COAST SALMON PARTNERSHIP

Special Publication Series

Report on the Washington Coast Chinook Symposium

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In 1999, the Washington State Legislature established the Salmon Recovery Act (*RCW 77.85*) embracing a vision for statewide salmon recovery and conveying the cultural and economic importance of salmon to the people of Washington. The Washington Coast Sustainable Salmon Partnership (Coast Salmon Partnership) is a Washington State salmon recovery organization established in 2009 by Interlocal Agreement among tribes, counties, and cities in the Washington Coast Region. The Washington Coast Region comprises 3.75 million acres of land and all watersheds that drain directly into the Pacific Ocean between Cape Flattery and Cape Disappointment. The Washington Coast Sustainable Salmon Foundation (Coast Salmon Foundation) is a 501 (c)(3) nonprofit, established in 2013 as the fiscal sponsor of the Coast Salmon Partnership.

The Coast Salmon Partnership works to keep our salmon runs and our livelihoods and way of life that depend on them healthy, through habitat restoration and protection projects in some of the last best habitats for salmon in the state. We identify barriers to healthy salmon runs and develop science-based solutions to address them, ensuring the long-term productivity of our salmon populations and bringing family-wage jobs and prosperity to our coastal communities. We focus on rivers with the highest potential for healthy salmon runs, bringing diverse local partners together with scientific experts to protect the best and restore the rest.

Special Publications of the Coast Salmon Partnership highlight topics of scientific interest and relevance to salmon recovery in the Washington Coast Region. Special publications undergo peer-review by selected scientific experts prior to publication. Sponsorship of publications does not necessarily imply that the findings or conclusions contained therein are endorsed by the Coast Salmon Partnership.

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The Coast Salmon Partnership and the Chinook Symposium Steering Committee are grateful for the participation of so many experts and partners to make this event a success. We look forward to continuing to work together toward strong Chinook populations in the Washington coast region.

Executive Summary

The Washington Coast Chinook Symposium brought together technical experts, fishery managers, restoration specialists, and others within the salmon recovery community concerned about Washington Coast Chinook salmon on October 8th and 9th, 2025. The outcomes from the presentations and subsequent discussions led to key takeaways that will guide next steps and our collective approach to recovery. First, all four "Hs" – habitat, harvest, hatcheries, and hydro-power – contribute to declines in Washington Coast Chinook. Second, recovery must involve management, policy, and cultural considerations as much as technical and scientific research, monitoring, and restoration. Third, we learned that changes in drivers such as geomorphology and climate occurring over geologic timescales influenced the evolution of Washington Coast Chinook and their distinct runs. Adaptation to a changing future holds the key to their resilience to environmental stress. The key question is: how can human communities offset, build resilience, mitigate for, and adapt to environmental change to address the problem of Chinook declines from multiple angles, both technical and managerial, from headwaters to ocean?

Background

This event stemmed from concerns over declines in the number of spawning Chinook salmon (*Oncorhynchus tshawytscha*) classified as spring-run in the Chehalis River over the past 20 years, which is estimated to be less than 23% of their historical population (Hiss and Knudsen 1993; Pacific Fishery Management Council 2019). These declines, and recent research in the Chehalis River quantifying hybridization rates between spring and fall Chinook (Zimmerman et al. 2025), propelled the conservation community to convene and discuss potential causes and restoration actions. In 2023, the Center for Biological Diversity and Pacific Rivers filed a petition to list spring-run Chinook on the Washington Coast, or the whole Washington Coast Chinook Evolutionarily Significant Unit (ESU), as threatened or endangered under the Endangered Species Act (The National Marine Fisheries Service has determined that listing is not warranted, issuing its decision on February 19, 2026; see Federal Register 91(33):7964–7977). The Chehalis Basin Aquatic Species Restoration Program designated spring Chinook as a priority species and formed a committee to address declining trends in spawning escapements. This symposium was convened to consider threats impacting the full range of Washington Coast Chinook in order to help understand the declines of spring and fall-run Chinook in the Chehalis. The Coast Salmon Partnership, an umbrella organization that supports and connects on-the-ground restoration efforts throughout the Washington coast region, agreed to host an event and convene experts on Washington Coast Chinook. The Coast Salmon Partnership convened a Steering Committee to guide the event planning process and identify experts to invite to present at the Washington Coast Chinook Symposium. The Steering Committee included representation from the Washington Department of Fish and Wildlife (WDFW), Quinault Indian Nation, and the Chehalis Tribe. Coast Salmon Partnership staff additionally met with other coastal tribes to discuss priorities for Chinook in their watersheds to ensure that the event would encompass the full range of concerns facing Chinook during their entire life cycle.

Objectives

1. Share the state of knowledge about the primary factors that help explain current status & trends in Washington Coast Chinook in watersheds across the range of the ESU.
2. Describe key uncertainties, assumptions, or data gaps that warrant further investigation to improve our ability to rebuild Chinook salmon runs.
3. Identify actionable steps to address identified data gaps and/or to test population response to factors hypothesized to affect declining trends in productivity and spawning escapements.

Presentations

On the first day of the symposium, subject matter experts gave presentations and shared their knowledge to provide a foundation for the second day of the symposium which involved in-depth discussion on data gaps, threats, and recovery actions.

On the first day, there were four sessions:

(1) **Watershed Status & Trends** session provided an update on the status, trends, and concerns in each of the 5 major watersheds in the region that produce both spring and fall Chinook;
(2) **Juvenile Outmigration** session provided information about habitat use and the challenges faced by juvenile Chinook during outmigration;
(3) **Marine Phase** session focused on growth and distribution of Chinook during the marine phase;
(4) and the **Genetics** session provided context around the use of genetic tools for identifying run-timing genotypes and using them for conservation and management purposes.

Presentation slides and other Symposium materials are available from the Coast Salmon Partnership on their website or by email request.

Session 1: Watershed Status & Trends

1. Quillayute River – Kayla Owen & Sierra Hemmig (Quileute Tribe)
2. Hoh River – James Losee (Wild Salmon Center), Kim Bray & Brian Hoffman (Hoh Tribe)
3. Queets & Quinault Rivers – Tyler Jurasin (Quinault Indian Nation)
4. Chehalis Basin – Marisa Litz (WDFW)

The watershed status and trends presentations provided updates on the spring and fall Chinook runs in each of the major basins that support both run types of Chinook in the Washington coast region. The presentations highlighted differences with regard to the status of the salmon and the issues they face. Based on monitoring data presented by the Quileute Tribe, none of the Chinook runs in the Quillayute River have been in decline for at least the last 20 years, however, others noted that many other basins show a notable decline for their spring-run fish. Multiple presenters described changing demographics in their Chinook populations, including earlier maturation rates and declining size at age.

The Quillayute is the only system in the region with hatchery production of spring Chinook and where consistent directed fisheries for spring Chinook have continued in recent decades. Until recent years, there have been directed fisheries for spring Chinook in the Hoh River and Chehalis River as well. Directed fisheries targeting spring-run Chinook have not occurred in the Queets or Quinault rivers for decades due to concerns about the status of the runs.

While the hydrology of these systems is diverse, presenters expressed concern about changing climate impacts on flow and temperature conditions. Rain-fed systems are impacted by extreme rain events which can scour away redds. The large glacier that fed the East Fork of the Quinault River has disappeared due to climate change, and others in the region are shrinking in size. Changes from snow-fed to rain-fed hydrology can have drastic impacts on the ecology of the watershed which affect salmon habitat quality and survival.

Each presenter also shared some of the work that is currently underway in their system, including a major oxbow reconnection project in the Quillayute, acoustic tagging study in the Hoh, large woody debris placements in the Queets and Quinault, and a comprehensive assessment of spawning escapement methods in the Chehalis. The presentations provided the opportunity for cross-basin partnerships and information exchange.

Session 2: Juvenile Outmigration

1. Estuarine Life Histories of Juvenile Chinook Salmon: Applications of Salish Sea Science to the Outer Coast – Correigh Greene (Skagit River System Cooperative)
2. Successful Juvenile Life History Strategies in Returning Adult Chinook from Western Washington – Andrew Claiborne (WDFW)
3. Nonnative Fish Predators in the Chehalis River and Implications for Chinook Salmon – John Winkowski (WDFW)

The juvenile outmigration session explored the diversity of life histories that Chinook exhibit, the relative success of different life histories depending on habitat availability, and other threats, such as predation, that face juvenile Chinook as they rear and migrate to the ocean. Correigh Greene opened the Juvenile Outmigration session with a description of the broad range of juvenile life histories of Chinook in the Salish Sea that are differentiated by the length of time that they rear in freshwater, estuary, and nearshore habitats. His work in Skagit Bay revealed that subyearlings strongly rely on estuarine habitats and other sheltered, structured habitats for rearing, and that a lack of available habitat can limit abundance. He also described the large distances traveled by subyearlings originating in Skagit Bay, and encouraged a broad spatial view for habitat conservation and restoration. Some areas of the coast region contain tidal delta complexes similar to areas of the Salish Sea (i.e. Gray's Harbor, Willapa Bay), where Greene encouraged protection and restoration of vegetated tidal deltas, lagoons, submerged aquatic vegetation (i.e. eelgrass), and associated coastal creeks. In the more northern watersheds of the coast region where extensive estuaries are absent, Greene emphasized the likely importance of seasonal lagoons, nearshore submerged aquatic vegetation (kelp beds), and nearby independent coastal creeks.

It was notable that few studies have been done on the Pacific coast to investigate juvenile life histories in similar ways to the work that has been done in the inland waters of the Salish Sea. An exception is work Andrew Claiborne presented, who provided a summary of their lab's efforts using otolith microchemistry to explore the relative success of Chinook life histories in different systems. In the Quillayute, they found that larger and later emigrating juvenile outmigrants survived to return at higher rates, and that the mean migration time among surviving adults was significantly later than all other basins in the study. In contrast, smaller fish from the Chehalis/Newaukum made up a higher proportion of returning adults than in the Quillayute, and there is some evidence that larger and later migrants experienced higher rates of mortality. These patterns could be explained by the relatively small estuary area in the Quillayute (characteristic of coastal systems north of Grays Harbor) compared to the Chehalis, and the threat of high summer water temperatures. This provided important background for discussion about the

diversity of habitat available in different coastal systems and what that means for restoration and recovery strategies.

John Winkowski's research on piscivorous predators showcased the impact of nonnative smallmouth bass (*Micropterus dolomieu*) and native northern pikeminnow (*Ptychocheilus oregonensis*) on juvenile Chinook in the Chehalis. He also described that warming water temperatures in the system due to climate change could expand the range and abundance of smallmouth bass and increase the predation of juvenile Chinook. This led to a brief discussion about the potential pitfalls of predator control programs (i.e. unintended or indirect trophic impacts). Specifically, pikeminnow consumed fewer Chinook than smallmouth bass did, but pikeminnow also consumed substantial amounts of smallmouth bass, suggesting that removing pikeminnow could have unintended consequences. Some attendees also wanted to know how predator control programs could be used to ensure the efficacy of restoration projects intended to increase habitat for juvenile Chinook without exposure of young fish to increased predation pressure.

The Juvenile Outmigration session provided key information about the diversity of Chinook life histories that are influenced by different habitat conditions and the significance of juvenile predation pressure during migration. Predation in particular was explored during later discussion and was expanded to include a consideration of pinniped predation of adult and juvenile salmonids, which is a looming concern in many coastal systems both for juvenile outmigrants and returning adults.

Session 3: Marine Phase

1. Impacts of Ocean Variability on Feeding Ecology and Prey of Spring Chinook Salmon During Early Marine Residence – Elizabeth Daly (Oregon State University Cooperative Institute for Marine Ecosystem and Resource Studies)
2. Washington Coastal Chinook Fishery Exploitation Rates (1980s to present) – Jake Kvistad (WDFW)
3. Demographic Trends in Chinook Salmon and Implications for Reproductive Output and Fisheries Management – Jan Ohlberger (WDFW)

The Marine Phase session focused on understanding the key dynamics for Chinook growth and survival in the ocean. Elizabeth Daly described how prey availability for juvenile salmon during the first few weeks of ocean survival varies according to ocean conditions. Warm or cold ocean temperature regimes cause significant changes in the amount and nutritional value of prey available to juvenile Chinook, which impacts their diet and body condition. The abundance of juvenile Columbia River spring-run Chinook in the ocean during this critical growth period is also correlated to the abundance of adult returns 2 years later, indicating that these first few weeks in the ocean are very important for yearling outmigrants. Daly also observed changing interactions with other species as distributions shift with a changing climate, including increased competition between juvenile Chinook, other salmonid species, sablefish (*Anoplopoma fimbria*) and market squid (*Doryteuthis opalescens*) during warmer ocean conditions.

Jake Kvistad reported fishery exploitation rates for coastal populations of fall and spring Chinook from the 1980s to present. Exploitation rates of fall Chinook were calculated using coded-wire tagged (CWT) recoveries of the Queets fall Chinook indicator stock reared at the Salmon River hatchery that have been specifically propagated to avoid domestication effects and to match the size and migration timing of wild fall Chinook smolts. Only wild broodstock is used each year in this program. These data are used as an indicator stock by the Pacific Salmon Commission Chinook Technical Committee. For fall Chinook, exploitation rates have been high (averaging approximately 60%) and relatively stable since the 1980s, with an increasing portion of the pre-terminal catch (catch that occurs before the fish reach the river mouth) occurring in the Southeast Alaska and Northern British Columbia fisheries. The discussion noted the magnitude of mortality occurring in pre-terminal fisheries for fall Chinook and this concern resurfaced multiple times in later discussions about potential recovery actions and levers we can pull as a region.

Exploitation rates for spring Chinook were calculated using CWT Sol Duc spring Chinook from the Sol Duc hatchery. These data are not used as a Chinook Technical Committee indicator stock due to mixed origin and spring/summer run timing of this hatchery stock. For spring Chinook, most of the pre-terminal harvest occurred in troll fisheries in Southeast Alaska, West Coast Vancouver Island, and the North of Falcon areas. In general, the spring Chinook exploitation rates have declined, especially post-2020. This could indicate success of current fishery management practices to reduce impact on this declining group, but it could also be due to variability in movement or distribution that impacts encounter rates.

Jan Ohlberger described declines in size at age and age at return for 85 populations of Chinook, and discussed what that means for recovery potential. Some modeling work in the Yukon-Kuskokwim system of Alaska showed that declines in size at age can lead to declining fecundity (using egg mass as a proxy) which has the potential to decrease productivity (returns per spawner) for the population. More research into the causes of these range-wide demographic changes and the potential future impacts on productivity and recovery are merited. The group discussed how changing ocean conditions and prey availability might cause metabolic stress and contribute to changing growth and maturity patterns. There was also considerable concern that these changes in productivity were not being adequately accounted for in fishery management processes, which might be leading to higher exploitation rates on Chinook than they can handle, especially in pre-terminal (ocean) fisheries.

Overall, the marine phase session provided attendees with a picture of a changing ocean ecosystem with likely impacts on Chinook growth and survival and a relatively unchanged fishery management system with high exploitation on Washington Coast Chinook from fisheries in Alaska and British Columbia.

Session 4: Genetics

1. The Thing Spring Chinook Need Most: An Evolutionary Reason to Exist – Tasha Thompson (Wild Salmon Center)

2. Genetic and Life History Diversity in Relation to Conservation Units – Adrian Spidle (Northwest Indian Fisheries Commission)
3. Preliminary Results of a Flow Manipulation Study to Reduce Hybridization of Spring and Fall Chinook in the Chehalis River Basin – Marisa Litz (WDFW)

The Genetics session looked at the evolutionary background of spring and fall Chinook life history strategies and explored the prevalence and potential impacts of run-timing hybridization. Tasha Thompson posed the question "What gives spring Chinook an evolutionary reason to exist?" and hypothesized that spring-run fish, which forego extended ocean growth opportunities and return to freshwater 4-6 months prior to spawning, benefit from exclusive access to spawning habitat that fall-run fish cannot access. Spring-run fish return to the system when flows are generally higher than would be typically encountered during summer and early fall, allowing them to traverse features that may become low-flow or thermal barriers later in the season when early returning fall-run fish move upstream in freshwater, effectively separating the two runs in the same system by space and time. The benefit can become disrupted when former spring Chinook exclusive habitat becomes unusable or becomes accessible to fall-run fish. Thompson proposed that management actions that restore the barriers that prevent access by fall-run fish could help maintain the spring Chinook "reason to exist". Understanding the specific evolutionary factors under which the spring Chinook life history evolved in a basin can help point to appropriate restoration actions by clarifying the conditions under which that life history evolved in the first place and how they have adapted to changes since that time.

Adrian Spidle provided additional context for the evolutionary history of Chinook in Washington. The spring run-timing in this region likely diverged after the last glaciation, suggesting that it is a newer adaptation on the Washington coast than in watersheds further south, like the Klamath River, that were not impacted by glaciation. The genetic differences between the spring and fall genotypes in the Puget Sound are much less divergent than in systems that did not experience glaciation, indicating both a more recent split and/or frequent interbreeding. Spidle stated that because the spring-run life history is a more recent development in this region, it can also be more quickly recovered under the right conditions, as evidenced in the Nooksack River located in North Puget Sound. While a similar type of analysis is not yet available for coastal populations, he hypothesized that Chinook on the Washington coast would have similar genetic characteristics considering their similar evolutionary history. Spidle cautioned against altering habitats or implementing narrow management actions specifically for the success of spring-run fish instead of conserving diverse habitats that encourage genetic diversity and resiliency across all Chinook life histories.

Marisa Litz provided a summary of the Skookumchuck Dam flow manipulation and fry genotyping study (Zimmerman et al. 2025) in the Skookumchuck and Newaukum rivers of the Chehalis River basin. The Skookumchuck Dam was constructed in 1971 as a water source for a coal fire plant. During its operation, flows in the Skookumchuck River during summer and early fall were elevated from historic levels, which some hypothesized might be contributing to more overlap between spring- and fall-run Chinook spawning, leading to hybridization between the two runs. In 2021, dam operators agreed to modify flows from the coal fire plant to explore the impact of lower late summer flows, similar to the pre-dam period, on hybridization rates. Since

the beginning of the flow manipulations at the Skookumchuck Dam in 2022, the proportion of homozygous spring-run fish in the Skookumchuck has ranged between 5% and 9%, with the most recent (2025) outmigration year having the highest spring-run proportions. The study also identified that the overall abundance of fry in the Skookumchuck River is two orders of magnitude greater than Chinook fry abundance in the Newaukum River, where flows have not been manipulated. This study is designed to directly test the hypothesis that flow regimes are a key dynamic to ensuring the success of the spring-run life history, although it is still too early to draw any solid conclusions.

The genetics session provided a few different viewpoints on the importance of run-timing genotypes and hybridization, which laid a solid foundation for additional discussion about future genetics studies coastwide to fill data gaps and inform recovery actions.

Discussion

The second day of the Symposium was entirely dedicated to making progress toward the event objectives through group discussion. The discussion was split into three categories to help identify information gaps and prioritize management actions:

(1) describe key factors contributing to current status and trends,
(2) explore uncertainties and data gaps currently acting as barriers to effective management, and
(3) identify potential actions to improve the future of Washington Coast Chinook.

To kick-start the discussions, the organizers asked table groups, loosely organized by the watershed they primarily work in, to brainstorm the characteristics of their watersheds that support the spring-run Chinook life history. Participants highlighted how glaciers create the temperature and flow regimes to support spring-run Chinook and that currently shrinking glaciers threaten those conditions. Participants in some table groups discussed how spatial and/or temporal separation between spring and fall runs could have occurred due to seasonal barriers such as beaver dams, thermal stratification in Lake Quinault, low flow barriers in multiple locations in the Chehalis, or other unidentified aspects of the watershed. In the Quillayute River, declining summer flows and warming temperatures pose a threat to spring Chinook, even if the population numbers have not declined. Participants in one table group also discussed that during the last glaciation, Puget Sound drained through the Chehalis, raising the possibility that spring-run fish could be remnants from that era that managed to persist post-glaciation. This conversation helped table groups to think about their watersheds through a Chinook life history lens in preparation for the following discussions.

Key Factors

The next phase of facilitated discussion focused on identifying the key factors affecting current Chinook population and trends. The organizers asked attendees to fill out a worksheet designed to classify the main issues Chinook face in their watershed and what key factors might explain those issues. Subsequently, table groups shared their worksheet outcomes with one another, and

attempted to create a cohesive list of issues and key factors relevant to Chinook in their watershed.

Through the above exercise, common themes emerged for multiple watersheds in the region. Importantly, however, attendees acknowledged and detailed the nuances within these themes unique to individual watersheds. For example, the theme of environmental change was attributed coast-wide as a primary factor affecting Chinook. However, melting glaciers leading to warmer summer stream temperatures are a key factor affecting the Quinault River, but warming summer stream temperatures, independent of glaciers, are a critical factor in the Chehalis River. Other environmental factors identified for multiple watersheds in the region include changing water temperatures and flow, decreased quality and quantity of freshwater habitat, and an overall shift in hydrologic regimes (snow-fed to rain-fed) due to climate change. Another common theme identified across watersheds was the broad challenge of cumulative impacts. Impacts of changing ocean prey availability on growth and fecundity, pre-terminal fishery mortality, and pinniped predation contribute to these cumulative impacts. In the Chehalis River table group, participants expressed additional concern about floodplain development along Interstate 5, nonnative fish predators, and poaching. Through this portion of the discussion, multiple participants stressed the need to simultaneously address multiple factors because many of these dynamics are intertwined.

Uncertainties

The next phase of facilitated discussion asked table groups to consider the key data gaps or uncertainties that serve as barriers to more effective management. In order to expand thinking on the topic and capitalize on the information shared during the presentations on Day 1, the organizers asked attendees to also consider any underlying assumptions with regard to management or monitoring that could use additional scrutiny.

One uncertainty that table groups expressed concern about is the quality of spawning abundance data. There are uncertainties and a lack of clarity about the standardization of training for survey and estimation methods between agencies and restoration partners. A few participants also brought up the somewhat arbitrary nature of the cutoff dates used to distinguish between spring-run and fall-run fish in the field. Investigation into the accuracy and utility of these cutoff dates would be useful.

Participants mentioned the need to establish CWT programs to address uncertainty regarding the distribution and pre-terminal fishing mortality of Washington Coast spring Chinook.

Some table groups identified a need for additional communication opportunities between experts working on Chinook through different lenses, pointing out that there are not many opportunities for the restoration community to communicate with the harvest management community, or for researchers looking at Chinook issues on a larger geographic scale (range-wide or coast-wide) to exchange information and improve data collection.

Participants also discussed concern about wetland degradation in relation to development, and data gaps around the potential impacts on salmon and their habitat needs. Other attendees

discussed how little is known about the changing prey community available to salmon in the ocean – spatially and temporally – and the consequences for salmon growth and survival in the widespread marine habitats they utilize.

Attendees discussed interest in the use of genetic markers to differentiate run-timing. There is interest in developing a comprehensive and up-to-date genetic baseline for watersheds across the region and to improve understanding of the run-timing genetic markers in each watershed. This would require a cooperative region-wide sampling program to collect suitable samples and associated demographic information.

Potential Actions

During the watershed breakout discussions, attendees brainstormed potential actions that would address an identified key factor or information gap, and they identified the entity(ies) that could initiate such an action. Groups then narrowed in on their best idea and sent a couple representatives to a neighboring table to peer review their proposed potential action. The fine-tuned ideas were then shared with the full group, and a general discussion of additional ideas followed. The following six umbrella actions emerged from that discussion.

Document and Preserve Genetic Diversity of Washington Coast Chinook

- Develop an ESU-wide genetic baseline and assessment of run-timing markers
- Collect associated demographic data including age, sex, and length to better inform population metrics (including genetic analysis of archived scale samples)
- Develop a plan to preserve/maintain the genetic diversity of run timing, including consideration of actions to better separate runs in space and time and the potential for a conservation hatchery program

Two table groups came up with similar actions centered around improved understanding of coastal Chinook genetics. The first table group was focused on collecting genetic samples and associated demographic information (length, sex, age, etc. as feasible) from Chinook across the full range of run timings in the Quillayute River. This group would aim for comprehensive sampling of salmon in the system by targeting broodstock, spawned out fish encountered on redd surveys, and fish caught in gillnet fisheries. The aim would be to parse spring-, summer-, and fall-run fish more accurately and assess any patterns in their demographic information that might point to particularly relevant threats or recovery actions.

The second table group took a broader approach to understanding Chinook genetics across the region. Participants proposed to collect samples via spawning surveys and net fisheries and use archival scale samples. For each sampled fish, they would collect the length, sex, tissue for genetics, and scale for aging. The goal would be to collect 100+ samples from each life history in each basin in order to better understand the proportions of run-timing markers within and across watersheds. This updated genetic assignment information and associated demographic data would then be used to compile a more accurate image of life history diversity in the region, which would provide important perspective for subsequent management actions.

Investigate Pinniped Predation and Potential Control Measures

- Connect coastal salmon managers with regional pinniped experts and managers
- Support existing research projects that fill data gaps, including updated pinniped abundance and diet studies
- Improve outreach about legislative fixes to the Marine Mammal Protection Act that partners can support
- Investigate ways to mitigate pinniped predation impacts through restoring complex habitat or other salmon-centric management actions

This group discussed how pinnipeds could be managed similarly to other problematic wildlife in conflict with food production systems. They proposed a social and political campaign for range-wide action, rather than targeted place-based removals, to prevent displacement of predation pressure within the region. There was some apprehension about such drastic action without additional studies, but the concern about the magnitude of pinniped predation emphasized the immediacy of the need for action. Questions were also raised about the feasibility of being able to garner the social, legal, and political support needed to effectively accomplish changes to marine mammal management.

Reduce Impacts of Pre-Terminal Fisheries

- Initiate a Queets River spring Chinook hatchery indicator stock program for the purpose of using coded wire tag marked releases to improve exploitation rate estimates and our understanding of the geographic distribution of pre-terminal harvest of spring Chinook
    - Explore relationship between exploitation rates of spring and fall-run CWT groups and whether fall-run exploitation rates can be used as an indicator for spring-run Chinook
    - Meet criteria to have these data included by the Chinook Technical Committee of the Pacific Salmon Commission
- Investigate whether current exploitation rates can be sustained and conservation responsibility fairly shared given changing productivity for WA Coast Chinook populations
- Disseminate information about salmon management processes, including where and when public comment is accepted
- Develop messaging for U.S. Pacific Salmon Commissioners for Pacific Salmon Treaty re-negotiations in 2028
- Improve collaboration and communication among other salmon-centric communities about advocacy opportunities
    - Need to speak as a WA/OR coalition, not from individual watersheds

This group developed a plan to improve estimation of spring-run Chinook exploitation rates. Participants proposed to initiate a spring-run hatchery program in the Queets River and tag and release a few brood cycles of hatchery-produced spring/summer Chinook from this program. Participants clarified that the released fish would be intended specifically for ocean exploitation rate calculations, not for terminal harvest opportunity or conservation/supplementation. The

release groups would need to meet certain criteria in order to be considered a viable data source by the Chinook Technical Committee of the Pacific Salmon Commission. The goal would be to compare the exploitation rate between the Queets fall-run and spring-run indicator stocks to see if there is a reliable relationship or conversion factor that could be used to estimate spring-run exploitation using fall-run exploitation in future years. This type of project may be feasible based on tagged early migrant releases tested in the 1980s and could help improve understanding of fishery mortality for Washington Coast spring-run Chinook.

This idea inspired a discussion about management of pre-terminal fisheries and their impacts on Washington Coast Chinook. Attendees were interested in learning more about the Pacific Salmon Treaty and the management processes that set quotas from international negotiations down to local fishery regulations. The Pacific Salmon Treaty will be renegotiated in 2028, and attendees were interested in more information about opportunities for public comment, communication with their commissioner about regional priorities, and the potential to develop a regional coalition to speak with a strong and unified voice on behalf of Washington Coast Chinook.

Suppress Nonnative Fish Predators

- Support WDFW suppression study to inform which management actions to reduce predation may be most effective
- Support WDFW study (Winkowski) to improve understanding of nonnative fish predator diets in space and time
- Outreach to fishers to improve retention rates
    - Develop a cookbook for consumption of non-native fish predators as an outreach tool
    - Educational signage
- Form a political coalition to recommend improvements to Fish & Wildlife Commission's Nonnative Game Fish and Fisheries Policy (C-3632)

The fifth table group focused on better management of predatory nonnative fish that consume large numbers of juvenile Chinook, specifically in the Chehalis. They discussed forming a coalition to approach the Washington Fish & Wildlife Commission with ideas for better regulation of nonnative fish populations. Participants were also excited about a number of outreach ideas to encourage more retention of nonnative fish in recreational fisheries, including a cookbook for smallmouth bass recipes. There was agreement that this is an issue that must be addressed immediately before it gets worse; therefore, accumulating political momentum and grassroots support will be crucial.

Understand and Mitigate for Climate Change Impacts

- Continue to monitor and research glacial melt, snow-fed to rain-fed transitions, extreme rain events, temperatures, changes in precipitation patterns (both high and low flows) and impacts on salmon
- Identify opportunities for mitigation and adaptation for restoration and management
- Encourage use of Coast Salmon Partnership's Climate Adaptation Tool

This action category emerged from general group discussion about the increasing threats posed to multiple coastal watersheds from changing hydrologic regimes. Many attendees that work in habitat restoration were keen for additional information about how restoration projects can mitigate climate impacts and increase the resilience of Washington Coast Chinook populations. Some attendees were also interested in more conservative fishery management to account for the increasingly variable and unpredictable climate that can leave salmon vulnerable to unexpected mortality.

Investigate Changes in Marine Prey Availability and Impacts on Growth

- Open dialogues and build connections between marine productivity researchers and the salmon restoration community
- Create opportunities to collect and analyze more Washington coast-centric data on salmon growth and survival during their marine phase
- Incorporate information about changing marine productivity into climate readiness processes and management uncertainty calculations

Elizabeth Daly's presentation brought a focus on the marine food web and impacts of marine growth conditions on salmon survival that was new to many habitat restoration practitioners in the room. This action emerged from a need for additional information about how coast Chinook specifically interact with the marine environment, especially because their life history differs from that of Salish Sea or Columbia River fish, and their needs when they enter the ocean are not adequately monitored or researched with existing survey programs.

Overall, the actions identified through this exercise fell into a few different categories that highlight the diverse strengths of partnerships within the Washington coast region: political coalition building to share information and advocate for changes to salmon management, studies to improve our understanding of key threats to Chinook salmon survival, and forward-looking adaptation strategies for dealing with climate change-related impacts.

Next Steps

The Washington Coast Chinook Symposium convened experts to share the state of knowledge about the primary factors that explain current status & trends among Chinook salmon in diverse watersheds across the range of the Washington Coast ESU. The event was conceived by a Steering Committee working primarily within the Chehalis Basin, and this core group will provide the roadmap of next steps. The outcomes of the Chinook Symposium discussions highlighted the need for more than one group of experts in their respective roles and organizations to begin addressing the key data gaps, uncertainties, and actions necessary to advance recovery and sustainability. As part of these actions, coordination is needed to understand which projects need funding, what data already exist for the proposed projects, what coalitions currently exist, and which need to be formed. While the Steering Committee is dedicated to initiating the conceptual framework for these next steps, it will be the engagement of the broader salmon recovery community that moves the needle for Washington Coast Chinook resilience.

Remaining Questions and Discussion Topics

Attendees had the opportunity to write additional questions on a flipchart during both days of the event. Some topics were introduced during day 2 discussions, but many were not discussed further and might warrant more consideration in future conversations.

- Have you considered using Lidar combined with thalweg survey to do pre- and post-restoration monitoring?
- Could we test release strategies, timing and location, interactions between steelhead, coho, and Chinook?
- Measures to improve productivity and abundance of spring and fall Chinook
- Expand on the relationship between glaciation history and genetic differentiation
- Do summer-run fish experience less sea lion predation pressure in Washington terminal areas?
- Why are older age classes disappearing?
- Will you change hatchery release Chinook if drought condition and glacial water flow are reduced? (Queets) Look at watersheds where we had spring Chinook but no longer do.
- Range and timing shifts, displacement, prey changes (anchovy & thiamine)
- Environmental change impacts on Chinook in freshwater and marine environments and biological response
- Could the hybridization of spring and fall Chinook serve as a genetic resilience tool?
- Harvest management reform
- Bering Sea Trawl Bycatch
- Why are there so few yearlings produced by springers?
- How much can spawning habitat restoration move the needle for WA Coast Chinook populations?
- What happened with Chehalis fall Chinook? Consistently lower returns after 1997

References & Additional Resources

Invited presenters and Steering Committee members were asked to identify papers, reports, and other resources that would help attendees of the symposium and readers of this report gain a deeper understanding of the topics they introduced in their presentations. These resources are organized by presentation session here.

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