”; we see the directions that got us here; need to recognize additional challenges can be expected
 - 2014 Guidance for Updating Recovery Goals
 - Discusses status and route to the future with NMFS
 - 7 Recommendations in the white paper
 - Looking for participant input on the issues identified, the roadmap, and other questions

A New Look at Abundance and Productivity

Norma Sands, NMFS (retired), presented on [Viability Goals for Abundance and Productivity](#). Her co-authors were Mindy Rowse (NMFS) and Larry Lestelle (Biostream Environmental).

- Described NMFS viability definition and introduced graphs for how viability data are displayed
- Variability around the underlying relationship is important and affects viability
- Abundance and Productivity tables (A&P) converts annual data into brood year data
- HC and SJDF brood year numbers displayed in three groups 1974-2001, 2002-2006 (warm phase PDO), and 2007-2012 (cool phase PDO)
- Viability Curves introduced with capacity on y-axis, productivity on x-axis
 - Viability curves assuming no harvest (0% exploitation rate [ER]) and harvest (30% ER).
 - If datapoint below both lines, then not viable even with no harvest.
 - If datapoint between lines, then viable assuming no harvest, but population is not viable if ER = 30%.
 - If datapoint above both lines, then population is viable with ER = 30%.
 - SJDF Population exceeded viability threshold at ER=0% during **cool** phase PDO, not during warm phase.
 - Restoration effects of past actions will increase performance to even further above the threshold.
 - HC Population exceeded viability threshold at ER=0% during both phases of PDO, and is substantially higher than the 30% ER during the cool phase.
 - During the 2007-2012 cool phase, the population appears capacity limited. When population numbers are lower, the population appears productivity limited

Climate and Climate Change Impacts

Larry Lestelle (Biostream Environmental) presented on Incorporating Climate Influences in Recovery.

- Abundance viability analysis suggests recovery may already be achieved...but there are other factors
- HCCC held a Hood Canal Climate Forum held in March to review summer chum results and consider PDO and climate change effects.
- Climate system includes oceans, atmosphere, and continents
 - Climate system interactions can strongly affect salmon performance and mask the effects of habitat
 - PDO and Long-term climate change are both relevant to recovery
 - PDO – strong evidence for effects in past; extent of future effects is uncertain
 - Long-term climate change – predicted to be significant over the next 80 years in Puget Sound region
 - These processes operate at multiple spatial scales
 - Interactions between PDO and long-term climate change are unknown
 - Overview of PDO provided
 - Long-lived patterns, PDO “events” generally 20-30 years or more in 20th century
 - Can suddenly shift, resulting in abrupt changes
 - Affects air and sea temperatures, winds, and precipitation
 - To date, researchers have not been able to develop method for predicting future PDO conditions. That is, we currently cannot predict changes.
 - Late 1970s-late 1990s prevailing warm phase, late 1990s-end 2013 prevailing cool phase, since Jan 2014 been back in warm phase
 - Warm phase – enhanced coastal ocean biological productivity in Alaska and reduced productivity off the west coast of contiguous U.S.
 - Cool phase – evidence for opposite north-south pattern of productivity for some species
 - Mechanisms unknown or uncertain
 - The HC and SDJF summer chum populations show significant correspondence to PDO
 - Starkly different population Spawner-Recruit curves in cool phase brood years than warm phase brood years (warm = poor, cool = strong)
 - Subpopulations show same patterns
 - Observed patterns suggests PDO effects occurring on outmigrant fry near streams of origin.
 - Recovery Planning must consider performance during a warm phase – when the role of freshwater and sub-estuarine habitats will be most important. Progress toward real recovery will be measured then.
 - The apparent shift to warm phase in January 2014 provides opportunity to test progress toward recovery from actions
 - Data analysis shows HC population shows PDO effect is lagged (fry migration year minus 2 years); SDJF population no lag

- Mechanisms not known, but suggests differential effects of circulation patterns within Salish Sea. Ocean water coming in deep; diluted seawater going out near surface. Sills at various locations affect circulation of water into areas and contributes to lags
 - Key years SDJF are 2016-2020 for 3 yr old and 4 yr old adult returns; HC key years are 2018-2022
 - SDJF 2016 returns strong for 3 yr olds – a positive sign
 - Clarity on PDO effects should be known no later than 2024, but perhaps by 2022.
 - Scott Bass PNPTC is proposing pre-season forecasting methods using PDO and Canadian test fisheries. Results look promising. 2017 results from Canada expected mid-August.
- Climate Change-related effects
 - Key drivers – 9 listed with Climate Impacts Group information on change expected for each
 - Conclusions of qualitative analysis of long-term climate effects on summer chum
 - Overall population performance likely to decline
 - Interannual variability likely to increase – increasing viability threshold curves
 - Habitat restoration actions need to target ways of improving habitat quality (not quantity) – increasing resilience to climate effects
 - Increase channel complexity, floodplains, instream structure
- Discussion
 - Comment was made that all the climate work presented was based on spawner-recruit relationships. Has smolt data been considered for additional analysis of the potential relationship between population performance and climate change? When considering chinook productivity, often use smolts per female which is highly correlated to hydrology during freshwater incubation and rearing. In summer chum, that portion of productivity isn't adequately evaluated. Incubation conditions are important to consider. For example, high peak flows in 2015 contributed to very low number of smolts produced despite there having been high number of spawners return. There is a need to investigate freshwater incubation and rearing to help inform the relationship between PDO and other climate variables with summer chum population performance.
 - Larry replied that he is a strong advocate of looking at those questions. He also noted that the PDO effects are not just marine, e.g., the freshwater hydrology (peak flows) can be influenced by PDO. So, some of the freshwater changes affecting smolt numbers can still be PDO-related. Agreed, more analysis is warranted.
 - Question was asked about whether there are patterns with PDO that can be applied to forecast future PDO conditions?
 - Larry replied that the conclusion from the Hood Canal Climate Change Forum was that patterns have not been identified that would allow for effective prediction of future PDO conditions.
 - Comment was made that recovery requires more than just freshwater habitat restoration which had been the primary type of examples given. Habitat protection as well as estuary and nearshore restoration are also very important.

- Scott provided a recap that the next few years are expected to provide a great opportunity to evaluate summer chum population performance with the warm phase PDO. He noted that the restoration work needs to continue in the meantime – it is not a time to slow down on the work.

Early Emergence of Salmon Creek Summer Chum

Josh Weinheimer (WDFW) made a presentation titled Monitoring Climate Impacts: Survival and Migration Timing of Summer Chum in Salmon Creek, Washington. His co-authors were Joe Anderson, Mark Downen, Mara Zimmerman, and Thom Johnson.

- Summer chum spawn late Aug to end Oct; juveniles emerge January through April; emerge and outmigrate quickly.
- Study had 3 objectives
 - Describe the abundance, migration timing and egg to migrant survival.
 - Determine the relationship of egg to migrant survival with adult abundance, minimum spawning flow and peak incubation flow.
 - Determine the relationship between incubation temperature and outmigration timing
- Data collected using adult weir and juvenile scoop trap
 - Adult weir provides total enumeration of adults. Operated 24 hrs/day from late August through October.
 - Juvenile scoop trap only fishes in evening hours (most outmigration) between start of February and end of April.
- Objective 1 – Describe the abundance, migration timing, and egg to migrant survival
 - investigated using egg-to-migrant survival data from brood year (BY) 2007 to 2015. There was substantial variability between years as survival ranged 0.9% to 46.3%.
 - The number of female adult returns was fairly uniform between years
 - Fry outmigration much more variable between years than adult returns (temperature influenced)
 - Timing of adults return migration to creek consistent. Median migration date in mid-September varied by only 8 days between the years analyzed.
 - Timing of juvenile outmigration highly variable. Median outmigration date varied by 5 weeks between the years analyzed.
- Objective 2 – Determine the relationship of egg-to-migrant survival with adult abundance, minimum spawning flow and peak incubation flow
 - There was no correlation between survival and female abundance or low flow during incubation.
 - There was clearly definitely relationship with peak flow during incubation. The higher the peak flow during incubation, the lower the egg-to-fry survival percentage.
- Objective 3 – Determine the relationship between incubation temperature and outmigration timing
 - There was an identifiable relationship between incubation temperature and outmigration timing. A 1 degree Celsius increase during incubation led to 12 days earlier median outmigration date. This finding is similar to Holtby et al. (1989) fall chum work in British Columbia where the authors report a 13 day effect.

- Based on the Cumulative degree-days as a function of average temperature from 50% egg deposition to 50% fry outmigration; during cooler years, the Temperature Unit¹ Model predicts fewer degree days during incubation and more degree days during warmer years. These results show that summer chum have the ability compensate for increased temperatures during incubation by taking on more temperature units before emerging. This suggests the fish delay emergence and have some ability to adapt so as to not emerge too early.
- Potential climate change effects related to flows and temperatures
 - Projected increased fall-winter flows would be detrimental to incubating eggs
 - Projected decreased spring-summer flows could be detrimental to returning adults
 - Projected increased in stream temperatures would advance the outmigration timing by 27 to 31 days and create potential for mismatched timing with prey in marine environment.
 - .
- Discussion
 - Josh clarified that the stream temperature data used in their analysis was from U.S. Geological Survey gages, so surficial temperature data.
 - Josh noted that scale data are being collected and will be analyzed to determine whether the earlier juvenile outmigration affects fish survival to adult
 - Question was asked whether fry in warmer years exhibit any decreased fitness or are not yet buttoned up?
 - Josh replied that although the fish are developing faster in warmer years, the fry sizes are the same between years. They are not seeing more fish that haven't buttoned up. Differences in the fitness of the fish are generally unknown at this time.

Spatial Structure and Diversity Goals

Larry Lestelle (Biostream Environmental) presented on Goals for Spatial Structure and Biological Diversity

- Recovery must address 4 characteristics (parameters) of Viable Salmonid Populations (VSPs): abundance, productivity, spatial structure, and biological diversity
- Spatial structure and biological diversity defined more qualitatively than quantitatively.
- Spatial structure and biological diversity are closely related
- Strong spatial structure and biological diversity stabilize population processes and provide increased resiliency to environmental change and threats. For example, Hilborn analyzed Bristol Bay sockeye and reported that some areas were stronger than others in some years, but in other years, this reverses and other areas are stronger. Seeing some indication of similar pattern in Hood Canal summer chum.

¹ Accumulated thermal units (TUs); the sum total number of daily average temperature experienced by embryos prior to hatching. Example would be if average daily stream temperature was 5 degrees Celsius, then 5 thermal units were accumulated. If the next day was also 5 degrees Celsius, the sum total would be 10 and so on.

- Streams within distribution are vastly different and provide diverse conditions for salmon.
- Genetic data show a “stepping stone” pattern of relatedness such that salmon are more closely related to salmon more nearby streams than in more distant streams. Summer chum in an eastside stream are more closely related to fish in other eastside streams even if there’s a closer stream on the west side. Straying appears more by fish moving along shoreline than across to the other side.
- Union River very isolated compared to historically due to extinction of nearby subpopulations.
- Extinction along multiple streams on eastside of Hood Canal
- Technical Recovery Team (TRT) conclusions on recovery needs
 - Spatial structure to be based on Ecological Diversity Groups (EDGs) using eco-regions and marine area distinctions.
 - One or more subpopulations need to persist in EDG in each population
 - Persistence means some level of population robustness, but not tied to a number of fish
 - Excludes Toandos and recognizes uncertainty about Dungeness
 - This persistence would achieve spacing based on observed straying patterns and genetic data
- HCCC held a summer chum diversity forum to revisit TRT conclusions. Conclusions as follows:
 - Meeting spatial structure need will address diversity need
 - SJDF spatial structure is met provided presence maintained in Dungeness
 - HC has several subpopulations trending upward and robust, although Tahuya and Big Beef reintroductions were not successful. One hypothesis for Big Beef failure that Quilcene fish were used and the reintroduction may have been more successful if a closer genetic source of fish (e.g., Union or Lilliwaup) were used.
 - One geographic area – West Kitsap – remains a concern. Union strong, but others not. Eastside fish more closely related to Union. Lilliwaup also more closely related to Union and other Westside fish.
 - The Union subpopulation is the only robust subpopulation in the West Kitsap EDG.
 - Given low numbers of summer chum in other streams in EDG, the area remains a concern.
 - Recommendation: subdivide the West Kitsap EDG into a north half and south half at the Great Bend
 - Spatial structure recovery need can be met by re-establishing a robust subpopulation in the northern spatial unit
 - Union satisfies robust subpopulation need in southern spatial unit
 - Would need another robust subpopulation in northern spatial unit
 - Natural re-colonization is likely to occur with continued favorable marine survival; a delay will likely occur with downturn in survival
 - Re-introduction could accelerate re-colonization and speed recovery

- Discussion
 - Question was asked about why focus reintroduction efforts on Big Beef again where there are already severe habitat limitations? Dewatto is in better shape and more suited for reintroduction.
 - Larry replied that he did not mean to indicate the re-introduction efforts should go to Big Beef. He used Big Beef as an example to re-enforce the spatial structure “stepping stone” concept.
 - A question was asked about the nature of the diversity forum outcome to recommend sub-dividing the West Sound EDG. The commenter did not recall reaching consensus on the decision to subdivide the area. And asked for clarification.
 - Patty Michak (HCCC) replied that there was a lot of discussion on the topic during the diversity forum, but tended toward the recommendation to subdivide the area.
 - A follow up question asked if science leading to the recommendation to split?
 - Scott replied that the recommendation is to address uncertainty associated with having one robust subpopulation located at the far end of one EDG. The recommendation increases the requirements for achieving spatial diversity. Without subdividing the EDG, Hood Canal could be at recovery already, but looking closer at the distribution data it appears that more spatial diversity needed in West Kitsap. There is a long distance between Union and other streams in EDG. Prudent to have a second strong stream in EDG.
 - Larry added that there will be more certainty that the subpopulation is persistent if you’ve got the second creek producing strong numbers of fish. The recommendation is for a more conservative approach.
 - A follow up question asked what is process for formalizing this recommendation?
 - Scott replied that the next steps are to update the 2014 guidance, then have conversations with NMFS. Updating recovery plan may be accomplished less formally or may require Federal Register notice. Note: later in symposium, Jennifer Quan, NMFS, indicated that a formal update to the recovery plan is not expected to be necessary.
 - A comment noted that the information presented suggests more projects are needed in the West Kitsap EDG, but those projects do not tend to score well during regional rankings.
 - Larry replied that the information presented is new and has not yet been applied in any project development or ranking. It can be applied in the future.
 - A comment noted the need for additional work in the West Kitsap EDG.

Near-Term Steps and Roadmap for Decisions

Larry Lestelle (Biostream Environmental) presented on Near-Term Steps and Roadmap for Decisions.

- The following issues were identified as “in play” and requiring next steps to be taken
 - Harvest related issues – recommended to address in summer 2017
 - Discuss revisiting Base Conservation Regime (BCR)
 - Develop a Recovering Conservation Regime (RCR)
 - Need a decision on strategy for re-establishment of a robust sub-population in Northern West Kitsap; summer 2017
 - Climate Change planning in 2017 and 2018
 - Need to plan in order to reduce risk from climate change. Changes are coming, so start now in building resilience in the population.
 - Define Broad Sense Recovery Goals starting now and continuing over time
 - Determine to what extent these need to be achieved for delisting? E.g., ER targets in viability analysis presented earlier
 - Need to develop a Recovered Harvest Regime (RHR)
 - Dungeness subpopulation may be part of these goals
 - Review the status of threats for each subpopulation between now and 2019
 - Research and monitoring priorities identified
 - Starting summer 2017 have an initial list
 - Roadmap for decisions
 - Year 2022 projected as a decision year
 - Flowchart decision tree described for getting to decision points on whether the ESU remains listed or potentially gets delisted
 - Now is the time to address issues raised earlier so we are ready for 2022 decision
 - Joint meeting of co-managers and NOAA needed in summer 2017 to agree on next steps and roadmap
- Discussion
 - Question was asked about how 2022 could be the decision year if it is decided to subdivide the West Kitsap EDG which requires establishment of a robust subpopulation in the northern area. This will take more than 5 years.
 - Larry replied that it could take more time than 2022, but need to double-down and make progress on issues raised. May take to 2024, but need to plan for success.
 - A question was asked about whether the funding is secured to conduct the monitoring needed to inform population trends analysis between now and 2022?
 - Larry and Scott both replied that the funding is not entirely secured, but the work is a priority and we need to make it happen.
 - A commenter noted that considering 2022 as a decision year depends on the PDO remaining in warm phase and providing the opportunity to test the PDO signal. This is uncertain.
 - Larry agreed and noted the Hood Canal Climate Forum discussion about the uncertainty of link between salmon population performance and PDO because

we do not know the mechanisms driving the population changes. The recommendation was to be cautious and not necessarily jump to delisting because recent strong numbers are during what is understood to be more favorable PDO conditions. Expecting that within 5 years we will have more information for a decision even if PDO regime varies.

- A commenter noted that PDO is not a mechanism. Other climatic cycles, such as the North Pacific Gyre Oscillation (NPGO), are other indicators that could be used and may be better linked to mechanisms affecting salmon populations. Mechanisms are important.
 - Larry replied that the example climatic cycle noted, NPGO, is closely linked to PDO, but agreed neither are mechanisms. We need to start hypothesizing mechanisms, per Kurt Fresh at Hood Canal Climate Forum.
- A question was asked about whether the decision tree would still work even if PDO taken out of it.
 - Larry replied that PDO could be removed, but it appears that the recent strong numbers are linked to PDO. There is a risk of delisting too early if we do not look at population numbers in less favorable conditions, such as what appears to be related to PDO phase.
 - Scott emphasized that when the flowchart leads to a delisting box, there is a question mark next to it. Following the decision tree to that box does not absolutely lead to delisting the population. Delisting is just one option and discussion/analysis will be needed to determine proper direction to take at that time.

Targeting Habitat Quality is Key

Alicia Olivas (HCCC) presented on What Needs to be Done Next?

- The region, the practitioners need to collectively continue work on targeting habitat quality
- Habitat is important for enabling salmon populations to be resilient to stressors
- Goal is to target habitat driving abundance and spatial structure
- This year's call for projects focused on Quilcene, Dosewallips, Salmon-Snow, and Union
- Focused habitat protection and restoration actions
- Target habitat quality SJDF Salmon-Snow Creeks
- Target habitat quality HC – Big Quilcene, Dosewallips, Union
- Each identified stream system included list of types of restoration recommended

The Quilcene Example

Michelle Myers of the Hood Canal Salmon Enhancement Group presented on the Lower Big Quilcene River Restoration Project.

- Presentation summarized work in last year and ongoing work
- Two projects planned in the lower 2.5 miles of river. The Lower One Mile Reach and Moon Valley Reach project near RM 2.5. No work planned in area between these reaches because the area is functioning naturally.
- Started planning project 3 years ago with stakeholders; recognizing need for and taking a multi-benefit approach
- Numerous limiting factors affecting area
- Lower One Mile Project is further ahead, so remainder of presentation focused on that project
- Hydrodynamic modeling conducted to estimate water depths and velocities under specified flow conditions.
- Showed depth and velocity estimates for 100-year flood event. Showed differences between existing conditions and various restoration alternatives. Alternatives varied in treatments to roads and levees.
- More analysis will be conducted as project moves forward to design. One line of analysis to be studied is how future changes at Moon Valley reach could affect conditions in the Lower One Mile Project area.
- The many project partners were acknowledged.

Group Discussion

- Scott acknowledged the great work being done by many organizations. He noted that funding agencies, such as the Salmon Recovery Funding Board (SRFB) need to think about funding longer term than grant round by grant round. This would enable larger projects to be conducted without interruptions around funding start and end dates.
- Comment was made that the habitat approach summarized by Alicia reflects a prioritization of working in core streams, but if thinking of adding a north West Kitsap EDG then work will be needed in that area also.
 - Scott agreed with the commenter. He noted the continued need to improve conditions for the core subpopulations, but also the need to improve the population spatial structure. He also noted the need to track subpopulations in all other systems also. There are some difficult decisions ahead regarding where to focus the available money.
- A commenter noted recovery requires restoration and protection. The protection element is where we have been failing since we've been working on restoration. New modifications are being added to sensitive areas (e.g., new house protected by bulkhead on Hwy 106). Need to identify priority habitats to protect, then get people with authority to prevent development in those areas. Despite all the good restoration work, we are losing intact habitats so we need to work on protection. Looking to 2022, also need to think about how much more habitat we are going to lose by then. The commenter encouraged setting the land use regulations, then

working with people to understand and comply to higher level than currently. Successful protection will require a paradigm shift.

- It was noted that the Mason County SMP will be updated and will prevent the types of development described. If more people comment on SEPA decisions, it would be good.
- Question was posed about whether HCCC has a strategy for getting involved in permit reviews.
 - Scott replied that the environmental regulations on the books are better than they have been, but need to be enforced. Variances etc. limit the effectiveness of the regulations. We need to show the counties what's needed where and how by developing a protection strategy. HCCC maintains a protected land database that includes protections ranging from National Parks to County labeled greenways. Take map and overlay with critical areas to identify where development may be allowed and where development should not be allowed. Such an effort would be improved by also taking an informed look at the development threat, i.e., likelihood certain areas being developed. This type of prioritization and development threat information could then be taken to policymakers and used to inform comments on SMPs.
- Another participant noted that protection requires money. If protections are going to take away the ability of landowners to use their land, then the land will need to be purchased. The Sentinel Landscapes Designation by the Department of Defense could lead to potential funding sources. Further prioritization of critical parcels is needed to determine where to focus available funds and conservation efforts.
 - Scott noted that the Trust for Public Lands is leading the effort to get Hood Canal approved as a Sentinel Landscape designation. Mitigation banking is another tool being used to protect areas.
- Comment was made that there needs to be a fundamental change at the federal level for a different way to compensate landowners. Ecological economic analysis shows the high value of the lands. Need to be able to offer more than traditional appraisal.
 - Scott noted that incentives may be one type of tool to work around appraisal limits.
- A commenter noted that condemnation may be necessary tool to protect particularly sensitive areas.
 - It was noted that SRFB does not allow condemnation. This could be changed although through SRFB planning, the state indicated the work could be accomplished through voluntary participation.
- Comment was made that among West Kitsap streams, Tahuya not responding well and habitat getting hammered due to development and logging impacts. Dewatto has some pressures, but on face of it looks to be good habitat. Dewatto should very much be part of recovery efforts. Big Beef was used as an example of eastside stream for restoration. There is still a question about what work to do where to improve spatial structure in the north West Kitsap EDG if the area is subdivided.
 - Patty replied that the TRT documents indicate summer chum are needed in both Dewatto and Big Beef. If we are going to take action, where do we take it? Patty noted that a question remains about why there are not already more fish colonizing Dewatto.
 - Commenter noted that natural recolonization needs to be considered as a strategy for fish returning to those streams, rather than trying to do reintroduction everywhere. Fish will find the habitat if it is there for them.

- A commenter noted that the Skokomish Tribe is monitoring temperatures in the Tahuya River. Twenty temperature loggers are currently in place. During the late June heatwave, temperatures in the creek already reached 20 degrees Celsius.
- Comment was made to again emphasize the importance of working in nearshore and estuary.
- Question was posed about what information is available about the small numbers of summer chum in the Skokomish?
 - Reply was that the fish are strays from the Union River.
- Comment was made to compliment the efforts to date for being on the right track. For people who want the success story now – and may want to accelerate the delisting decision to be able to claim success – the fact that the conversation about delisting has started is a success to highlight. We need to remain thoughtful on future decisions.

WRAP UP

Jennifer Quan, NOAA Fisheries, provided a wrap-up for the conference.

- Impressive discussion today. Different set of issues being discussed in Hood Canal then other areas given success toward recovery that is occurring in Hood Canal.
- She is in a new role at NOAA Fisheries as branch chief. Elizabeth Babcock is counterpart in North Puget Sound.
- Starting to see need to develop new skills for delisting in Washington and Oregon. Need to decide what that process looks like. She and others at NOAA Fisheries will be coordinating with USFWS who has more experience with delisting.
- Need Adaptive Management around the plans. Looking forward to bringing lessons learned from other areas to discussions for Hood Canal summer chum.
- Draft NOAA Fisheries action plan has a focus action on Hood Canal summer chum. Builds off of next steps in earlier presentations. Need to make sure the roadmap lines up with how what the Federal agencies need. Will work collaboratively on status review and list of actions needed.
- Regarding the upcoming status review in 2019 or 2020, there needs to be a discussion about what information needs to be in there. Jennifer can be the liaison for that process.
- In the next 3 years, what are short-term needs and how can NOAA Fisheries help direct through regulatory and potentially influencing funding.
- Recovery is leveraged through local protective regulations before people are comfortable with delisting.
- Not sure Recovery Plan needs to be rewritten, but need to think about how to share the goals. Creativity is possible in how to identify recovery goals.
- Discussion
 - Comment was made that currently PCSRF funding which provides a substantial portion of state's funding for restoration and protection discourages using the funding for capacity funding, such as the work needed to figure out and document updates and delisting decisions.
 - Commenter also noted the link between salmon recovery and orca whale recovery. Need to recover salmon stocks to be viable and to provide prey base for ESA listed orca whales.