

# All H and Predation Actions Summary

In recent years, members of the Chehalis Basin Board (CBB) have emphasized a need for an integrated approach for improving salmon and steelhead populations in the Chehalis Basin in light of climate change, salmon and steelhead population declines, ongoing development pressure and human population increases, and, more recently, growing concern about a potential Endangered Species Act (ESA) listing of spring-run Chinook salmon. The CBB tasked staff with identifying additional actions, or in some cases related studies, in the Basin to compliment the habitat focus of the Aquatic Species Restoration Plan (ASRP). ASRP is a science-informed program that aims to protect, restore, and enhance habitat, an important factor for salmonids in the Basin. In addition to habitat, the “Four Hs” or “All Hs” also include harvest, hatcheries, and hydropower, as well as predation.

Within the All H and predation construct, the Chehalis Basin Board’s role focuses on advocacy and supporting funding requests initiated by the state and the tribal co-manager and partners, who serve as the legal governmental bodies responsible for natural resource management across Washington State. In this role, the Chehalis Board plays a critical part in requesting and advocating for funding to study, plan and implement actions that can bolster the ASRP’s habitat restoration and protection efforts across the Basin and reduce threats to aquatic species.

This All H Matrix is the result of multiple discussions amongst scientists, co-managers, partners and CBB members. The actions and studies included in the matrix are prioritized to highlight for the CBB members the most important additional actions currently recommended to promote healthy and sustainable populations of salmon and steelhead in the Basin. It also describes on-going ASRP, and integrated project efforts and studies related or relevant to the All Hs.

Scientists, technical experts, tribal representatives, and agency staff have reviewed and discussed potential actions contained in this All H Matrix, however most actions cited will require more coordination and study design among the state and the tribal co-manager and partners before implementation. ASRP funded studies related to the All Hs range from the spring Chinook fry trapping, and smolt and adult tracking surveys to a multi-year fish predation study. This research is underway and the ASRP Steering Committee is actively evaluating studies to continue, pause, or add to the ASRP Monitoring and Adaptive Management Plan to enhance understanding of salmon and steelhead genetics, population size and health, climate adaptation, and predator-prey relationships and distributions, among others. These studies have provided important baseline information to inform the ASRP implementation efforts and to help adaptively manage habitat and species restoration and protection work in the Basin.

The actions and studies in the All H Matrix highlighted in **Orange** are potential priority elements for the CBB’s long-term strategy decision making process. The recommended actions and studies in the matrix have been initially discussed with the state and the tribal co-manager and partners but necessitate more coordination and likely funding to implement. Timing for actions is loosely described in the matrix along with general funding parameters.

## Priority Actions and Studies

### Recommended Actions

- Targeted removal or nest eradication of predatory non-native fish
- Initial aerial pinniped survey
- Outreach/behavioral change campaign to educate on fishing impacts, human activities that affect salmon and steelhead, and watershed health

### Studies Underway

- Chinook, Coho, and Steelhead Smolt and Adult Monitoring studies
- Spring Chinook Fry Trapping study
- Chinook, Coho, and Steelhead Adult Escapement survey
- Native Fish (& Non-native) Fish Predation study
- Skookumchuck Analysis (Phase 1-3) studies

The Recommended Actions in the All H Matrix include advocacy, outreach, and research studies designed to inform future management strategies. The CBB could help to fund *Targeted Removal or Nest Eradication of Predatory Non-native Fish*, and an *Initial Aerial Pinniped Survey* including advocacy to organizations involved in management and funding decisions. *Targeted removal of predatory non-native fish* could be an action undertaken by Tribes and WDFW in the near term for implementation in coordination with the current non-native fish study. This action might be controversial in some communities due to the support for sport fishing for non-native species. Pinniped impacts in the basin remain a data gap currently, and the recommended first step in developing a pinniped management strategy is to conduct an *Initial Aerial Pinniped Survey* to better understand the distribution and population size of these marine mammals.

The final recommended action is an *Outreach/behavioral change campaign to educate on fishing impacts*, especially considering a potential ESA listing of the spring Chinook. This campaign could help shift behaviors with education around fishing impacts and illegal activities that are harmful to vulnerable fish populations, such as spring Chinook salmon. Outreach and education could also bring attention to the status of salmon and overall watershed health in the Basin. To ensure long-term success, these actions will need to be adaptively managed to incorporate the latest science and respond to changing conditions.

## Potential Action Table

Rows in **Orange** are High Priority Actions

Potential Action	Issue(s) Addressed or Related	Desired Outcome	Potential Benefit	Likelihood of Success	Estimated Cost	Timeframe	Priority
<b>Studies Completed or In Progress</b>							
<b>ASRP-funded study</b> Non-native (and native) fish predation study	Non-native fish predation  Potential ESA listing of spring Chinook	Understand impact of predation and identify options to reduce predation (as needed)	Understand impact of predation – Moderate to High  Identify options to reduce predation - Moderate	Understand impact of predation – Moderate  Identify options to reduce predation - Moderate	Medium	First year of predation complete in 2024  Ongoing and/or targeted monitoring following actions to reduce predation	High/ Continue
<b>ASRP-funded study</b> Chinook, Coho, and Steelhead Smolt and Adult Monitoring Studies	Abundance, Chinook Genetics, Life History Diversity	Understand trends in abundance, smolts per spawner, Chinook genetics, and life history diversity	Understand and evaluate population distribution, growth rate and habitat restoration effectiveness	High	High	Ongoing since 2019 in Newaukum and 2021 in upper Chehalis  Potential to relocate upper Chehalis site to Skookumchuck	High/ Continue

Potential Action	Issue(s) Addressed or Related	Desired Outcome	Potential Benefit	Likelihood of Success	Estimated Cost	Timeframe	Priority
<b>ASRP- and Integrated-funded study</b> Spring Chinook Fry Trapping Study	Chinook Genetics  Potential ESA listing of spring Chinook	Understand trends in Chinook genetics (fall vs. spring and hybrids)	Understand hybridization trends – Moderate to High	High	High	Complete in 2025 or 2026  Potential to continue or repeat in the future	High/Continue
<b>ASRP- and Integrated-funded study</b> Chinook, Coho, and Steelhead Adult Escapement Survey	Chinook Genetics  Potential ESA listing of spring Chinook	Understand timing of fall vs. spring Chinook into Skookumchuck and Newaukum rivers and identify ways to separate	Understand timing – Moderate to High  Identify ways to separate -- Moderate	Understand timing – Moderate to High  Identify ways to separate -- Moderate	Medium	Complete in 2025  Potential to continue or repeat in the future	High/Continue
<b>Integrated-funded study</b> Skookumchuck Analysis (Phase 1-3) Studies	Hydropower/ Dams  Fish Passage  Chinook Genetics  Potential ESA listing of spring Chinook	Reduce hybridization (via operational changes or separation)  Increase steelhead, coho, spring Chinook access to habitat above dam	Reduce hybridization – Moderate  Increase populations – Low to Moderate	Reduce hybridization – Moderate  Increase populations – Low to Moderate	High	Phase 3 study complete Q1 2025  Phase 4 – 2025 to 2027, if funded by Board	High/Continue
<b>ASRP-funded study</b> Thermalscape study	Non-native fish predation	Identify areas at risk for predator expansion	Identify areas at risk – Moderate to High	Moderate to High	Medium	Continue periodically (e.g., every 5 years)	Medium

Potential Action	Issue(s) Addressed or Related	Desired Outcome	Potential Benefit	Likelihood of Success	Estimated Cost	Timeframe	Priority
	Potential ESA listing of spring Chinook  Climate resilience	Identify areas at risk for spring Chinook				Currently funded by others	
<b>ASRP-funded study</b> Thermal refugia study	Potential ESA listing of spring Chinook  Climate resilience	Identify existing refugia for spring Chinook and opportunities to increase refugia	Identify existing refugia and opportunities– Moderate to High	Moderate to High	Medium	Completed 2023  Potential to expand study in 2025-2027	Medium
<b>Predation</b>							
Conduct targeted removal or nest eradication of bass	Non-native fish predation	Reduce numbers of non-native bass	Moderate	Moderate	Medium	Conduct 1-2 times and evaluate	High
Initial aerial survey	Pinniped predation	Identify distribution of pinnipeds in Grays Harbor	Inform future planning and actions	High	Low to Medium	1-2 year study, 2025-2027 biennium	Medium/High
Evaluate full pinniped consumption rate of adult and/or juvenile salmonids	Pinniped predation	Understand scale of predation and identify options to reduce	Identify options to reduce predation	Moderate	Medium to High	Consider after detailed survey	Medium
Evaluate experimental non-native species reduction	Non-native fish predation	Find new, viable eradication strategies, like YY male introduction	Low to High	Unknown	Unknown	Unknown	Medium
Advocate for institution of	Non-native fish predation	Permanent removal of	Low to Moderate	High	Low	Fall/Winter 2024	Low/Medium

Potential Action	Issue(s) Addressed or Related	Desired Outcome	Potential Benefit	Likelihood of Success	Estimated Cost	Timeframe	Priority
mandatory retention of non-native species	Harvest	collected non-native bass					
Protect habitat currently unoccupied by invasive non-native fish	Non-native and native fish predation	Restrict movement of warmwater fish into unoccupied areas	Moderate	Unknown	Unknown	Unknown	Low/Medium
Support or conduct a bass derby or bounty	Non-native fish predation	Educate public  Reduce numbers of non-native bass	Educate – Moderate  Reduce numbers – Low to Moderate	Educate – Moderate  Reduce numbers – Low to Moderate	Medium	Once in 2026 or 2027; then evaluate effectiveness	Low
Survey avian population and feeding habits	Avian predation	Estimate potential impact of avian predation	Inform future planning and actions	High	Low to Medium	2-year study	Low
<b>Hatcheries</b>							
Comprehensive evaluation of conservation hatchery for spring Chinook following co-manager direction	Potential ESA listing of spring Chinook	Increase abundance of spring Chinook salmon  Maintain genetics of spring Chinook salmon	Inform future planning and potential recovery actions	Moderate	Medium	2-3 year evaluation; discussions on-going, consider after some other actions taken and/or ESA listing	Medium
Evaluate Skookumchuck hatchery impacts on steelhead and coho genetics	Decline of steelhead and coho in upper basin	Maintain genetics and abundance of steelhead and coho in upper basin	Inform future planning and potential actions	Moderate to High	Medium	3+ year study; consider after other actions taken (e.g.,	Medium

Potential Action	Issue(s) Addressed or Related	Desired Outcome	Potential Benefit	Likelihood of Success	Estimated Cost	Timeframe	Priority
	Loss of genetic diversity to both species					Skookumchuck Dam work)	
Nutrient augmentation evaluation	Enhancement of spawning ground nutrients	Supplementation of hatchery fish carcasses at spawning sites	Enrich nutrients	Low	Low to Medium	Occurs in Bingham Creek and at Skookumchuck hatchery  <1 year	Low
<b>Hydropower (existing)</b>							
Feasibility of operational or dam modifications at Wynoochee Dam for upstream/downstream fish passage	Hydropower  Fish Passage  Chinook Genetics  Potential ESA listing of spring Chinook	Increase abundance of steelhead, coho, fall Chinook, potential to reintroduce spring Chinook	Inform future planning and support improved passage or removal planning	Moderate	Medium to High	Approx. 1-2 year initial study, potential to continue based on success and cooperation with dam owner	Medium
<b>Harvest</b>							
Conduct outreach and education related to fish practices and impacts	Harvest/ Poaching  Potential ESA listing of spring Chinook	Behavior-change campaign related to fishing practices and impacts	Reduce fishing impacts through education – Moderate to High	Moderate	Low	Anytime; potential to fund continually	High
Evaluate impacts of poaching study	Harvest/ Poaching	Evaluate impacts of poaching on in-basin stocks	Inform future planning and staffing needs	Moderate	Low to Medium	Anytime	Medium

Potential Action	Issue(s) Addressed or Related	Desired Outcome	Potential Benefit	Likelihood of Success	Estimated Cost	Timeframe	Priority
Study abundance of prey-fish in Grays Harbor estuary	Harvest (ocean) of salmonid prey species	Understand abundance of prey-fish	Improve food sources for salmon at all life phase	Moderate	Low to Medium	1-3 years	Medium
Investigate potential link between ocean harvest and returning salmon size	Declining return size of adult salmonids	Larger, more productive returning spawners	Improve productivity	Low	Medium	Informed by NOAA and co-managers	Low/Medium
<b>Other</b>							
Propose municipal or county restrictions and develop educational materials on recreational boating in critical habitats	Disrupt redds and damage habitat	Educate local jurisdictions on a possible solution to enhance salmon protection	Educate and inform future local/county regulations about actions to protect spawners and habitat	Low	Low to Medium	5-10 years	Low

All topics and actions identified here require or have the potential to require federal, tribal, and state involvement. The Chehalis Basin Board serves in primarily an advocacy role on these topics.

Cost Estimate Key:

Low = \$10K - \$100K, Medium = \$100K - \$1M, High = \$1M - \$10M



## Study and Actions Summary

Below is a short description of the studies and actions in the matrix that provides a brief explanation about how these All H actions could improve salmon and steelhead health and survival.

### Studies Completed or in Progress

- **Non-Native and Native Fish Predation Study:** Understanding the scale of predation on juvenile salmonids, particularly Chinook, is imperative. Studies began in 2019 and are proposed through 2025 that aim to quantify the distribution and abundance of predators in the Chehalis River mainstem (between the Newaukum and Skookumchuck rivers) and the potential rate of predation on salmonids.
- **Chinook, Coho, and Steelhead Smolt and Adult Monitoring Studies:** Understanding trends in abundance, smolts per spawner, Chinook genetics, and life history diversity inform management goals and habitat restoration effectiveness. Smolt trapping studies provide annual abundance estimates for natural origin juvenile salmon and steelhead originating from the upper Chehalis and Newaukum rivers. These two focal sub-basins have been identified by the ASRP as areas for near-term implementation and by measuring smolt production, we should be able to test the effectiveness of stream restoration activities for increasing the freshwater production of juveniles. Annual measurements include juvenile abundance and life history diversity (size, age, and run timing). Additionally, the adult monitoring effort in the Newaukum River basin seeks to provide annual estimates of abundance, distribution, and life-history diversity of adult salmon and steelhead in addition to overall productivity of smolts-per-spawner and recruits-per-spawner. The adult salmon and steelhead monitoring in the Newaukum River basin informs restoration activities by establishing a baseline prior to the implementation of activities and monitors changes to abundance, distribution, and diversity after implementation to help determine if the activities are effective and performing as designed. The status and trends of salmon and steelhead are key indicators to ascertain if the restoration activities are both effective and adequate to maintain and recover culturally and economically significant species.
- **Chinook Fry, Smolt, and Adult Tracking Surveys:** Run timing of spring and fall Chinook have evolved to be distinct in the Chehalis Basin. As environmental conditions (e.g., warmer summer stream temperatures) have been altered by humans in the Skookumchuck and Newaukum rivers, there has been a growing overlap in space and time in spawning between these species, resulting in hybridization. By sampling fry, smolt, and adults, we better understand the distribution and relative proportion of spring, fall, and hybrid Chinook run types based on genetic markers. This information could help identify potential options to separate the two populations via flow management and other methods. These studies may also inform options for conserving spring Chinook if they are listed under the ESA.
- **Skookumchuck Analysis (Phase 1-3) Studies:** The Skookumchuck river is a key habitat for spring Chinook and the site of a dam operated by TransAlta. Several studies are underway in Phase 3 of the analysis to better understand the potential for predator species in the reservoir and smolt passage at the dam. The Skookumchuck dam has altered the flow of the river and created a reservoir that provides flow management, including a higher flow rate in the summer. The studies are also evaluating the potential for off-channel water storage and direct piping of water

supply to major water users to understand if these options could help support a dam removal option or reduce instream flows while still supplying water to water users. The opportunity for providing increased access for the steelhead, coho, and spring Chinook above the dam was investigated in Phase 2. Over phases 1-3 approximately \$1 million was spent and future funding could be allocated by CBB.

- **Thermalscape Study:** Initially funded by the ASRP, this study monitors water temperatures throughout the Chehalis Basin, resulting in a spatial model that predicts current and future stream temperatures. This study helps inform overall climate resilience, protection and restoration planning and is also used in associated studies to identify future changes such as the potential expansion of non-native species over time.
- **Thermal Refugia Study:** This study evaluated localized water temperatures in the Newaukum and Skookumchuck rivers to identify potential thermal refugia (cooler water pockets or reaches) during the warmest months in summer. This study helped identify the need for higher resolution data on thermal refugia in areas where thermal refugia exist which could be protected or enhanced for spring Chinook that hold through the summer months prior to spawning.

## Predation

- **Conduct targeted removal of predatory non-native fish:** Agencies and tribes could work together to develop a strategy for predatory non-native fish removal. This would require approval by the state and the tribal co-manager and partners. This action may result in immediate benefits to native fish while other complimentary actions, such as restoring habitat, are implemented. This action may be opposed by some sport fishers. This effort would be coupled with the ongoing non-native fish study to evaluate the effectiveness of this action to inform future bass management efforts in the basin.
- **Support or conduct a bass derby and/or bounty:** A bass derby (one or two days) may be conducted as a one-time educational opportunity to inform the public about the effects of non-native fish on salmonids. The goal is to catch as many bass as possible in the system and tally them for a reward based on the number of bass caught. There is an option to tag several fish with a high monetary value to generate additional interest and could further promote participation. Most bass fishing is catch and release so a central reward and processing center would need to be set up. A well-developed bounty program for fish (pikeminnow) on the Columbia River is sponsored by the Bonneville Power Administration and the Departments of Fish and Wildlife in Oregon and Washington. This program costs approximately \$1 million annually to sponsor with substantial start-up costs. While these could be educational opportunities to help anglers understand the impacts of bass predation on native fish, it could also promote bass fishing and become extremely costly through time.
- **Protect unoccupied waters:** Restricting the movement of non-native predators while also allowing unhindered access for native species is challenging. This action would require more study to identify key areas of expansion and understand the underlying causes to identify suitable solutions. Any solution would require co-manager support and approval. This would be a very complicated action to operationalize.

- **Advocate for mandatory retention of non-native species:** Several non-native fish species such as large-mouth and small-mouth bass are present in the Chehalis Basin. These fish have thrived with modified habitats and abundant food sources. One way to manage the non-native fish populations is to promote the retention of these species in fishing regulations. This is a management decision that will require Fish Commission approval and may be opposed by some members of the sports fishing community.
- **Evaluate experimental non-native species reduction:** Invasive species such as bass, which are well adapted to human-modified habitat conditions and have access to many linked habitats, are extremely difficult to manage or extirpate. Scientists are exploring options for more effective population control for these invasive species. One such approach is "YY male introduction", a method that involves producing males (such as Brook Trout in Idaho) with two Y-chromosomes which are then released into the population targeted for eradication. Offspring of YY males (Myy) and resident females (XX) are all male (XY), so over time, the population becomes skewed toward a single sex, leading to extirpation of the target population. The success of this YY male introduction strategy is under investigation and could be explored, along with other strategies, for bass in later biennia.
- **Conduct pinniped initial aerial survey:** Pinnipeds are known predators of adult salmon in a natural predator-prey relationship. The human induced choke points such as locks or dams that exacerbate pinniped predation are less present in the Chehalis than in systems like the Columbia, but commercial fishers of salmon in Grays Harbor do report predation. An aerial study will help to identify pinniped population sizes over the defined study period (WDFW cost estimate is approximately \$30k per year). Understanding the numbers of pinnipeds can inform future management strategies of species protected under the Marine Mammal Protection Act.
- **Conduct pinniped detailed aerial and boat survey:** Once initial understanding of the relative abundance of pinnipeds from an initial aerial survey, this strategy would further quantify pinniped seasonal timing and presence in specific areas of the estuary.
- **Evaluate pinniped consumption rate of adult and/or juvenile salmonids:** This study would be conducted by WDFW in coordination with NOAA and tribes and could be conducted after understanding presence and numbers of pinnipeds. Understanding feeding habits may require examination of stomach contents or other invasive methods. Behavior studies in other basins indicate individual pinnipeds can consume large numbers of salmon. Studies in other areas in the PNW demonstrate that predation can be reduced by the removal/culling of problematic individual pinnipeds that display this feeding behavior. These actions require Marine Mammal Protection Act approval. To date we do not have scientific data about the salmonid consumption rate of pinnipeds in the Chehalis Basin.
- **Survey avian populations and feeding habits:** To date the Chehalis Basin does not have data on avian predation to make management recommendations. The Columbia Basin, a very different system from the Chehalis, has had high predation on juvenile salmonids from nesting colonies of cormorants and terns on dredged material islands. These birds increased consumption of juvenile fish exponentially over the period of study and management actions were taken to reduce and relocate nesting colonies.

- **Proposed municipal or county restrictions and education materials on jet boat speeds in critical spawning areas:** Little is known in the Chehalis Basin about the impact of jet boats disturbance on spawning habitats. Rather than seek to fund a study of impacts, OCB could provide a short educational campaign to municipal and county law makers about how regulations have been set in other jurisdictions of the PNW and Canada that are trying to protect spawning grounds from disturbance. In the Chehalis Basin the authority for these regulations is at the municipal and county levels. These protections could more easily be added to municipal/county rules with the assistance of an OCB-developed model ordinance.

## Hatcheries

- **Evaluate efficacy of a conservation hatchery for spring Chinook:** The co-managers have begun discussing stock status and spring Chinook conservation needs that could potentially warrant further discussion of a spring-Chinook focused hatchery in the Chehalis Basin. Co-managers may seek financial or advocacy support from OCB and the Chehalis Basin Board depending on the outcome of those discussion; OCB will look to co-managers to lead any hatchery-related actions. This work could help jump start potential preservation actions if spring Chinook are listed under ESA. Timing may be better in the 2027-29 biennium to align with co-manager discussions and a potential ESA listing.
- **Evaluate Skookumchuck hatchery impacts on steelhead and coho genetics:** Steelhead and coho abundance in the upper basin has been declining and the genetics of the upper basin run is distinct from other parts of the basin. Theories point to the possible overwhelming of the native genetics by hatchery stock. Further study could help to better understand the dynamics in the system to find potential management solutions and actions to maintain the genetics and abundance of steelhead and coho in the upper basin.
- **Evaluate nutrient augmentation:** Some watersheds see enhanced salmonid productivity when nutrients are supplemented by depositing carcasses near streams that would otherwise be disposed of out of the watershed. It is not clear whether nutrient deficiency is a limiting factor in Chehalis Basin watersheds, but depositing carcasses is a relatively simple action that is fast to implement. Carcass supplementation occurs at Bingham Creek and Skookumchuck hatcheries.

## Hydropower

- **Feasibility of operational or dam modifications at the Wynoochee dam for upstream/downstream fish passage:** Chinook are not currently transported upstream of Wynoochee dam due to their juvenile outmigration timing not coinciding with dam operations. Downstream fish passage has been assessed in the past but not implemented. A new analysis of past efforts and potential additional solutions could be undertaken to identify operational and/or dam modifications that could allow for better passage and survival of multiple species, including the possibility of reintroducing spring Chinook.

## Harvest

- **Conduct outreach and education related to fishing practices and watershed health:** Develop an estimate of impacts on population abundance on salmonids in the Basin. Develop a mixed media campaign of public education designed to reduce poaching and illegal fishing practices that

contribute to the decline of salmon, and expand knowledge related to healthy rivers and watersheds.

- **Evaluate impacts of poaching:** Poaching, particularly of spring Chinook, is a problem that is occasionally reported by riverfront landowners. However, it is difficult to catch poachers in response to a poaching report. A study of the potential impact of poaching could inform future actions to reduce this poor practice in the basin. High risk areas could be identified, and future staffing or other management actions could be considered in the future with study results.
- **Study prey fish in Grays Harbor Estuary:** The abundance of prey fish such as eulachon could be affecting the productivity and abundance of salmonids in the Chehalis Basin. Fisheries management of all fish, including eulachon and other prey fish, is a co-manager responsibility negotiated between state, federal, and international interests. The co-managers could ask OCB and the Chehalis Basin Board to support a study of the interactions between prey fish and salmonids.
- **Investigate potential link between ocean harvest and returning salmon size:** Some recent studies suggest that ocean harvest has reduced the size of returning spawning salmon. Smaller salmon produce fewer fry, leading to lower overall productivity. Fisheries management of all fish, including salmonids, is a co-manager responsibility negotiated between state, federal, and international interests.

### Summary of Current and Past Presentations and Correspondence

- Presentation to CBB: *NOAA WaCoast Chinook Salmon Petition ESA Listing Process*, February 1, 2024
- Presentation to CBB: *ESA Petition to List Spring-Run Chinook Salmon*, August 3, 2023
- Presentation to CBB: *Updated on Pinniped Predation of Salmon in Washington*, May 4, 2023
- Presentation to CBB: *Non-native fish predators of the Chehalis River*, April 6, 2023
- Presentation to CBB: *Integrated Analysis – Limiting Factors and Opportunities for Improvement of Chehalis Salmon & Steelhead*, March 2, 2023
- 21 salmon recovery questions memo from Jay Gordon, December 12, 2022
- ASRP Monitoring and Adaptive Management Plan, August 2021
- Memo regarding Integration of Habitat, Harvest, Hydropower and Predation to CBB, March 31, 2021
- Presentations to CBB: *Chehalis Basin Hatchery Operations and Harvest Management*, and *Salmon recovery funding & related implications of ESA listings*, January 7, 2021
- CBB letter to WDFW, Quinault Indian Nation and Confederated Tribes of the Chehalis Reservation, December 8, 2020