

Chehalis Basin Strategy

Aquatic Species Restoration Plan



PUBLICATION INFORMATION

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- WRIA: 22 and 23
- *Chehalis Basin Strategy Aquatic Species Restoration Plan, Phase 1:* <https://apps.ecology.wa.gov/publications/SummaryPages/1913002.html>; <https://chehalisbasinstrategy.com/asrp-phase-i-draft-plan/>
- *Chehalis Basin Strategy Aquatic Species Restoration Plan, Near-Term Implementation Report:* <https://apps.ecology.wa.gov/publications/SummaryPages/2213001.html>; https://chehalisbasinstrategy.com/wp-content/uploads/2022/01/ASRP_Near-Term_Implementation_Update_1-13-2022_Tagged.pdf

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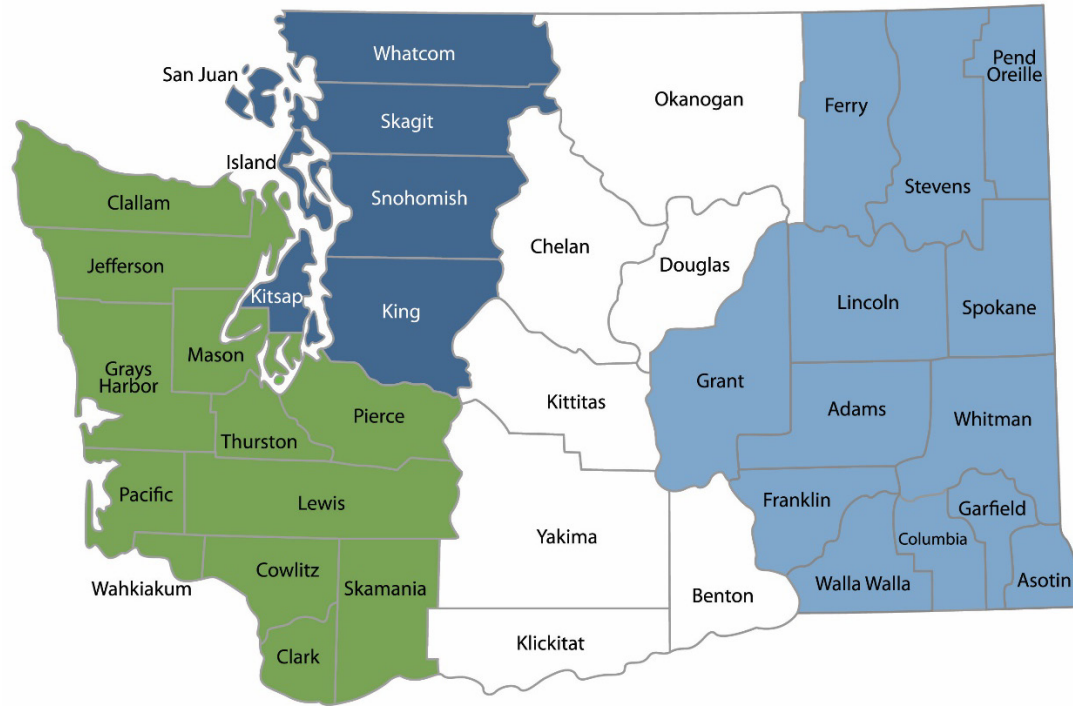
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EXECUTIVE SUMMARY

The purpose of this 2022 Aquatic Species Restoration Plan (ASRP) report is to highlight the notable progress made in the first year of ASRP project pipeline implementation, provide an overview of community engagement efforts, and summarize early learning from the first year of ASRP-funded monitoring and adaptive management (M&AM) studies.

ASRP progress in 2022 was guided by the *Phase 1 Aquatic Species Restoration Plan*² (ASRP SC 2019), which presents a science-based roadmap and goals for restoring and protecting habitat for aquatic species in the Chehalis Basin, as well as the *Near-Term (2021–2031) Implementation Report* (ASRP SC 2022), which lays out the steps to efficiently fulfill the vision of the ASRP. Applying this framework, the ASRP has made considerable progress in 2022 alone.

ASRP Vision Statement

The vision of the ASRP is to utilize the best available scientific information to protect and restore habitat in the Chehalis Basin in order to support healthy and harvestable salmon populations, robust and diverse populations of native aquatic and semiaquatic species, and productive ecosystems that are resilient to climate change and human-caused stressors while honoring the social, economic, and cultural values of the region and maintaining working lands.

Progress in Implementing Projects

Implementation has been focused in the near-term priority areas (first 10 years) identified in the ASRP Prioritization and Sequencing Memorandum (ASRP SRT 2021) that will generate the greatest habitat and species uplift. So far, in the 2021–2023 biennium, over 85% of project funding has gone to projects in these near-term priority regions. A total of 19 projects have been approved since 2021 (constructed and in progress), resulting in potentially over 9 miles of river restoration, 6 miles of streams made accessible, over 45 acres of floodplain restoration, and over 400 acres of native plantings, for an investment of \$15 million.



Wynoochee River Early Action Reach Project, completed in 2022

² <https://apps.ecology.wa.gov/publications/SummaryPages/1913002.html>; <https://chehalisbasinstrategy.com/asrp-phase-i-draft-plan/>

Evaluating Success with Scientific Monitoring

To evaluate the success of the ASRP, the *Monitoring and Adaptive Management Plan*³ (ASRP SC and M&AM 2021) provides a framework to assess ASRP actions and to improve strategies to meet program goals. In 2022, a total of 20 monitoring studies were in progress as part of the M&AM program.

Community Engagement

A number of community engagement efforts were initiated and continued in 2022 including creating the RITs; offering a symposium for community members and restoration practitioners; providing informational and learning sessions; and improving outreach efforts through social media, in-person meetings, and other local events.

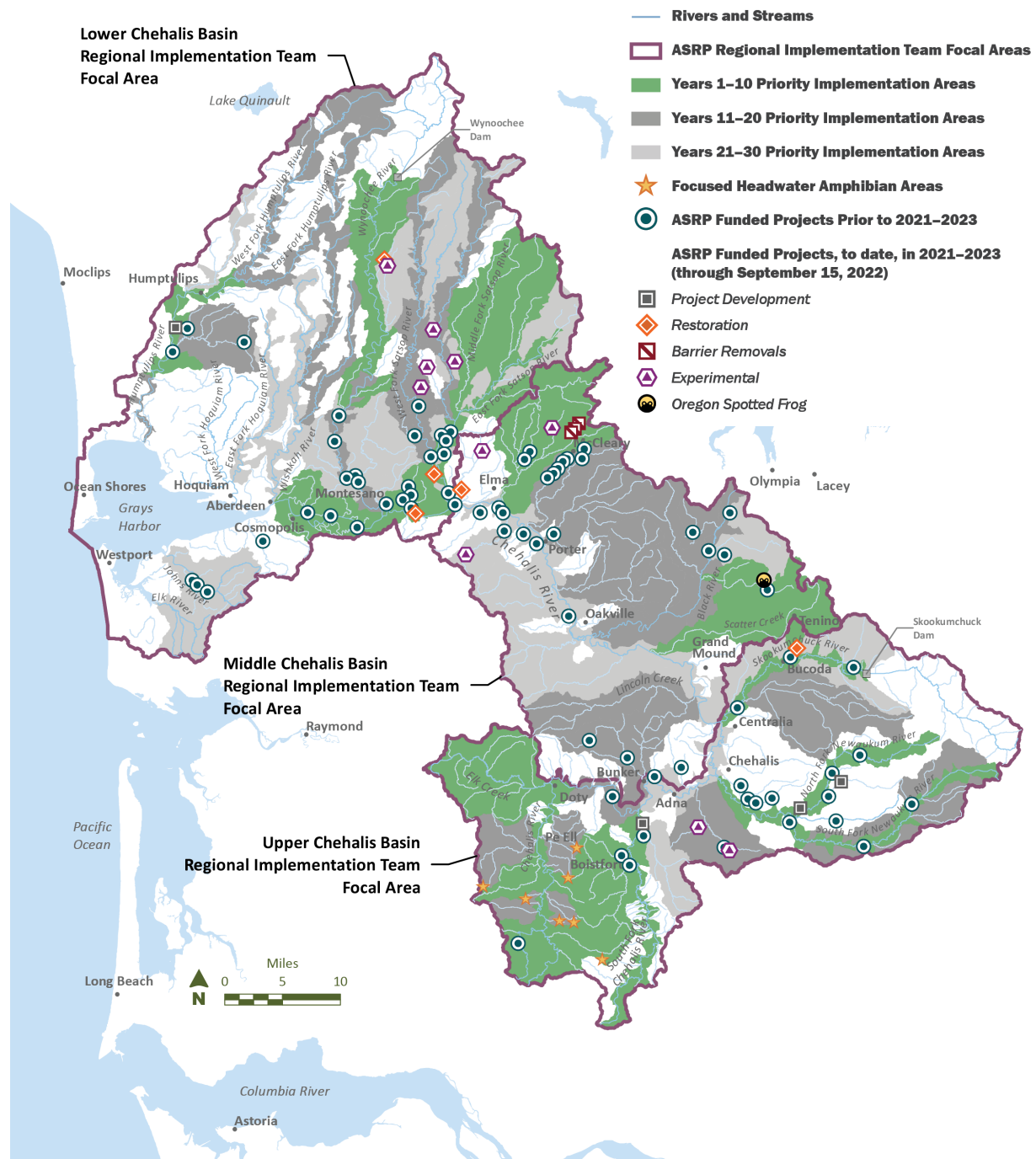
A variety of new initiatives and tasks will begin or continue in 2023 to propel the ASRP forward and maintain the momentum already created. These include developing landowner incentives, building a strategy to protect existing high-quality habitats, offering workshops and trainings to share lessons learned from work to date to inform future implementation efforts, and increasing coordination among implementers and technical and scientific bodies to ensure the ASRP continues to use science and best practices to reach its goals. Other work to continue in 2023 includes engaging with basin communities, partnering with private landowners, and building the capacity of the communities and organizations within the Chehalis Basin to take on the large-scale actions and long-term stewardship required to sustain and improve the economic and environmental resources across the basin.

Emerging scientific concerns identified in 2022 include the following:

- Climate change is happening even faster than predicted; restoration designs need to function with predicted climate change and promote resilience by helping to address high water temperatures and lower summer flows and higher peak flows.
- Can actions be taken to reduce the potential for hybridization of spring- and fall-run Chinook salmon?
- Are we doing enough for wild steelhead in the basin, considering the decline observed in 2022?
- The upper South Fork Newaukum River is an important spawning area for both steelhead and spring-run Chinook salmon, and so far, only limited restoration actions have been completed in this area.
- Further research is needed to understand if and how process-based restoration may work for Oregon spotted frog habitat.
- There is the potential for Endangered Species Act listing of the western ridged mussel.

³ <https://apps.ecology.wa.gov/publications/parts/2113003part7.pdf>

ASRP Priority Implementation Areas and ASRP-Funded Accomplishments



1 INTRODUCTION

The Chehalis Basin is a region rich in native fish and wildlife, working lands, and tribal and cultural significance that is economically and ecologically vital to the state and region. The basin is home to seven migratory salmon and trout species and the most diverse assemblage of amphibian species in the state. However, the ecosystem has been significantly changed and degraded from historical conditions, and without aggressive protection and restoration actions, further degradation from climate change and future human development will increasingly threaten the viability of aquatic species in the Chehalis Basin. If meaningful actions are not taken, the best available science predicts devastating effects for salmon and other native species (such as Oregon spotted frog, which are limited to one last stronghold in the state).

The Aquatic Species Restoration Plan (ASRP), a key component of the Chehalis Basin Strategy, aims to restore and protect aquatic habitats in order to support healthy, resilient populations of native species into the future.

ASRP Vision Statement

The vision of the ASRP is to utilize the best available scientific information to protect and restore habitat in the Chehalis Basin in order to support healthy and harvestable salmon populations, robust and diverse populations of native aquatic and semiaquatic species, and productive ecosystems that are resilient to climate change and human-caused stressors while honoring the social, economic, and cultural values of the region and maintaining working lands.

To meet the mandate set forth for the Chehalis Basin Strategy, the *Phase 1 Aquatic Species Restoration Plan*⁴ (ASRP SC 2019), published in 2019, presents a detailed, science-based roadmap and goals for restoring habitat and protecting intact ecosystems for aquatic species. In 2021, a *Near-Term Implementation Report*⁵ described the programmatic and scientific refinements guiding implementation of projects under the ASRP, and an accompanying *Monitoring and Adaptive Management (M&AM) Plan*⁶ outlined periodic self-assessments to adaptively manage the ASRP. A new implementation “project pipeline” structure⁷ was designed to efficiently fulfill the ASRP vision.

⁴ <https://apps.ecology.wa.gov/publications/SummaryPages/1913002.html>; <https://chehalisbasinstrategy.com/asrp-phase-i-draft-plan/>

⁵ <https://apps.ecology.wa.gov/publications/SummaryPages/2213001.html>; https://chehalisbasinstrategy.com/wp-content/uploads/2022/01/ASRP_Near-Term_Implementation_Update_1-13-2022_Tagged.pdf

⁶ <https://apps.ecology.wa.gov/publications/parts/2113003part7.pdf>

⁷ https://chehalisbasinstrategy.com/wp-content/uploads/2021/10/ASRP-Implementation-Structure-Overview-2021-2023_Final_Tagged.pdf

To support the accelerated pace of implementation and robust monitoring program, the Steering Committee recommended the Chehalis Basin Board consider stable and increasing funding for project implementation. The recommended program budget was broken into various categories, including project implementation, program management and support, and M&AM. As summarized in the *Near-Term*

Implementation Report,⁸ an investment of

\$1.3 billion for aquatic habitat in the Chehalis Basin is necessary to address the highly diverse and large geographic

expanse of the basin. This investment would support up to 555 miles of river channel restoration and protection over 30 or more years, with accelerated implementation of actions like riparian restoration, which will require years to decades to achieve the intended ecological functions.

Compared to other scenarios considered, this level of funding would reduce uncertainty that the ASRP will address limiting factors to restore natural processes and improve species viability, allow for inclusion of the estuary as a key habitat, and protect key areas critical for climate resiliency such as headwaters, cold water refugia and tidal floodplains.

An investment of approximately \$1 billion would be on the same scale as funds spent on two other major fish and wildlife programs in Washington; the Salmon Recovery Funding Board (\$4.7 billion invested from 1991 to 2020) and Columbia Basin Fish and Wildlife Program (\$1 billion invested from 2007 to 2021), and has a high likelihood of success, as salmonid species are not yet Endangered Species Act-listed and the scale of human development in the Chehalis Basin is far less than in many other watersheds in Washington. The Steering Committee recommends funding starting at \$20 million per biennium, increasing to \$40 million per biennium from 2021 to 2027 to support early implementation for on-the-ground projects. Beyond 2027, the Steering Committee recommends the project implementation portion of the ASRP budget steadily and substantially increase to support increased implementation.

Guided by science, the ASRP prioritizes and sequences habitat restoration actions to strategically build on past and current investments. This prioritization and sequencing approach is unique to restoration programs in Washington State by recommending specific actions that target habitat-related limiting factors for aquatic species that most affect their survival and abundance in specific geographic areas within three 10-year implementation periods—for instance, by removing barriers to

Chehalis Basin Strategy Mandate

The Chehalis Basin Strategy has a mandate set in Washington State law to “include a detailed set of actions to reduce flood damage and improve aquatic species habitat. The strategy must be amended by the Chehalis board as necessary to include new scientific information and needed changes to the actions to achieve the overall purpose of the strategy. The strategy must include an implementation schedule and quantified measures for evaluating the success of implementation” (Revised Code of Washington 43.21A.732).

⁸ <https://apps.ecology.wa.gov/publications/SummaryPages/2213001.html>; https://chehalisbasinstrategy.com/wp-content/uploads/2022/01/ASRP_Near-Term_Implementation_Update_1-13-2022_Tagged.pdf

fish passage and adding riparian vegetation to increase shade and reduce water temperatures. This guidance provides a clear roadmap for project sponsors and partners engaged in on-the-ground implementation to identify and complete projects that will result in the greatest ecological lift. Paired with a robust M&AM program, this approach also allows decision-makers to see where and how their investments are working in the basin. Five- and 10-year evaluation cycles are designed to inform both the Chehalis Basin Board and the Steering Committee as to whether the ASRP is on track to meet its goals. Steady and predictable increases in funding will help the Chehalis Basin Strategy work with partners to aggressively restore aquatic species habitat in the basin over the next 30 or more years.

ASRP Goals

The following goals were developed to guide the ASRP strategies, actions, and restoration scenarios:

- **Protect and restore natural habitat-forming processes within the Chehalis Basin watershed context.**
- **Increase the quality and quantity of habitats for aquatic species in priority areas.**
- **Protect and restore aquatic species viability considering viable species population parameters.**
- **Increase resiliency to climate change by protecting and improving natural water quantity, water timing, and water quality characteristics.**
- **Build recognition of and support for ASRP actions and the ways the ASRP supports resilient human communities.**

Key environmental concerns continue to be increasing summer temperatures and low summer flows. Low flows reduce available rearing habitat and can result in higher stream temperatures; a compounding challenge for the aquatic species that require cold water. These factors may have an outsized effect on vulnerable species with small and fragile populations in the Chehalis Basin, such as spring-run Chinook salmon and Oregon spotted frog. Specifically, warmer water can harm adult spring-run Chinook salmon that hold in freshwater during the summer months. Oregon spotted frog are dependent on perennially wetted ponds for survival, a habitat type that is detrimentally affected by reductions in surface flows and groundwater. ASRP actions strive to address those concerns by adding large wood to rivers and streams to help reconnect floodplains, create slower and faster water in different areas, to scour deep pools, and to deposit gravel, improving stream flows and providing habitat for fish and other aquatic species to feed, grow, and find refuge; by removing culverts and other barriers to aquatic species migrating upstream and downstream; planting native trees and shrubs that will grow into a mature forest that provides shade and cools the water; and protecting habitat to build certainty around resilience to the impacts of climate change now and into the future.

To tackle these ecological challenges, a Steering Committee composed of representatives from tribes, state agencies, local conservation districts, and the lead entity for salmon recovery oversees program development and implementation. The Steering Committee is supported by the newly formed Technical Advisory Group (TAG), who provides the overarching scientific expertise for the Steering Committee's policy decisions. The TAG includes scientists who have been involved since

the initiation of the ASRP, as well as newcomers to the Chehalis scientific community selected for their expertise, such as plant expertise to advise on riparian and floodplain vegetative communities and anadromous fish expertise to understand the life cycle and habitat needs of salmonid species. The TAG is also tasked with guiding the M&AM Plan, which in time will support data-driven adjustments to restoration strategies.

To streamline project implementation, Regional Implementation Teams (RITs) were established in 2021, led by local Conservation Districts in Lewis, Thurston, and Grays Harbor counties that span the major subareas of the basin. The RITs coordinate with local landowners and project sponsors to initiate project concepts and advance project opportunities in alignment with ASRP goals and priorities. Other groups that support the project vetting and development process include the Project Technical Review Team and Cultural Resources Workgroup. Together with coordination by Office of Chehalis Basin and Washington Department of Fish and Wildlife staff, these groups are engaged throughout the project development process to evaluate, adjust and help overcome challenges to project implementation, allowing on-the-ground actions to be completed faster and more efficiently.

Two reach-scale projects (e.g., 1 mile or more in length) on the Skookumchuck River focus on wood placement and riparian restoration to improve habitat for spring-run Chinook salmon by creating cold-water pools, providing cover and shade, and reconnecting floodplain habitat to the river.



A variety of new initiatives and tasks will begin or continue in 2023 to propel the ASRP forward and maintain the momentum already created. These include developing landowner incentives, building a strategy to protect existing high-quality habitats, offering workshops and trainings to share knowledge and inform future implementation efforts, and increasing coordination among implementers and technical and scientific bodies to ensure the ASRP continues to use science and best practices to reach its goals. Other work to continue in 2023 includes engaging with basin communities, partnering with private landowners, and building the capacity of organizations within the Chehalis Basin to take on the large-scale actions and long-term stewardship required to sustain and improve the economic and environmental resources across the basin and those who rely on those resources.

The purpose of this year's report is to highlight the efficient progress made in the first year of ASRP project pipeline implementation, provide an overview of community engagement efforts, and summarize early learnings from the first year of ASRP-funded M&AM studies.

2 IMPLEMENTATION: PROGRESS AND ACCOMPLISHMENTS

Restoration and protection implementation goals are established by ASRP program management for each state biennium (e.g., 2021–2023) and are based on metrics such as number of river miles restored and riparian and floodplain acres restored, with the understanding that these goals are only accomplished with active community planning, engagement, and capacity building efforts.



Stillman Creek Restoration Project during construction in 2022

In 2021 and 2022 alone, approximately 8.5 miles of river restoration were completed, which aligns with the target of 9 miles of channel restored set for the 2021–2023 biennium (ASRP SC 2022).

The ASRP’s prioritization and sequencing approach directs project sponsors to pursue high-priority actions and areas that will match funding priorities and result in overall success as seen by recent project data. The ASRP Prioritization and Sequencing Memorandum, a

key piece of science-based guidance for all participants, was released in 2021 and identified specific geographic areas for project implementation within the next 10 years that would generate the greatest habitat and species uplift. Since 2021, application of ASRP Prioritization and Sequencing has ensured that over 85% of project funding has gone to projects in these near-term priority regions. The remaining funding was allocated to experimental projects, such as sediment wedges meant to lower water temperatures by increasing connectivity with groundwater and beaver dam analogs that promote beaver use in compatible areas with limited constraints with infrastructure and other resources. These experimental projects have potential to expand our restoration toolkit and are intentionally located outside of near-term priority areas, where they can be safely monitored while avoiding unintended consequences with other priority actions. The overall result is a total of 19 projects approved in 2021 and 2022 in priority locations and representing project types that align with the ASRP strategies and meet ASRP goals (Figure 2; Attachment B).

The five guiding strategies of the ASRP include habitat and process protection, habitat and process restoration, community planning, community involvement, and institutional capacity. To guide the ASRP's implementation process in alignment with those strategies, a "project approval pipeline" was rolled out in 2021 as the ASRP's method for bringing a project from initiation through completion. Guidance for project sponsors was made broadly available, including communications on ASRP scientific priorities, funding amounts, and guidance on [how to participate in the new pipeline process](#).

The pipeline process starts with project sponsors actively participating with the RITs to propose and advance projects for technical evaluation, funding recommendations, and final approval (Figure 1). This allows sponsors to submit entire projects—from concept to construction—on a continuous rolling basis. Peer collaboration, technical review, and strategic analysis were incorporated into an efficient process that facilitates fast implementation while reducing administration and delays to on-the-ground efforts (a view of the complete process is shown in Attachment A).

ASRP Approach

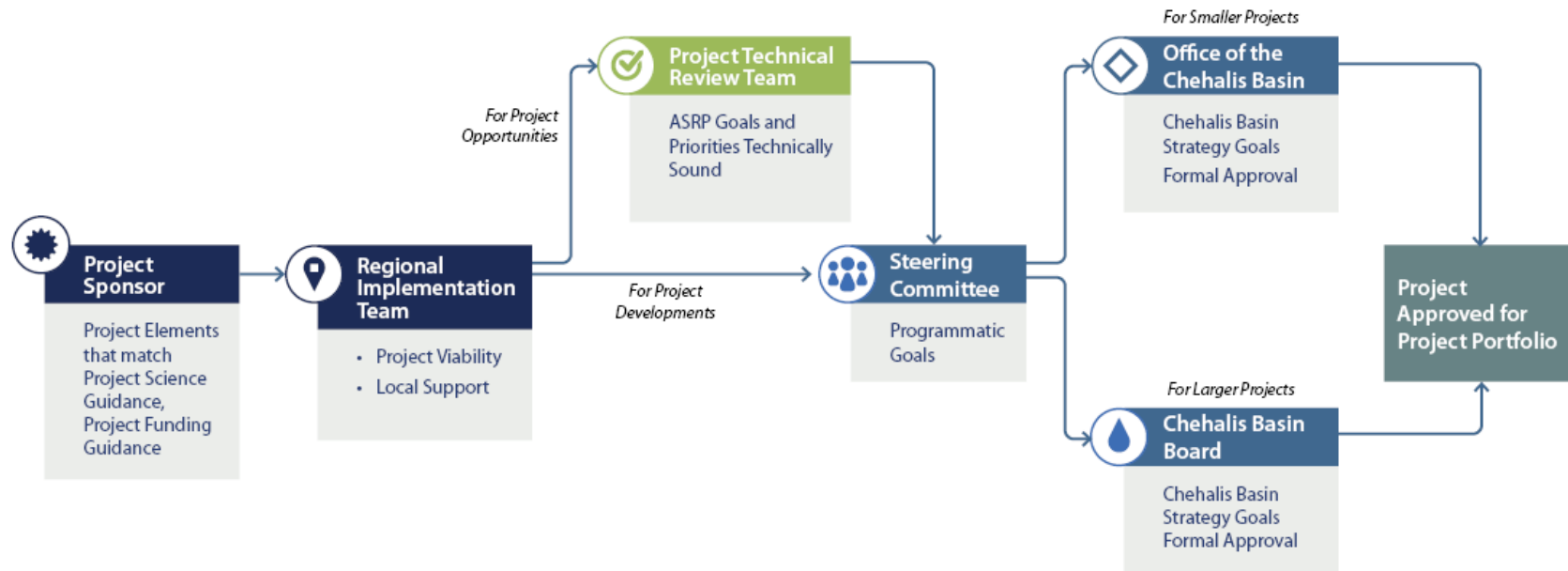
The ASRP approach is structured around five strategy categories:

- **Habitat and Process Protection**
- **Habitat and Process Restoration**
- **Community Planning**
- **Community Involvement**
- **Institutional Capacity**

Through this first year of implementation (2022), small refinements to this process have reduced the amount of time project sponsors typically spend in the project approval phase to fewer than 120 days compared to similar programs, which can take over a year for a project to proceed from proposal to funding. Approvals of funding for smaller projects are made efficiently at the level of the Office of Chehalis Basin, reserving the focus of the Chehalis Basin Board on approving projects costing more than \$500,000. Additionally, sponsors were able to take advantage of the "Project Development" accelerated funding pathway, which further reduced approval time down to fewer than 70 days and provided sponsor organizations with up to \$40,000 to build institutional capacity, conduct landowner outreach, and create conceptual plans for projects. Project development grants are intended to move a project from a concept to a "Project Opportunity," where the sponsor returns to the RIT and Project Technical Review Team with a specific project for design and eventually construction funding consideration, allowing for iterative revisions that align project objectives with ASRP goals. Early engagement of the technical team also streamlines subsequent design reviews, allowing for sponsors to implement these projects confidently and quickly. For example, sponsors, landowners, and partners can be confident that the whole project will be funded as opposed to each phase having to compete with other projects for often limited funding. It also allows for project designs to advance quickly into construction, avoiding delays and redesign often necessitated by dynamic river conditions from year to year.

Roles in Facilitating Efficient Project Approval and Implementation

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Author: ASRP Steering Committee



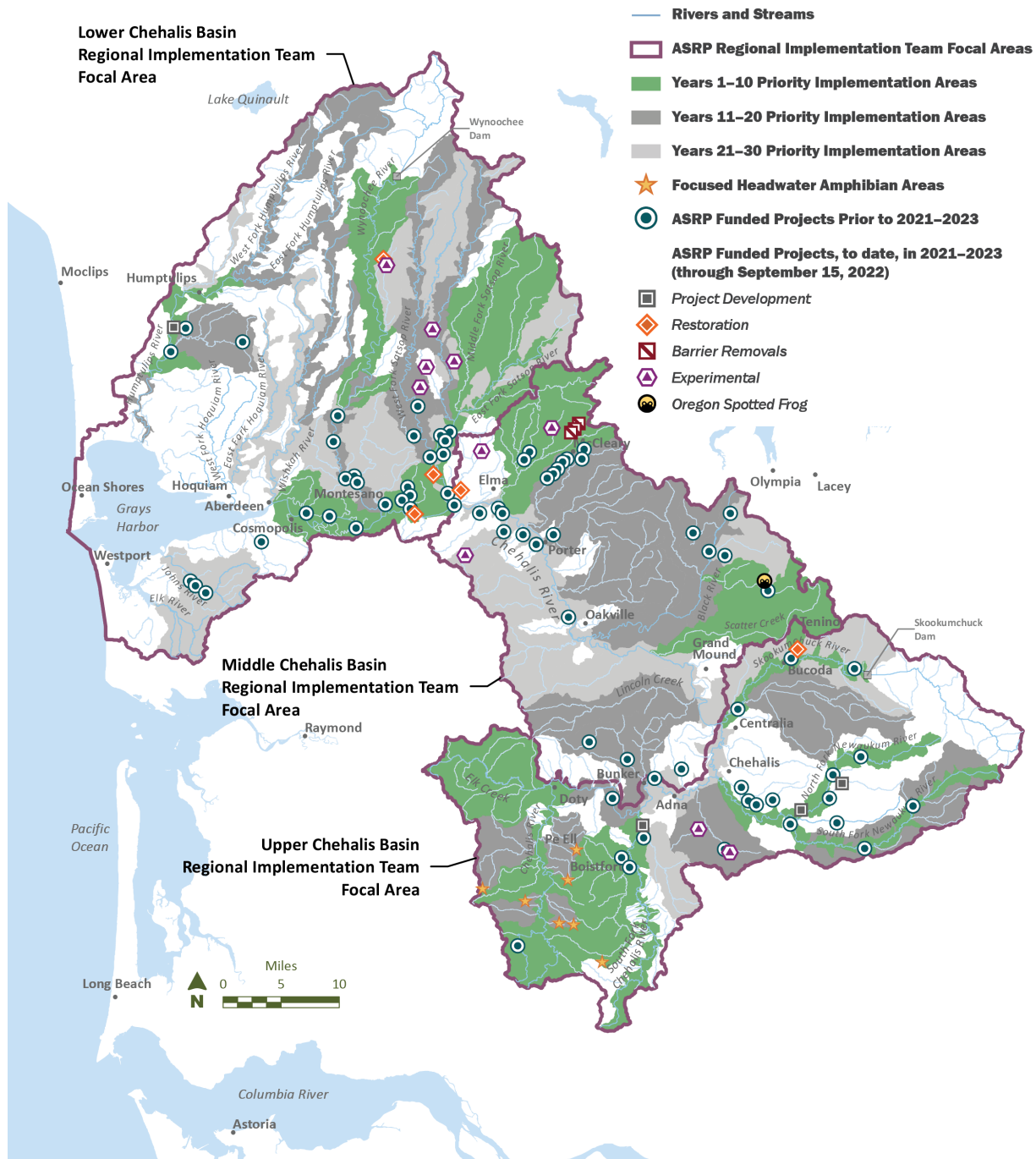
Consistent roles in the project approval and implementation process improve funding transparency and efficiency.

2021 and 2022 saw completion of multiple projects that contributed toward implementation metrics, including almost 270 acres of floodplain restoration and 8.5 miles of river restoration. Most of these projects are the culmination of years of work and were funded in previous biennia. Additionally, there are many projects currently in progress that are expected to substantially add to these contributions in future years. Most, but not all, of these projects that are still in progress were funded this year and therefore went through the current project approval process. Table 1 summarizes some of these key implementation metrics for both recently completed projects and those currently in progress.

Table 1
Measures of Implementation Progress to Date During 2021 Through 2022

STATUS	AMPHIBIAN HABITAT RESTORED (ACRES)	FLOODPLAIN PROTECTED (ACRES)	FLOODPLAIN RESTORED (ACRES)	INVASIVES TREATED (ACRES)	NATIVE PLANTINGS INSTALLED (ACRES)	STREAMS MADE ACCESSIBLE (RIVER MILES)	RIVER MILES RESTORED (RIVER MILES)
Completed in 2021 and 2022	0.0	167.7	269.0	283	143.0	18.5	8.5
In progress	6.9	37.0	47.5	319	462.5	5.1	8.7

ASRP Priority Implementation Areas and ASRP-Funded Accomplishments



Explore more information on individual ASRP-funded projects in the online Chehalis Basin Strategy Project Map at <https://chehalisbasinstrategy.com/project-map/>.

Another emphasis in 2022 was improving coordination and collaboration among project sponsors and local landowners through the RITs. In 2021, 14 organizations were approved as eligible ASRP Project Sponsors (via a qualifications review), including conservation districts, land trusts, government agencies, and nonprofit organizations. In 2022, 11 of these organizations proposed projects that were approved, many of which involve partnerships with other sponsors. Over 30 landowners were engaged in approved projects in 2021 and 2022. A focus in the next year will be to expand the number and diversity of project sponsors involved in the ASRP.

The intentional and strategic effort invested in the coordinated, transparent, and efficient pipeline process resulted in predictable levels of funding allocated toward each priority action type and actual distribution of funding going largely toward those targeted actions within just one year (Table 2).

Table 2
ASRP Project Type Funding Guidance and Actual Progress

PROJECT ACTION TYPE	SUBACTION TYPE	EMPHASIS IN 2021–2023 BIENNIUM BUDGET	ACTUAL FUNDING OBLIGATED TO DATE SINCE 2022	EXPECTED NUMBER OF PROJECTS SUPPORTED IN 2021–2023 BIENNIUM	ACTUAL PROJECTS FUNDED TO DATE SINCE 2022
Small-Scale Projects	Barrier Corrections	\$1,100,000	\$1,272,848	3 to 5 projects	3 projects
	Invasive Species Control and Riparian Plantings	\$250,000	\$34,079	TBD acres	2 projects
Reach-Scale Projects	Large River	\$3,500,000	\$3,842,339	1 to 2 miles	2 miles anticipated; 1 construction project
	Medium River	\$6,500,000	\$7,674,839	2 to 4 miles	3 miles anticipated; 1 construction project
	Small River	\$2,000,000	\$67,235	2 to 3 miles	0 miles; 1 project design
Project Development		\$500,000	\$343,608	10 projects	6 projects
Amphibian-Focused Projects		\$1,500,000	\$188,049	4 projects	2 projects
Acquisitions for Protection Priority		\$2,300,000	0	5 projects	0 projects
Experimental Restoration Techniques		\$1,750,000	\$1,776,400	6 projects	2 projects; 10 project sites
Opportunistic Projects		\$1,000,000	\$200,000	2 to 4 projects	1 project
TOTAL		\$20,400,000	\$15,399,397		19 Projects

While ASRP projects focus on habitat uplift and protection for focal species, many of these projects support other Chehalis Basin Strategy goals. Some examples include the following:

- Since the 2019–2021 biennium, the ASRP has implemented four reach-scale river restoration projects, referred to as the Early Action Reach projects. These projects are some of the largest river restoration projects constructed in the basin to date and serve as a model for future large-scale projects. Over 100 acres of invasive vegetation treatment and tree and shrub plantings was completed at each of the four sites, which will through time provide shade to cool water temperatures.
- Approximately 88 engineered log jams were installed this year across three sites implemented in 2022, which provide critical fish habitat and thermal refuge, improve floodplain connectivity, temporarily store peak flows, and also help slow erosion along streambanks and trap sediment.
- One home was moved out of the floodway as part of the Wynoochee River Early Action Reach restoration project, which protected a residence (eliminates flood damage) and enabled substantial restoration of the floodplain.
- Funding for at least 10 project sites that will enhance critical rearing habitat for native fish in headwater reaches, expand beaver habitat, create cold water refugia, and provide water storage, potentially increasing low flows and moderating downstream peak flows in large rivers.
- Three fish migration barrier removal projects were funded, which will protect county road crossings above current and future flood levels.



East Fork Satsop River Early Action Reach Project

3 SCIENCE: MONITORING AND ADAPTIVE MANAGEMENT STUDY PROGRESS

In 2021, the ASRP published the M&AM Plan, a critical first step to monitoring and tracking progress of on-the-ground restoration and protection actions across the basin. The M&AM Plan provides a framework to assess whether ASRP actions are creating the intended effect and to improve strategies to meet program goals. The M&AM Plan organized monitoring efforts that began in the 2019-2021 biennium into sampling plans that fall into the following three categories:

- **Status and Trends.** These studies evaluate changes in watershed conditions and abundance and distribution of target aquatic species over time.
- **Project Effectiveness.** These studies examine the effectiveness of restoration activities and determine how well they improve habitat conditions at the project site or reach.
- **Data Gaps and Hypothesis Testing.** These studies investigate critical gaps in knowledge to inform restoration planning and to test the scientific assumptions used to create the ASRP.

Monitoring studies will be reported on annually and in 5-year cycles. The scientists on the TAG will review the ongoing monitoring studies, studies funded by other entities in the basin, and other emerging science from the literature to support conclusions for the annual reporting, which allows the Steering Committee and the Board to act quickly if any critical issues are identified. The 5-year cycles provide a more robust evaluation of species trends and ASRP progress in meeting the aquatic species and habitat goals.

In 2022, a total of 20 ASRP monitoring studies were in progress (details in Attachment C).

In addition to funding from the ASRP, several partners and funding sources helped support the work (both in 2022 and prior years). These collaborations are extremely valuable and

2022 ASRP-FUNDED MONITORING STUDIES

Status and Trends

- Fish In/Out: Salmon and Steelhead Spawner Abundance Newaukum River
- Salmon and Steelhead Smolt Trapping Study (Newaukum and Upper Chehalis Rivers)
- Ecology of Non-Native Fishes
- Thermalscape
- Native Fish Occupancy
- Adult Run Timing Genetics
- Juvenile Run Timing Genetics
- Oregon Spotted Frog Surveys
- Stream-Associated Amphibian Surveys
- Western Toad Surveys
- Watershed Health

Project Effectiveness Monitoring

- Beaver Dam Analog Monitoring
- Early Action Reach Drone Monitoring
- Sediment Wedge Monitoring
- Watershed Health Monitoring at Early Action Reaches

Data Gaps and Hypothesis Testing Studies

- Thermal Refugia Monitoring
- Freshwater Mussel Surveys
- Off-Channel Experimental Reconnections – Effects on Non-Salmon Aquatic Species
- Satsop Experimental Off-Channel Reconnection
- Upper Basin Chinook Salmon Fry Trapping

demonstrate the commitment of the basin's partners to program success through continuous learning and adaptive management. Key status and trends takeaways from this year's work include the following:

- Genetic information, to date, indicates that **spring-run Chinook salmon are a much smaller proportion (2% to 18%) of the overall Chinook salmon population in the Chehalis Basin than previously understood**. Hybridization between spring- and fall-run Chinook salmon is occurring, with hybrid fish comprising 10% to 25% of Chinook salmon sampled for genetics at multiple locations within the basin. This means that there are substantially fewer pure spring-run Chinook salmon being produced in the basin than previously believed based on spawning ground surveys.
- High flows in winter 2021-2022 in the Newaukum River and upper Chehalis River may have had negative effects on incubating eggs of Chinook salmon. Scouring from high flows can impact redds.
- **Substantial mortality of juvenile Chinook salmon in the Chehalis River occurred downstream of the Newaukum River in 2022**, as measured by low numbers of Chinook salmon at the mainstem fish trap in 2022. This mortality may be related to high water temperatures, predation, or other factors.
- **Coho salmon abundance trended higher in 2021-2022** than in the 2 prior years.
- **Wild steelhead abundance was lower in 2022** than in the 2 prior years.
- Both **native and non-native fish in the mainstem Chehalis River showed substantial predation on juvenile Chinook salmon**. Non-native fish, particularly smallmouth bass, preferentially preyed on Chinook salmon. Other native salmonids were a smaller proportion of the prey.
- **Water temperatures are becoming too warm for salmonids in large parts of the Chehalis Basin**. Continued warming is projected under future climate change and is anticipated to expand the ranges of non-native species, including those that prey on salmonids and other native fish, exacerbating existing threats.
- Western toads have not been found breeding in the Cascade Mountains ecological region. Primary distribution known, to date, is within Willapa Hills and Olympic Mountains ecological regions.

Emphasized or emerging concerns and questions in specific areas of the basin that will be considered in 2023 include the following:

- Genetic data are emphasizing the importance of reducing hybridization of spring- and fall-run Chinook salmon.
 - Flow modifications in the Skookumchuck River are currently being implemented/monitored and temporary barriers are also being considered.
- Are we doing enough for spring-run Chinook salmon, given the first takeaway above?
- Consider if additional actions are needed for wild steelhead in the basin.

- The upper South Fork Newaukum River is an important current spawning area for both steelhead and spring-run Chinook salmon and will become more important with continued climate change. Limited restoration actions have been completed in this area.
- How can we incorporate climate resiliency considerations more explicitly into ASRP project design?
- It will be difficult to detect or understand trends for some species, including amphibians whose life history stages are not well understood, and whether these trends are related to ASRP actions or whether climate change or other factors are outpacing restoration and protection actions.
- High levels of water extraction and water quality concerns in the South Fork Chehalis River may diminish the potential benefits of habitat restoration actions in this sub-basin.
- A native fish occupancy model has been developed to support ASRP work, but further sampling for non-salmonid native fish is not proposed beyond this year. Concerns relative to Olympic mudminnow, a state-listed sensitive species, may be difficult to address without more focused monitoring studies. For example, it is not known to what extent non-salmonid native fish are preyed upon in the Chehalis Basin.
- Further research is needed to understand if and how process-based restoration may work for Oregon spotted frog habitat. Proposed new projects will begin to address this need.
- Are we doing enough for western ridged mussel, considering the potential for Endangered Species Act listing?

The study results so far provide important insights into annual variations and overall trends in aquatic species populations. Drone flights and eDNA are excellent technologies to support both status and trends and project effectiveness monitoring more extensively in the future for relatively low cost and effort. Although project effectiveness monitoring is primarily focused on physical parameters, the TAG will further define the most important biological metrics related to project effectiveness that can guide restoration actions to more effectively perform desired functions in collaboration with project sponsors and the Project Technical Review Team.

A summary of the purpose, status, key results, and next steps for each of the 20 monitoring studies can be found in Attachment C.

4 COMMUNITY INVOLVEMENT

Community involvement is another of the five strategy categories of the ASRP Approach defined in the 2019 ASRP document. A number of community involvement efforts were initiated in 2022, including creating the RITs; offering a symposium to engage directly with community members and restoration practitioners; providing informational and learning sessions; and improving outreach efforts through social media, in-person meetings, and other local events.

Regional Implementation Teams

As described in Section 2, three RITs led by local conservation districts focusing on the upper, middle, and lower portions of the basin kicked off in 2022. The purpose of the RITs is to serve as the first step in the implementation process to improve efficiency of ASRP-funded project development; one aspect of this role is to actively bring together project sponsors, landowners, and partners to collaborate on project opportunities that align with ASRP priority areas and goals. These teams meet monthly to exchange ideas, share resources, present and discuss projects, and support each other. The three implementation teams met separately initially and now meet jointly to foster more cross-pollination of ideas and opportunities to meet the ASRP's collective goals, especially by improving community involvement by sharing experiences and resources and building organizational capacity that will support future scaling up of the program.

2022 ASRP Symposium

Another key effort in 2022 included hosting a two-day ASRP symposium. While the previous symposium in 2020 focused primarily on sharing the ASRP science guidance, the initiation of the new project pipeline process in 2021 offered a unique opportunity for the 2022 ASRP symposium to focus on implementation, more directed towards basin residents and project partners, in addition to the continued scientific results. Presentations and break-out discussions highlighted landowner and project sponsor perspectives and lessons learned. An emphasis was made to inform project sponsors and landowners about ways to get involved with ASRP and where to find resources related to permitting, cultural resources, technical materials, and other topics.

Sharing the ambitious and collaborative vision of the future of the ASRP over the next decade, discussions centered around the following topics:

- Keynote speaker Urban Eberhart from the Kittitas Reclamation District with lessons learned about collaboration for the Yakima Basin Water Enhancement Project
- Keynote address delivered by David Trout of the Nisqually Indian Tribe
- Success stories from inside and outside of the basin capturing the challenges of shifting from planning to implementation and discussing why habitat is a major focus of the ASRP

- Incorporating research and monitoring into restoration planning and design efforts through collaboration with sponsors and the Project Technical Review Team
- Perspectives from the Wynoochee River Early Action Reach project participants on flooding and the house relocation, a large-scale action involving multiple landowners, and challenges faced with aligning expectations from design through construction
- Successes based on robust communication plans and feedback loops, involving landowners, regulatory agencies, and other entities

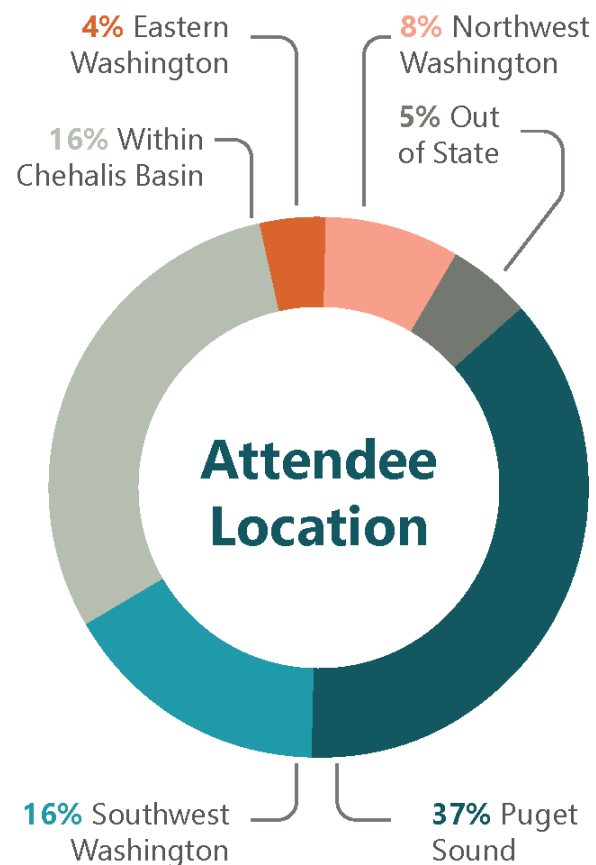
This year's symposium participation included more project sponsors, landowners, and interested people. A large percentage of participants were from within the Chehalis Basin and southwest Washington, showing the local interest and active involvement of sponsors, landowners, and stakeholders who are key to the success of the program (Figure 3).

Learning Sessions and Site Visits

To round out the ASRP's community involvement and other related efforts, cultural resources and permitting learning sessions were offered to project sponsors, consultants, and restoration practitioners in an effort to educate, create networking opportunities, and share resources aimed at continuously improving the program and project implementation.

Additionally, several site visits with community members, board members, government officials (such as Governor Inslee), and others occurred throughout the year. These offerings focused on highlighting the collaborative efforts of the Chehalis Basin Strategy, such as working with other funding programs to increase ecological lift and effectively leverage multiple funding sources. Projects that integrate flood damage reduction elements with habitat restoration and protection components of ASRP projects were also highlighted. Some ASRP outreach and educational materials are included in Attachment D.

Future opportunities for similar engagement will be made available in 2023 guided by the implementation teams, Chehalis Basin Strategy leaders, and staff to meet both ongoing interests and emerging needs. This year's efforts will help shape future symposia topics, planned for 2024, and guide ongoing ASRP community education and outreach efforts.



5 ASRP'S ROLE AS PART OF THE BROADER CHEHALIS BASIN STRATEGY

As described in the Chehalis Basin Strategy mandate, the Office of Chehalis Basin's charge is to aggressively pursue both long-term flood damage reduction and aquatic species restoration. The ASRP is complemented by many other initiatives in the Chehalis Basin Strategy to advance these two goals. The Local Actions Non-Dam Alternative is evaluating options to reduce flood damage outside of constructing a dam on the upper Chehalis River near Pe Ell and aims to do so with a lower impact on aquatic species. The Office of Chehalis Basin continues its analysis of future options for the Skookumchuck Dam, identifying both potential flood damage reduction and aquatic species benefits, with the possibility of improving salmon and steelhead runs in ASRP-prioritized geospatial units. Local projects through the Chehalis River Basin Flood Authority continue to move forward with a variety of projects that include infrastructure improvements such as pump station upgrades and property protection efforts. An Office of Chehalis Basin-led workgroup has also created a framework of an erosion management program to address streambank erosion on private property that balances flood damage and habitat improvement, potentially offering an alternative to landowners that are not in ASRP priority areas or who cannot commit to the level of habitat restoration required by ASRP. Finally, flood assistance program work has focused on providing technical support to landowners who may benefit from elevating their homes or potentially relocating homes and infrastructure to meet the Chehalis Basin Strategy's flood damage reduction mandate.

2022 has been a productive year for the ASRP. The program intends to build upon the restoration and protection, community involvement, and other key strategies currently underway by increasing sponsor and landowner capacity to implement projects, fund work that will generate project ideas and advance those ideas to completion, and educate and share resources to support collective success and contribute to a resilient future for both aquatic species and basin communities who rely on the land and resources offered in this unique place—the Chehalis Basin.

The ASRP continues to seek opportunities to align and compliment flood damage reduction work to better serve the basin's communities. Many of the ASRP habitat-focused actions have also addressed flood-related impacts, whether it's relocating or removing homes from floodways, opening up barriers to fish migration while also elevating county roads above current and future flood levels, or placing large wood that can slow and redirect water into floodplains or away from streambanks.

6 REFERENCES

ASRP SC (Aquatic Species Restoration Plan Steering Committee), 2019. *Phase 1 Aquatic Species Restoration Plan*.

ASRP SC, 2022. *Near-Term (2021-2031) Implementation Report*.

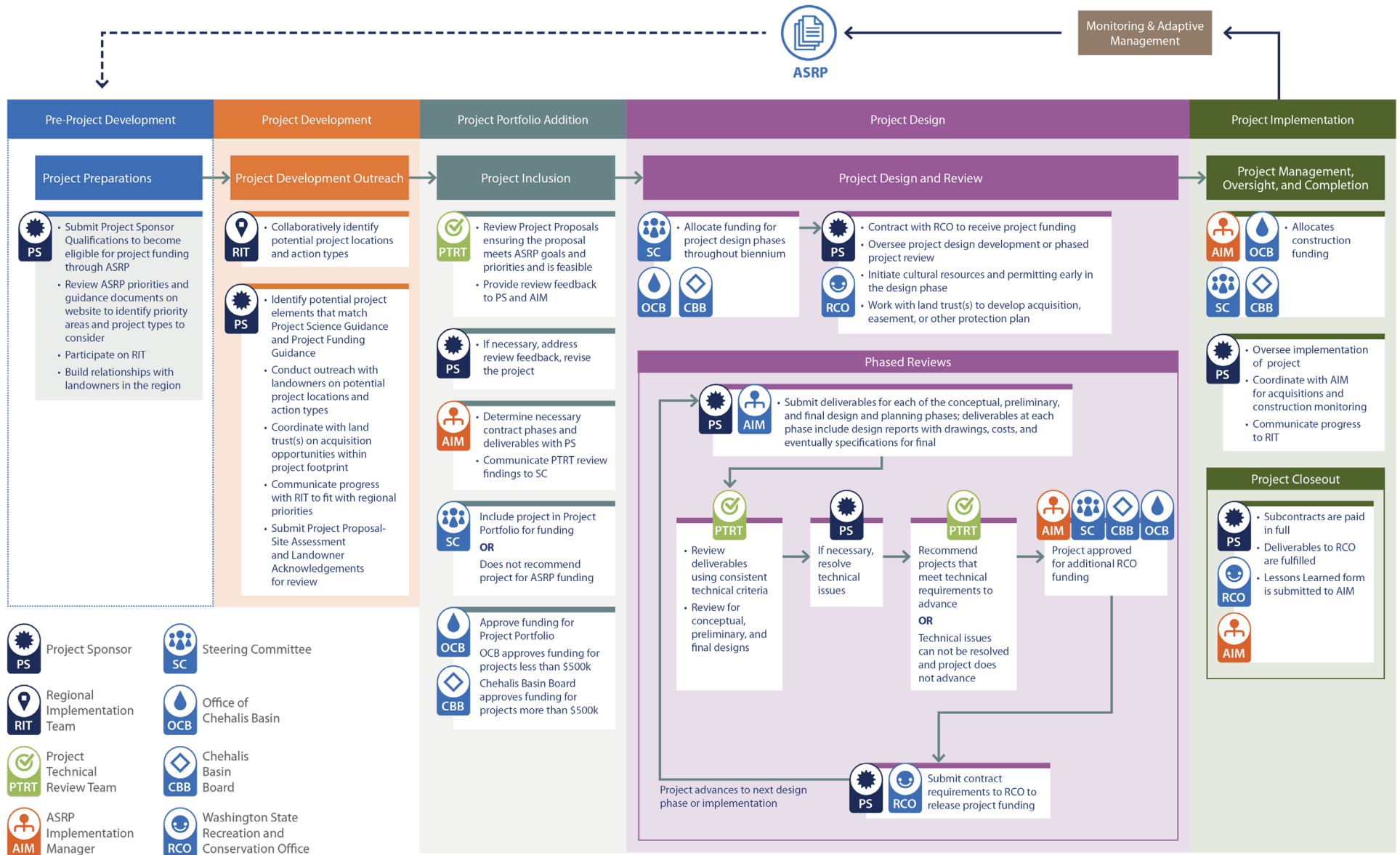
ASRP SC and M&AMT (Aquatic Species Restoration Plan Steering Committee and Monitoring and Adaptive Management Team), 2021. *Monitoring and Adaptive Management Plan*.

ASRP SRT (Aquatic Species Restoration Plan Science and Project Technical Review Team), 2021. *ASRP Prioritization and Sequencing Memorandum*.

ATTACHMENT A

PROJECT PIPELINE









ASRP Project Pipeline Process



ATTACHMENT B








ASRP PROJECTS IMPLEMENTED IN 2022

Aquatic Species Restoration Plan Progress Through Q3 of 2022

Project Name	Project Type	Description	Location, County	2021-2023 Funding	Sponsor
Grays Harbor County					
Middle Humptulips Project Development	 Project Development	Project development through landowner engagement and developing restoration ideas/options.	Middle Humptulips River, Grays Harbor County	\$80,000	Trout Unlimited
Wildcat Creek Barrier Removals	 Barrier Removal	Remove 3 fish barrier culverts on MF Wildcat Creek, improving access to over 4 miles of stream and improving riparian and in-channel habitat conditions.	MF Wildcat Creek, Grays Harbor County	\$1,073,733 Matching funding from Grays Harbor County (25%)	Chehalis Basin Fisheries Task Force
Beaver Dam Analog (BDA) Construction	 Experimental	Construct BDAs at eight sites to store water, raise the groundwater table, increase low flows, reduce water temperature, and retain sediment.	Stearns Creek, Middle Fork Satsop, Lewis and Grays Harbor County	\$286,000	Wild Fish Conservancy
Newman Creek Restoration	 Restoration	Alternatives analysis and preliminary design to restore creek to historical channel and wetland complex, riparian restoration, and invasives management.	Newman Creek, Grays Harbor County	\$67,235	Ducks Unlimited
Sediment Wedging Experimental Project	 Experimental	Experimental project to evaluate pre-filled sediment wedge potential at two sites for reducing stream temperature and create cool water pool.	Shaffer Creek, Delezene Creek, Grays Harbor County	\$1,490,400	WDFW
Satsop Rivermile 2.5-5.0 Reach-Scale	 Restoration	Reach-scale restoration of 2.5 miles along left-bank Satsop River including large wood, flood fencing, riparian restoration, and invasives management.	Lower Satsop River, Grays Harbor County	\$3,591,987	Grays Harbor Conservation District
Chehalis Rivermile 15.5-17.5 Reach-Scale	 Restoration	Engagement with willing landowners re: potential acquisitions, restoration concept design, early riparian restoration.	Chehalis River, Grays Harbor County	\$250,352	Grays Harbor Conservation District
Thurston County					
West Rocky Prairie Oregon Spotted Frog Restoration	 Oregon Spotted Frog	Invasive species management and hydrologic restoration (BDAs, pond creation).	Headwaters of Beaver Creek, Thurston County	\$159,430	WDFW
Riverbend Ranch Reach-Scale	 Restoration	Reach-scale restoration of 2.5 miles of Skookumchuck River including large wood, riparian restoration, and side channels.	Lower Skookumchuck River, Thurston County	\$7,674,839	Thurston Conservation District
Lewis County					
SF Chehalis/Lake Creek Project Development	 Project Development	Project development through landowner engagement and developing restoration ideas/options.	SF Chehalis River, Lake Creek, Lewis County	\$40,000	Lewis Conservation District
NF Newaukum Lawson Reach Project Development	 Project Development	Due diligence and negotiation of conservation easement with willing landowner.	NF Newaukum River, Lewis County	\$40,000	Lewis Conservation District
Lucas Creek Project Development	 Project Development	Due diligence and negotiation of conservation easement with willing landowner.	Lucas Creek, tributary to NF Newaukum River, Lewis County	\$10,000	Capitol Land Trust, Lewis Conservation District
Total Funding for Projects Listed Here				\$14.76 million	
Previous Total Funding				\$41 million	
Total Funding to Date				\$55.76 million	



Aquatic Species Restoration Plan Progress Q4 of 2022

Project Name	Project Type	Description	Location, County	2021-2023 Funding	Sponsor
Grays Harbor County					
Schafer Creek Headwaters Restoration	 Restoration	Installation of post-assisted log structures along river miles 8-9	Schafer Creek	\$200,000	Grays Harbor Conservation District
Cloquallum Project Development	 Project Development	Project development through landowner engagement and developing restoration ideas/options.	Cloquallum Creek sub-basin, Grays Harbor and Mason counties	\$115,658	Ducks Unlimited, Mason Conservation District, Grays Harbor Conservation District
Thurston County					
Allen Creek Oregon Spotted Frog Maintenance and Monitoring	 Oregon Spotted Frog	Invasive species management and hydrologic monitoring of OSF habitat.	Allen Creek, Thurston County	\$19,079	WDFW
Mima Creek Oregon Spotted Frog Maintenance	 Oregon Spotted Frog	Invasive species management to enhance OSF habitat	Mima Creek, Thurston County	\$15,000	WDFW
Salmon Creek Oregon Spotted Frog Maintenance	 Oregon Spotted Frog	Invasive species management and hydrologic monitoring of OSF habitat.	Salmon Creek, Thurston County	\$28,619	WDFW
Oregon Spotted Frog Translocation Project Development	 Oregon Spotted Frog	Project development through habitat assessment, landowner engagement and planning for possible OSF translocation to expand distribution.	Black River sub-basin, Thurston County	\$57,950	WDFW, Thurston Conservation District
Lewis County					
Coal Creek Fish Barrier Removal	 Barrier Removal	Design and construction to remove fish barrier on Coal Creek.	Coal Creek, Lewis County	\$45,000	Trout Unlimited
Total Funding for Projects Listed Here				\$481,306	
Previous Total Funding (2021-2023)				\$14.76 million	
Total Funding to Date				\$58.6 million	

ATTACHMENT C

MONITORING STUDIES SUMMARY

MONITORING STUDY NAME	PURPOSE	STATUS	KEY TAKEAWAYS	LOOK-AHEAD
Status and Trends Monitoring Studies				
Fish In/Out: Salmon and Steelhead Spawner Abundance (Newaukum River)	Document population baseline and changes and trends to support understanding of restoration effectiveness, climate change effects, and other factors.	Annual study since 2019; results for 2021-2022 in progress	<ul style="list-style-type: none"> Chinook salmon and steelhead adult abundance are slightly lower in 2021-2022 than previous years, although spring-run Chinook salmon were higher than 2019-2020 season Coho salmon abundance is higher in 2021-2022 than previous year (nearly double) 	Minimal restoration, to date, in Newaukum River through ASRP (barrier removals on some tributaries); discussing how to increase project development on Newaukum River
Salmon and Steelhead Smolt Trapping Study (Newaukum and upper Chehalis rivers)	Document population baseline and changes and trends to support understanding of restoration effectiveness, climate change effects, and other factors.	Annual study since 2019; results for 2021-2022 in progress	<ul style="list-style-type: none"> Chinook salmon and steelhead juvenile abundance lower in 2021-2022 than previous years in both Newaukum and Upper Chehalis rivers Coho salmon abundance is higher in 2021-2022 than previous year in upper Chehalis River but slightly decreased in Newaukum River; likely correlated to high flows in winter 2022 	Minimal restoration, to date, in Newaukum River or upper Chehalis River through ASRP (barrier removals on some tributaries), monitoring is developing baseline abundance that characterizes interannual variability
Ecology of Non-Native Fishes	Understand spatial and temporal patterns of predation from non-native predator fish and one native species, pikeminnow, primarily in mainstem Chehalis River.	Conducted in 2021 and 2022	<ul style="list-style-type: none"> Chinook salmon are a substantial component of the diet of all fish species sampled Other salmonids make up a smaller portion of the diet but are still preyed upon 	Important to link spatial and temporal patterns of non-native fish species to Thermalscape data

MONITORING STUDY NAME	PURPOSE	STATUS	KEY TAKEAWAYS	LOOK-AHEAD
Thermalscape	Maintain basin-wide water temperature network; update temperatures status and trends for stream networks; update climate change predictions of temperatures.	Annually since 2018, results for 2021-2022 in progress	<ul style="list-style-type: none"> • Warming significantly correlated with air temperature • Cooling significantly correlated with elevation, precipitation, and stream flow 	Potential to expand network to better cover upper Chehalis River area
Native Fish Occupancy	Document native fish (non-salmonids) occupancy in the Chehalis Basin; develop model to predict native fish occupancy; describe habitat relationships for native fish species.	Study began in 2019 and was completed in 2022	<ul style="list-style-type: none"> • Occupancy and predicted distribution maps for several native fish species • Developed native fish diversity maps (number of native fish for reaches in the basin) for current and future climate conditions 	Important to link to non-native predator study and continued Thermalscape status and trends; help refine priority areas; eDNA can be useful for continuing tracking of native fish
Adult Run Timing Genetics	Fill a data gap on spatial and temporal distribution of adult Chinook salmon run timing genetics (spring, fall, hybrid-run) (mainstem Chehalis River and Newaukum River).	Study for 2021-2022 season only	<ul style="list-style-type: none"> • Hybrid-run genetics in 20% of samples • 83% of samples identified as spring-run Chinook salmon came from the South Fork Newaukum River; also, the majority of samples identified as hybrid-run came from the South Fork Newaukum River 	Upper South Fork Newaukum River is an important spring-run Chinook salmon spawning area, and to date, only limited ASRP actions have been taken

MONITORING STUDY NAME	PURPOSE	STATUS	KEY TAKEAWAYS	LOOK-AHEAD
Juvenile Run Timing Genetics	Fill a data gap on spatial and temporal distribution of juvenile Chinook salmon run timing genetics (spring, fall, hybrid-run) (mainstem Chehalis River and Newaukum River).	Study for 2021-2022 season only	<ul style="list-style-type: none"> Fall-run Chinook salmon accounted for 60% to 89% of samples (Newaukum and upper Chehalis rivers, respectively) Spring-run Chinook salmon accounted for 1% to 20% of samples (upper Chehalis and Newaukum rivers, respectively) Hybrids accounted for 10% to 23% of samples (upper Chehalis and middle Chehalis rivers, respectively) Mainstem trap near the Black River only documented 6.6% of the Chinook salmon production from the Newaukum River trap 	Spring-run Chinook salmon in the upper Chehalis River are an extremely small proportion of the total Chinook salmon production; hybridization with fall-run Chinook salmon is a significant issue everywhere that spring-run Chinook salmon occur; predation and other mortality in the middle Chehalis River can be substantial
Oregon Spotted Frog Surveys	Monitor long-term trends of Oregon spotted frog distribution and abundance in response to restoration actions, climate change, and land use.	Annual surveys starting in 2020; building on data collected by multiple partners since 2010	<ul style="list-style-type: none"> Oregon spotted frog abundance trending upwards at West Rocky Prairie site after substantial decline following 2015 drought 	Evaluate hydrology and movements to understand how habitats can be improved for Oregon spotted frog
Stream-Associated Amphibian Surveys	Perform annual surveys for presence and distribution of stream-breeding amphibians to document trends in response to restoration actions, climate change, and land use.	Annual surveys starting in 2022; building on data collected since 2017	Study in progress; no results yet	Data will describe the impacts of near-term restoration actions, climate change, and human activities on aquatic ecosystem health

MONITORING STUDY NAME	PURPOSE	STATUS	KEY TAKEAWAYS	LOOK-AHEAD
Western Toad Surveys	Perform annual surveys for presence and distribution of western toad to document trends in response to restoration actions, climate change, and land use.	Census surveys from 2014 to 2022; annual surveys beginning in 2023	<ul style="list-style-type: none"> Western toads are breeding in larger river systems including upper Chehalis, South Fork Chehalis, Satsop, Humptulips, Wynoochee, Wishkah rivers No breeding was found in the Cascades Ecological Region (Newaukum or Skookumchuck rivers) 	Include genetic sampling in future years to document if any differences exist between Willapa Hills population versus Olympic Mountains population
Watershed Health	Perform annual surveys to track changes in watershed health in response to restoration actions, climate change, and other factors.		Study in progress; no results yet	Determine which metrics are most important to track
Project Effectiveness Monitoring				
Beaver Dam Analog Monitoring	Monitor 2 years pre- and post-construction at proposed beaver dam analog sites; parameters include stream temperature, riparian water table elevation, cold water patches, channel change, floodplain connectivity, and beaver presence and use.	2021-2022 for pre-construction; 2023-2024 for post-construction	Study in progress; no results yet	Determine which metrics are most important to track
Early Action Reach Drone Monitoring	Compare changes from pre- to post-construction at Early Action Reaches for channel morphology, elevations, erosion and deposition, riparian vegetation, and overall effectiveness in promoting process-based restoration.	Pre-construction from 2020 to 2022; post-construction 2021 and continuing annual flights	Study in progress; no results yet	Determine which metrics are most important to track

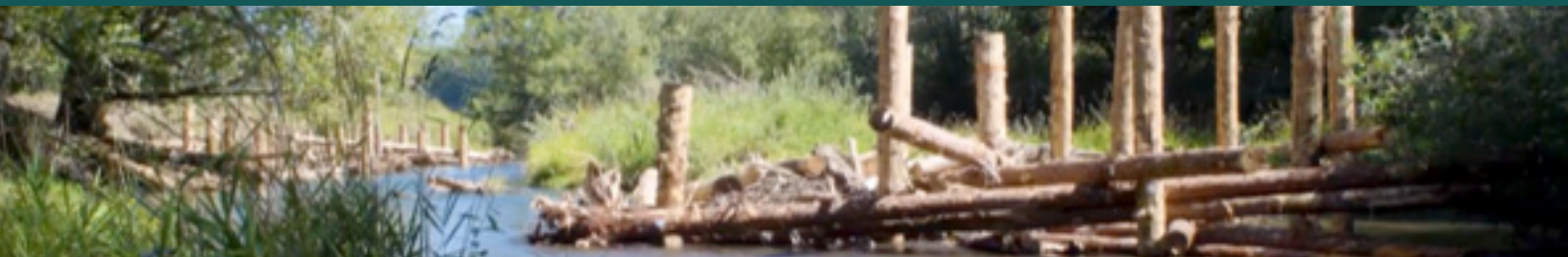
MONITORING STUDY NAME	PURPOSE	STATUS	KEY TAKEAWAYS	LOOK-AHEAD
Sediment Wedge Monitoring	Monitor 2 years pre- and post-construction at proposed sediment wedge sites; parameters include stream temperature, discharge, riparian water table elevation, cold water patches, stream substrate, stream geomorphic units, floodplain connectivity, and channel morphology.	2022-2023 for pre-construction; 2024-2025 for post-construction	Study in progress; no results yet	Determine which metrics are most important to track
Watershed Health Monitoring at Early Action Reaches	Monitor pre- and post-construction at Early Action Reaches; parameters include substrate size, stream habitat units, riparian condition, large wood, water temperature, and water levels.	2019-2020 for pre-construction; 2022-2023 for post-construction	Study in progress; no results yet	Determine which metrics are most important to track
Data Gaps and Hypothesis Testing Studies				
Thermal Refugia Monitoring	Identify cold water areas within the Skookumchuck and lower Newaukum rivers to inform restoration priority areas and design options.	2022 only	Study in progress; no results yet	Important for species such as spring-run Chinook salmon that rely on thermal refugia to increase survival to spawn over summer months. Intended to inform future restoration priority areas and design.
Freshwater Mussel Surveys	Document presence, distribution, and health of freshwater mussel species (including western ridged mussel).	2022 continuing work started by other partners in earlier years; continuing in 2023-2024	Study in progress; no results yet	Intended to inform siting of engineered log jams (to avoid impacts) and advance understanding of habitat restoration design to enhance mussels; potential Endangered Species Act listing of western ridged mussel

MONITORING STUDY NAME	PURPOSE	STATUS	KEY TAKEAWAYS	LOOK-AHEAD
Off-Channel Experimental Reconnections – Effects on Non-Salmon Aquatic Species	Monitor 2 years pre- and post-construction at experimental off-channel reconnection sites; parameters include dissolved oxygen, water temperature, water levels, egg masses, and electrofishing.	2022-2023 pre-construction; 2024-2025 post-construction	Study in progress; no results yet	Intended to document response of multiple aquatic species to varying connectivity of off-channel habitats
Satsop Experimental Off-Channel Reconnection	Monitor pre- and post-construction at experimentally restored former gravel mine off-channel ponds; parameters include dissolved oxygen, water temperature, water levels, egg masses, and electrofishing.	2023 will be last season of post-construction monitoring	Data being processed; earlier years show effectiveness of reconnections on physical parameters; biological effectiveness still TBD	Intended to document amphibian and fish use of seasonally connected off-channel habitats
Upper Basin Chinook Salmon Fry Trapping	Fill a data gap on proportion of spring-, fall-, and hybrid-run Chinook salmon at the fry stage in upper Chehalis Basin.	2020-2022	Results for 2020 and 2021: <ul style="list-style-type: none"> • Fall-run Chinook salmon about 80% proportion of samples • Spring-run Chinook salmon about 3% of samples • Hybrids about 13% to 18% of samples 	Hybridization is a serious concern; spring-run Chinook salmon present in very low proportions

ATTACHMENT D

ASRP OUTREACH MATERIALS

Aquatic Species Restoration Plan (ASRP): Part of an Ambitious Strategy for a Resilient Future



The ASRP is a key element of the Chehalis Basin Strategy to address two of the basin's greatest challenges: 1) the devastating decline of salmon and other aquatic species; and 2) catastrophic flooding. Habitat degradation from climate change and other human-related impacts threaten the viability of aquatic species. The ASRP provides a science-informed plan and collaborative approach to identify and implement actions to restore and protect aquatic habitats throughout the Chehalis Basin.

A Collaborative Approach

The ASRP uses a collaborative approach toward implementation to ensure projects are technically viable, locally supported, and making progress toward meeting program and strategy goals across the basin. Local organizations work with landowners and restoration professionals on Regional Implementation Teams to identify and develop projects. Guided by priorities,¹ projects are funded on a continuous basis, allowing flexibility to act on opportunities as they arise while ensuring the highest-priority activities are addressed first.

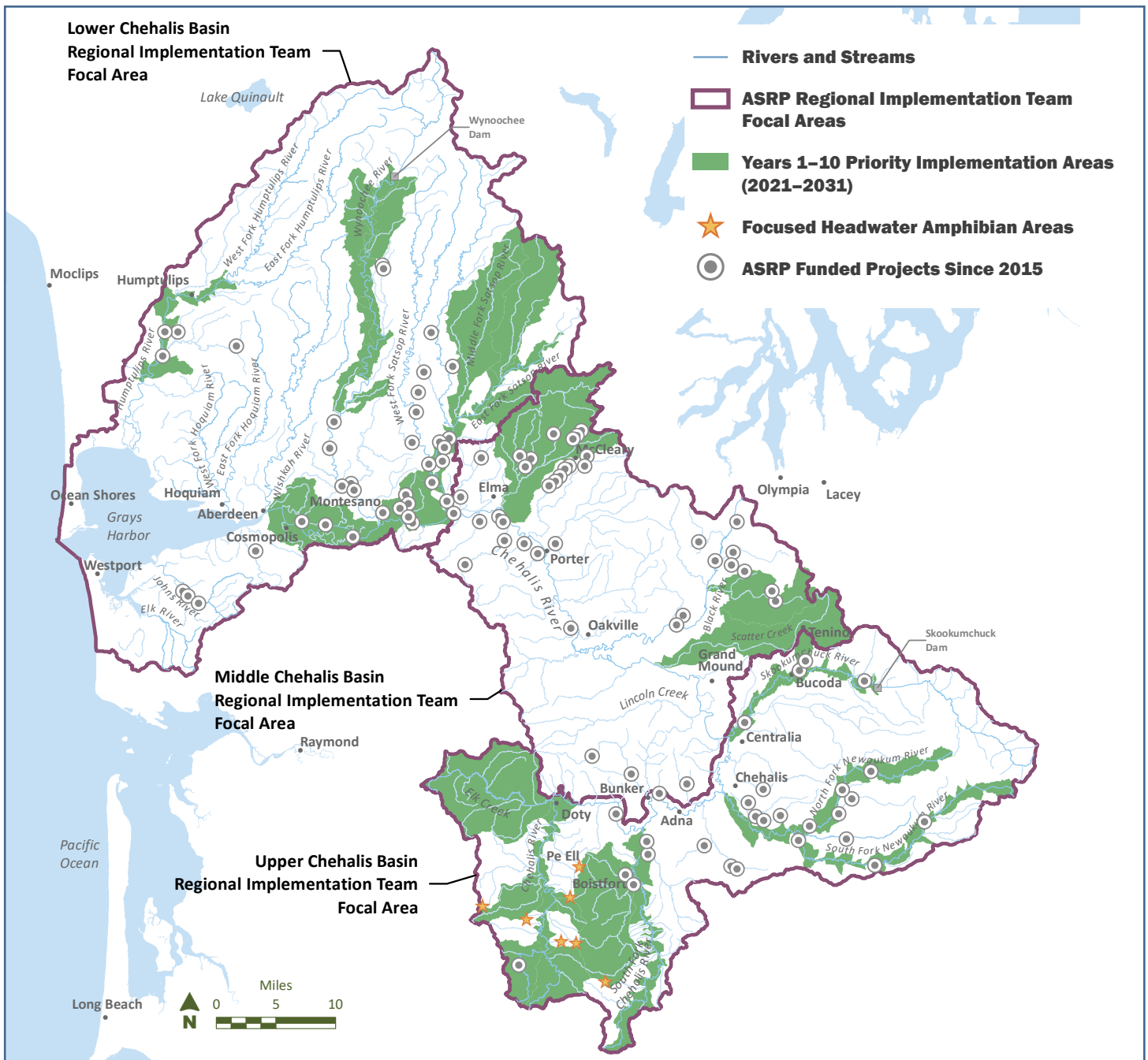
Goals and Outcomes

Since 2015, approximately \$58 million dollars has been invested in ASRP project development, design, and implementation. Of this total, approximately \$32.2 million dollars supported on-the-ground restoration actions across Grays Harbor, Thurston, and Lewis counties. The ASRP is on track to meet its 2021–2023 biennial goal to restore 9 miles of river habitat and 400 acres of floodplain habitat.

	Grays Harbor County (\$17.5 million)	Thurston County (\$3.5 million)	Lewis County (\$11.3 million)	Total
River miles restored	4.8	1.1	2.6	8.5
Acres of floodplain restored	137	101	30	269
Acres of habitat protected	156	102	38	295
Miles made newly accessible through barrier corrections	73	0.5	32	106
Acres of invasive vegetation treated	223	20	40	283
Acres of native plants installed	76	67	45	188

The Chehalis Basin Board will continue to evaluate the components of a long-term Chehalis Basin Strategy in the 2023–2025 biennium. The ASRP will continue to implement projects with available funding until a finalized strategy with legislative support is in place to support long-term implementation.

1. <https://apps.ecology.wa.gov/publications/SummaryPages/2213001.html>; https://chehalisbasinstrategy.com/wp-content/uploads/2022/01/ASRP_Near-Term_Implementation_Update_1-13-2022_Tagged.pdf



The ASRP's 10-Year Implementation Objectives

- Prioritize actions that benefit species at highest risk: spring-run Chinook salmon, Oregon spotted frog, and coastal tailed frog.
- Increase native species abundance and diversity to help mitigate climate change.
- Restore and protect core habitats that are currently productive and stable.
- Plant trees and shrubs along streams and rivers to provide habitat and shade.
- Restore habitat access for migrating fish and amphibians.
- Continuously improve on restoration effectiveness, funds spent, and community engagement.



East Fork Satsop River Restoration



East Fork Satsop Project Highlights

- **7 partnerships** with local landowners
- **3.2 miles** of river habitat restored
- **109 acres** of riparian and floodplain habitat protected
- **53 log jams** installed
- **107 acres** of invasive plants treated
- **62 acres** of native plantings

The East Fork Satsop River provides vital habitat for Chinook salmon, coho salmon, steelhead, Dolly Varden, bull trout, mountain whitefish, and cutthroat trout.

Contact

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WA Dept. of Fish & Wildlife

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Protecting Chehalis Basin habitats through collaboration and community

The Washington Department of Fish and Wildlife (WDFW) worked with community partners to initiate several habitat restoration pilot projects in the Chehalis River Basin referred to as **Early Action Reach projects**.

These projects are part of the Aquatic Species Restoration Plan (ASRP), a science-based plan designed to restore, rebuild, and protect the Chehalis River Basin to support a productive ecosystem that is resilient to the impacts of climate change.

Each of the WDFW-sponsored river restoration projects includes:

- Installing native trees and shrubs;
- Removing invasive species such as blackberry and knotweed;
- Constructing engineered log jams; and
- Reconnecting floodplain and off-channel habitats



Map: Chehalis River Basin in Southwest Washington

Early Action Reach Projects

As shown on map to the left, WDFW is sponsoring habitat projects on the Skookumchuck, Wynoochee, Satsop, and Newaukum rivers, and on Stillman Creek, a tributary to the South Fork Chehalis River.

Funding is provided by the Washington State Legislature through the Department of Ecology's Office of Chehalis Basin.

East Fork Satsop River Restoration

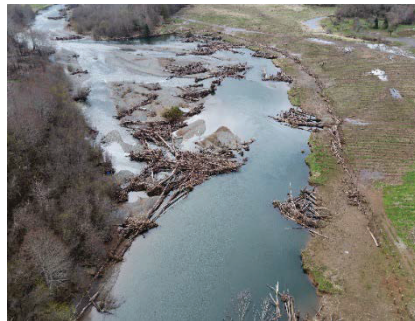


Coordination is key to habitat restoration

The East Fork Satsop River Restoration Project started construction in summer 2021 and was completed in summer 2022. WDFW collaborated with Forterra, Grays Harbor Conservation District, and landowners to make this project a success.

Forterra worked with three landowners to permanently conserve 109 acres of floodplain habitat. Landowners have been experiencing extreme winter flooding and damage to their properties, creating an opportunity to form a restoration partnership benefiting landowners and aquatic species. Following acquisition, one landowner's home was demolished allowing extensive restoration to occur.

Grays Harbor Conservation District is a key partner in landowner communications and floodplain restoration for this project. Over 50,000 new plantings will grow into a mature riparian forest that provides shade, insects, nutrients, and wood to the river that improves habitat for fish and wildlife.



Engineered log jams (shown above) are an important habitat component for the EF Satsop River Restoration Project.

Engineered log jams help create slower and faster water in different areas to scour deep pools and deposit gravel, providing habitat for fish and other aquatic species. Juvenile salmon use pools, riffles, and off-channel habitats to feed, grow, and find refuge during floods. Large wood helps form these habitats for juvenile salmon, can slow erosion, and is also an important part of a healthy river system.



Individuals who need to receive this information in an alternative format, language, or who need reasonable accommodations to participate in WDFW-sponsored public meetings or other activities may contact the Title VI/ADA Compliance Coordinator by phone at 360-902-2349, TTY (711), or email (Title6@dfw.wa.gov).

FORTERRA
FOR THE PEOPLE. FOR THE LAND. FOREVER.



Being a good neighbor

We work with agricultural landowners to minimize impacts on their working lands in the timing and location of project construction.

Get involved

Visit the [Chehalis Basin Strategy website](https://ChehalisBasinStrategy.com) to learn how people are working together to reduce flood damage and restore salmon habitat.

ChehalisBasinStrategy.com

Stillman Creek Restoration



Stillman Creek provides vital habitat for fall and spring Chinook salmon, coho salmon, steelhead, rainbow trout, and coastal cutthroat trout.

Project Highlights

- **5 partnerships** with local landowners
- **2 miles** of river habitat restoration
- **38 acres** of habitat protected
- **113 large wood structures**
- **40 acres** treated for invasive plants
- **45 acres** of plantings including **45,000+ native trees and shrubs**

Protecting Chehalis basin habitats through collaboration and community

The Washington Department of Fish and Wildlife (WDFW) is working with community partners to complete several habitat restoration pilot projects, referred to as **Early Action Reach projects** in the Chehalis River basin.

These projects are part of the Aquatic Species Restoration Plan (ASRP), a science-based plan designed to restore, rebuild, and protect the Chehalis River basin to support a productive ecosystem that is resilient to the impacts of climate change.

Each of the WDFW-sponsored river restoration projects includes:

- Installing native trees and shrubs;
- Removing invasive species, such as blackberry and knotweed;
- Building engineered log jams; and
- Reconnecting floodplain and off-channel habitats.

Contact

Celina Abercrombie

Chehalis Basin Strategy Manager
WA Dept. of Fish & Wildlife

Celina.Abercrombie@dfw.wa.gov



Map: Chehalis River Basin in Southwest Washington

Early Action Reach Projects

As shown on map to the left, WDFW is sponsoring habitat projects on the Skookumchuck, Wynoochee, and Satsop rivers and on Stillman Creek, a tributary to the South Fork Chehalis River.

Funding is provided by the Washington State Legislature through the Department of Ecology's Office of Chehalis

Stillman Creek Restoration



Coordination is key to habitat restoration

The Stillman Creek Restoration Project started construction in summer 2022 and is scheduled to wrap up in summer 2023. WDFW is collaborating with Lewis Conservation District, Capitol Land Trust, and landowners to make this project a success.

Lewis Conservation District is a key partner in landowner communications and floodplain restoration for this project. Their efforts will result in 40 acres of invasive plant removal. The district is also planting 45 acres with native plants, including over 45,000 new trees and shrubs, which will grow into a mature forest, providing shade, insects, nutrients, and woody habitat material for fish and wildlife.

Capitol Land Trust worked with a local landowner to permanently protect 38 acres of habitat. This property is being restored with riparian plantings and enhanced with large wood structures to improve habitat for salmon, other native fish and aquatic species and wildlife.



Engineered large wood structures (above, left) are an important habitat component for the Stillman Creek Restoration Project.

Large wood structures help create slower and faster water in different areas to scour deep pools and deposit gravel, providing habitat for fish and other aquatic species. Juvenile salmon use pools, riffles, and off-channel habitats to feed, grow, and find refuge during floods. Large wood helps form these habitats, can slow erosion, and is also an important part of a healthy river system. Side and off-channel habitat provides refuge for fish during high-flow events.



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Wynoochee River Restoration



The Wynoochee River provides vital habitat for fall and spring Chinook salmon, coho salmon, chum salmon, and steelhead.

Project Highlights

- **1 home relocated**
- **4 partnerships** with local landowners
- **1.25 miles restored** of river habitat
- **26 acres protected** for riparian and floodplain habitat
- **65 log jams installed**
- **116 acres treated** for invasive plants
- **14 acres planted** including **30,000+ native plantings**

Contact

Celina Abercrombie

Chehalis Basin Strategy Manager
WA Dept. of Fish & Wildlife

Celina.Abercrombie@dfw.wa.gov

Protecting Chehalis Basin habitats through collaboration and community

The Washington Department of Fish and Wildlife (WDFW) is working with community partners to initiate several habitat restoration pilot projects in the Chehalis River Basin referred to as **Early Action Reach projects**.

These projects are part of the Aquatic Species Restoration Plan (ASRP), a science-based plan designed to restore, rebuild, and protect the Chehalis River Basin to support a productive ecosystem that is resilient to the impacts of climate change.

Each of the WDFW-sponsored river restoration projects includes:

- Installing native trees and shrubs;
- Removing invasive species such as blackberry and knotweed;
- Constructing engineered log jams; and
- Reconnecting floodplain and off-channel habitats



Map: Chehalis River Basin in Southwest Washington

Early Action Reach Projects

As shown on map to the left, WDFW is sponsoring habitat projects on the Skookumchuck, Wynoochee, Satsop, and on Stillman Creek, a tributary to the South Fork Chehalis River.

Funding is provided by the Washington State Legislature through the Department of Ecology's Office of Chehalis Basin.

September 2022

Wynoochee River Restoration



Coordination is key to habitat restoration

The Wynoochee River Restoration Project started construction in summer 2021 and was completed in summer 2022. WDFW collaborated with Forterra, Grays Harbor Conservation District, and landowners to make this project a success.

Forterra worked with a local landowner to permanently conserve 26 acres of riparian and floodplain habitat. This landowner had been experiencing extreme flooding, resulting in restricted access and damage to their property. This created the opportunity for a mutually beneficial project benefiting the landowner and aquatic species. Following acquisition, the home was relocated to safer, higher ground, and the property was planted with floodplain trees and shrubs.

Grays Harbor Conservation District is a key partner in landowner communications and floodplain restoration for this project. Along with being the project lead for the house relocation, their efforts resulted in over 30,000 new plantings which will grow into a mature riparian forest that provides shade, insects, nutrients, and woody material habitat for fish and wildlife.

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Get involved

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[ChehalisBasinStrategy.com](https://www.ChehalisBasinStrategy.com)



The house relocation (above, left) was a key element in the collaboration between a landowner and project partners. Engineered log jams (above, right) are an important habitat component for the Wynoochee River Restoration Project.












Engineered log jams help create slower and faster water in different areas to scour deep pools and deposit gravel, providing habitat for fish and other aquatic species. Juvenile salmon use pools, riffles, and off-channel habitats to feed, grow, and find refuge during floods. Large wood helps form these habitats for juvenile salmon, can slow erosion, and is also an important part of a healthy river system.



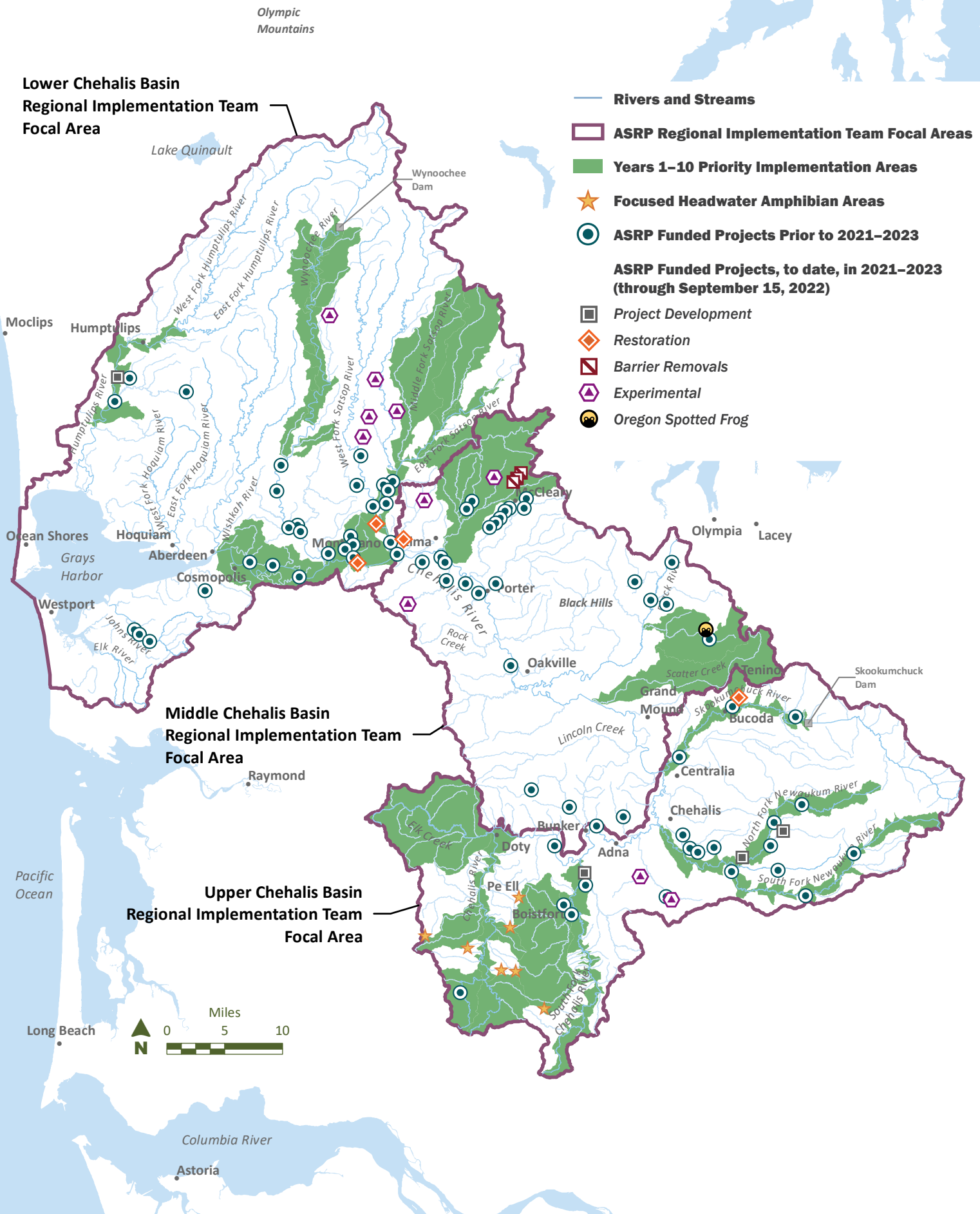
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September 2022

Aquatic Species Restoration Plan Progress Through Q3 of 2022

Project Name	Project Type	Description	Location, County	2021-2023 Funding	Sponsor
Grays Harbor County					
Middle Humptulips Project Development	 Project Development	Project development through landowner engagement and developing restoration ideas/options.	Middle Humptulips River, Grays Harbor County	\$80,000	Trout Unlimited
Wildcat Creek Barrier Removals	 Barrier Removal	Remove 3 fish barrier culverts on MF Wildcat Creek, improving access to over 4 miles of stream and improving riparian and in-channel habitat conditions.	MF Wildcat Creek, Grays Harbor County	\$1,073,733 Matching funding from Grays Harbor County (25%)	Chehalis Basin Fisheries Task Force
Beaver Dam Analog (BDA) Construction	 Experimental	Construct BDAs at eight sites to store water, raise the groundwater table, increase low flows, reduce water temperature, and retain sediment.	Stearns Creek, Middle Fork Satsop, Lewis and Grays Harbor County	\$286,000	Wild Fish Conservancy
Newman Creek Restoration	 Restoration	Alternatives analysis and preliminary design to restore creek to historical channel and wetland complex, riparian restoration, and invasives management.	Newman Creek, Grays Harbor County	\$67,235	Ducks Unlimited
Sediment Wedging Experimental Project	 Experimental	Experimental project to evaluate pre-filled sediment wedge potential at two sites for reducing stream temperature and create cool water pool.	Shaffer Creek, Delezene Creek, Grays Harbor County	\$1,490,400	WDFW
Satsop Rivermile 2.5-5.0 Reach-Scale	 Restoration	Reach-scale restoration of 2.5 miles along left-bank Satsop River including large wood, flood fencing, riparian restoration, and invasives management.	Lower Satsop River, Grays Harbor County	\$3,591,987	Grays Harbor Conservation District
Chehalis Rivermile 15.5-17.5 Reach-Scale	 Restoration	Engagement with willing landowners re: potential acquisitions, restoration concept design, early riparian restoration.	Chehalis River, Grays Harbor County	\$250,352	Grays Harbor Conservation District
Thurston County					
West Rocky Prairie Oregon Spotted Frog Restoration	 Oregon Spotted Frog	Invasive species management and hydrologic restoration (BDAs, pond creation).	Headwaters of Beaver Creek, Thurston County	\$159,430	WDFW
Riverbend Ranch Reach-Scale	 Restoration	Reach-scale restoration of 2.5 miles of Skookumchuck River including large wood, riparian restoration, and side channels.	Lower Skookumchuck River, Thurston County	\$7,674,839	Thurston Conservation District
Lewis County					
SF Chehalis/Lake Creek Project Development	 Project Development	Project development through landowner engagement and developing restoration ideas/options.	SF Chehalis River, Lake Creek, Lewis County	\$40,000	Lewis Conservation District
NF Newaukum Lawson Reach Project Development	 Project Development	Due diligence and negotiation of conservation easement with willing landowner.	NF Newaukum River, Lewis County	\$40,000	Lewis Conservation District
Lucas Creek Project Development	 Project Development	Due diligence and negotiation of conservation easement with willing landowner.	Lucas Creek, tributary to NF Newaukum River, Lewis County	\$10,000	Capitol Land Trust, Lewis Conservation District
Total Funding for Projects Listed Here				\$14.76 million	
Previous Total Funding				\$41 million	
Total Funding to Date				\$55.76 million	








**Lower Chehalis Basin
Regional Implementation Team
Focal Area**

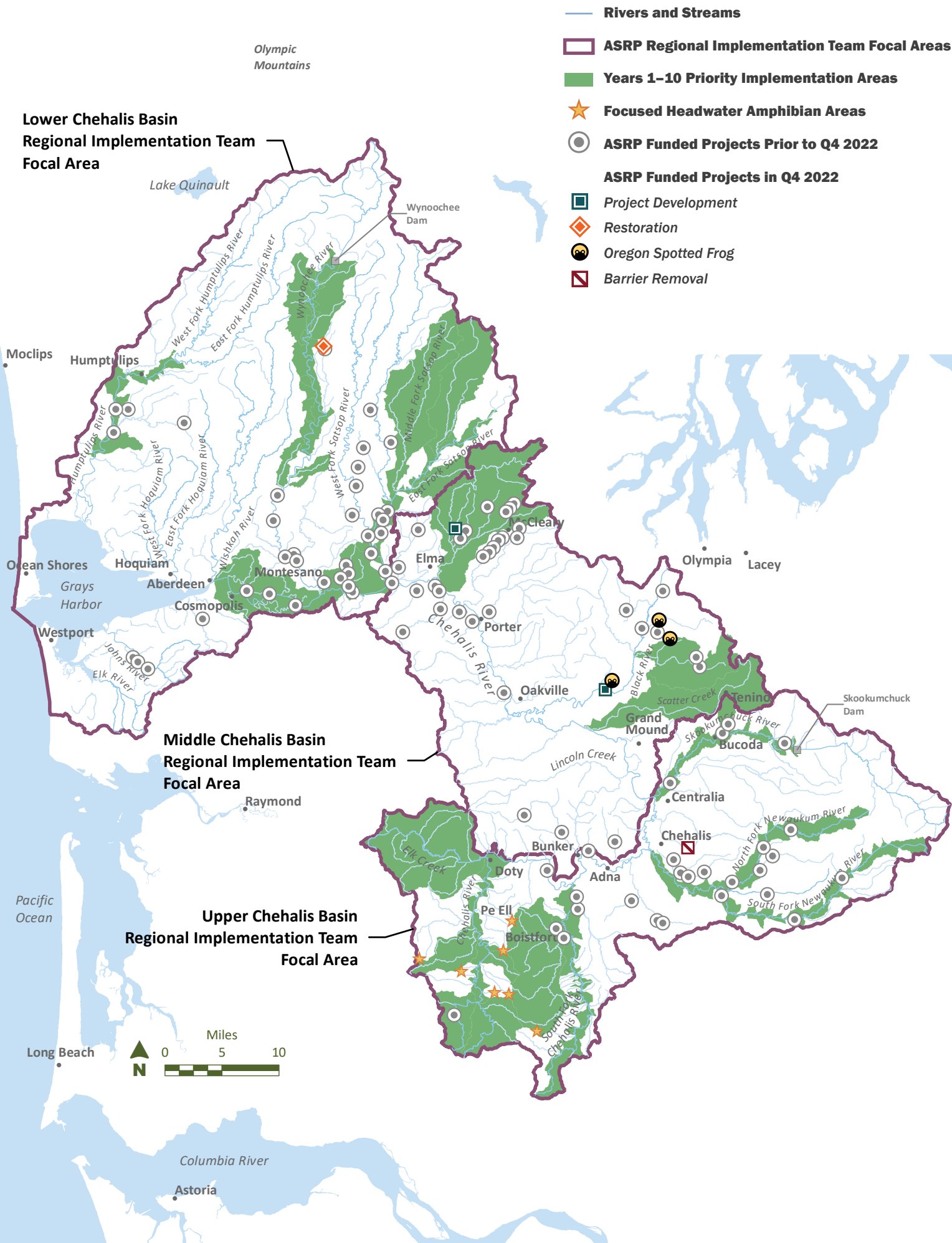




Oregon spotted frog

Aquatic Species Restoration Plan Progress Q4 of 2022

Project Name	Project Type	Description	Location, County	2021-2023 Funding	Sponsor
Grays Harbor County					
Schafer Creek Headwaters Restoration	 Restoration	Installation of post-assisted log structures along river miles 8-9	Schafer Creek	\$200,000	Grays Harbor Conservation District
Cloquallum Project Development	 Project Development	Project development through landowner engagement and developing restoration ideas/options.	Cloquallum Creek sub-basin, Grays Harbor and Mason counties	\$115,658	Ducks Unlimited, Mason Conservation District, Grays Harbor Conservation District
Thurston County					
Allen Creek Oregon Spotted Frog Maintenance and Monitoring	 Oregon Spotted Frog	Invasive species management and hydrologic monitoring of OSF habitat.	Allen Creek, Thurston County	\$19,079	WDFW
Mima Creek Oregon Spotted Frog Maintenance	 Oregon Spotted Frog	Invasive species management to enhance OSF habitat	Mima Creek, Thurston County	\$15,000	WDFW
Salmon Creek Oregon Spotted Frog Maintenance	 Oregon Spotted Frog	Invasive species management and hydrologic monitoring of OSF habitat.	Salmon Creek, Thurston County	\$28,619	WDFW
Oregon Spotted Frog Translocation Project Development	 Oregon Spotted Frog	Project development through habitat assessment, landowner engagement and planning for possible OSF translocation to expand distribution.	Black River sub-basin, Thurston County	\$57,950	WDFW, Thurston Conservation District
Lewis County					
Coal Creek Fish Barrier Removal	 Barrier Removal	Design and construction to remove fish barrier on Coal Creek.	Coal Creek, Lewis County	\$45,000	Trout Unlimited
Total Funding for Projects Listed Here				\$481,306	
Previous Total Funding (2021–2023)				\$14.76 million	
Total Funding to Date				\$58.6 million	



January 2023
Chehalis Basin Strategy
Aquatic Species Restoration Plan
2022 Annual Report

