

Chehalis Basin Strategy

Aquatic Species Restoration Plan



Aquatic Species Restoration Plan Steering Committee
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EXECUTIVE SUMMARY

The Chehalis Basin is a region rich in native wildlife, working lands, and cultural significance that is economically and ecologically vital to the state and region. The basin is one of the only remaining river basins in Washington where no salmon species are listed as threatened or endangered. It is also home to the most diverse assemblage of amphibian species in the state, including Oregon spotted frog (an Endangered Species Act [ESA] threatened species) and numerous other native fish and wildlife species. The 2,700-square-mile Chehalis Basin (Water Resource Inventory Areas 22 and 23) has more than 3,400 miles of identified perennial streams and is the second largest watershed in Washington State. The basin encompasses the Chehalis River and its tributaries, all other tributaries to Grays Harbor (see Figure S-1 at the end of this section), and a large expanse of floodplain habitats with lower levels of development than many other basins in the Pacific Northwest. The fish and aquatic resources of the Chehalis Basin are of regional, national, and international significance to tribal, commercial, and sport fishing interests.

However, the ecosystem has been substantially changed from historical conditions through activities such as removal of wood from rivers, use of splash dams, channel straightening, and removal of riparian forest. These actions contributed to channel incision that disconnected the river from side channels and floodplain wetlands and reduced cover, shading, and aquatic habitat area. After decades of significant degradation of habitat and natural processes from development and land uses, aquatic species face a grave future under the status quo.

The *Aquatic Species Restoration Plan* (ASRP) is a major element of the Chehalis Basin Strategy, an initiative led by the State Office of the Chehalis Basin and overseen by the Chehalis Basin Board. The Quinault Indian Nation, the Confederated Tribes of the Chehalis Reservation, and the Washington Department of Fish and Wildlife have been key co-authors in the ASRP's creation.



Estimates indicate that existing salmon populations are less than half of their historic run sizes, with spring-run Chinook salmon currently just 23% of historic run sizes in the Chehalis Basin (PFMC 2019; Hiss and Knudsen 1993). Sustaining the productivity of native aquatic species will require rebuilding ecosystem resiliency through a network of interconnected habitats. Without aggressive protection and restoration actions, 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 projects devastating effects—for example, the basin’s spring-run Chinook salmon, an important food source for tribal communities as well as for orca whales, could be extinct by the end of the century. This bleak outlook demands urgent attention, but it also presents historic opportunity. By following the roadmap laid out in this *Aquatic Species Restoration Plan* (ASRP), the basin’s aquatic species and habitats can be restored and protected now to help ensure a resilient, flourishing basin into the future. The Chehalis Basin holds great promise when compared to other regions in the state where more significant degradation and ESA listings have already occurred and population and development pressures are greater. Opportunity still exists to avoid more intensive regulatory-driven recovery measures and act on our stewardship responsibilities in the Chehalis Basin to ensure a brighter future for native salmon and aquatic species, along with the communities who depend on and benefit from them.

An aggressive, sustained level of commitment and action will be required to restore the basin’s habitats. The ASRP portrays a comprehensive analysis of necessary actions, which is based on a quantity and quality of coordinated scientific

“Our Chehalis culture is inseparably linked to the Chehalis River, which we call *nsúlaps̓*, which translates literally to ‘my river of wealth.’ The abundance provided by this watershed has fed our people and shaped our lifeways since a time beyond the reach of memory. Protecting and enhancing the aquatic resources of the Chehalis Basin must be vigorously pursued to preserve the river for the benefit of all citizens and future generations. The Confederated Tribes of the Chehalis Reservation support the immediate and comprehensive restoration efforts described in the *Aquatic Species Restoration Plan* and look forward to a future of a healthy, sustainable watershed.”

—Harry Pickernell, Chairman, Confederated Tribes of the Chehalis Reservation

“The lower Chehalis River and its estuary make up the most important economic waterway for Quinault fishermen. The ambitious scale and generational perspective of the ASRP truly matches the uphill battle we face in rebuilding our sacred salmon runs. We appreciate the commitment and look forward to working with the state and other leaders across the Basin to see it come to fruition.”

—Tyson Johnston, Vice-President, Quinault Indian Nation

analysis unprecedented anywhere in Washington. It provides a detailed, science-based roadmap for restoring habitat and protecting intact ecosystems of aquatic species along the rivers and streams in the Chehalis Basin. The actions identified through the ASRP chart a course toward the best chance to support healthy and harvestable salmon populations, robust and diverse populations of native aquatic and semi-aquatic species, and productive ecosystems that are more resilient to climate change and human-caused stressors.

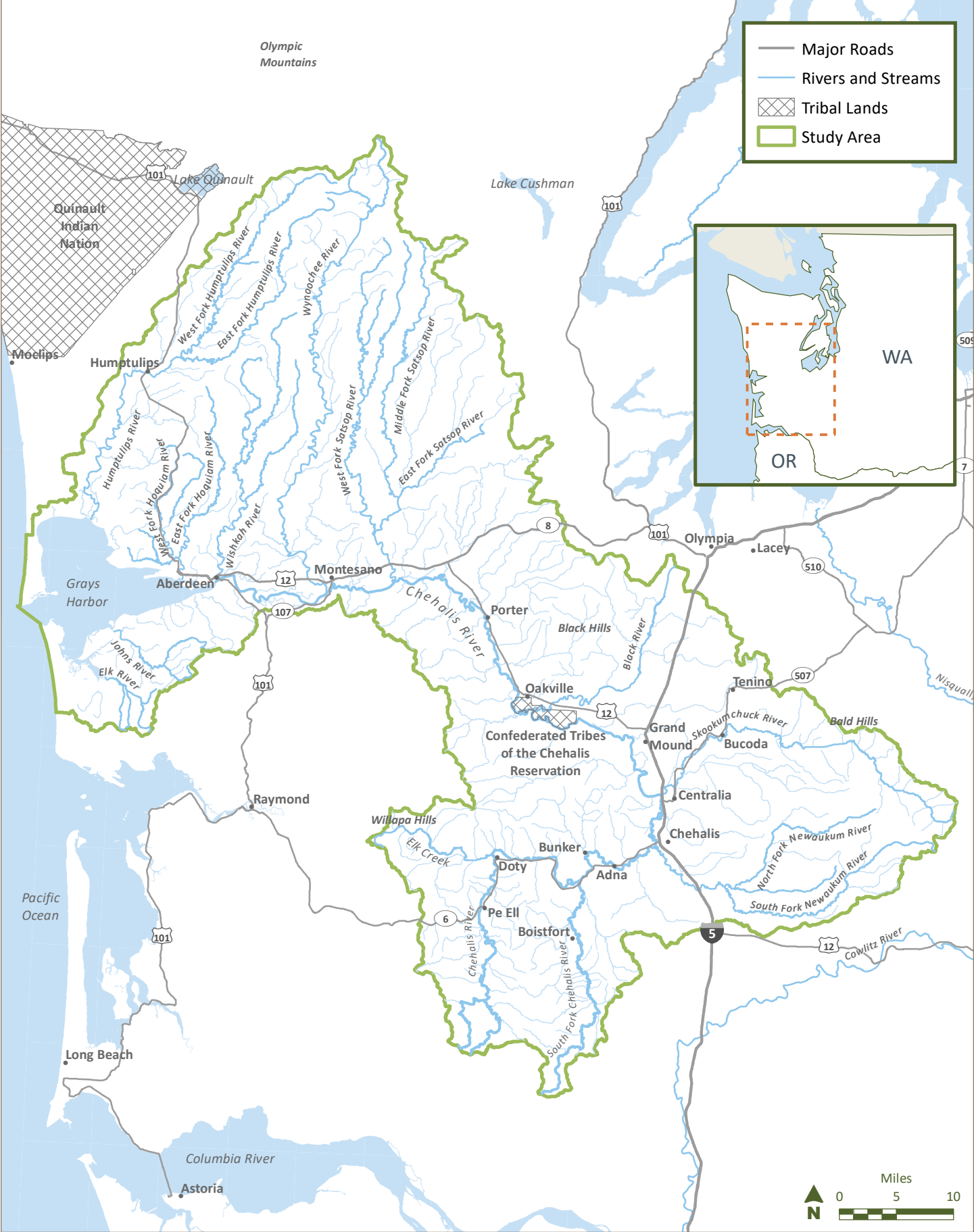
Collectively, the ASRP strives to honor the social, economic, and cultural values of the region and maintain working lands. The importance of community involvement in the ASRP cannot be overstated—most of the actions proposed in the ASRP would occur on private land, and the program relies on landowners willing to collaborate in this important undertaking to be successful. The prospect for recovery is highly achievable in the Chehalis Basin, largely because much of the land use is still rural agriculture and working forest lands and the basin does not yet have highly developed, sprawling urban centers (as is the case in other regions of the state).

The scope of the ASRP focuses on taking action where the greatest potential exists to provide substantial gains for aquatic species, while recognizing the dynamic uncertainties of external factors such as estuary, ocean, hatchery, harvest, invasive species, and climate change conditions. The ASRP honors existing community values, builds on previous actions to protect and restore basin habitat and ecological processes, and complements investments the state has already made in aquatic species habitat restoration and protection.

“The Chehalis River and its tributaries provides for culturally and economically important commercial, sport and tribal fisheries. The technical work over the last seven years has moved the basin from data poor to a much richer understanding of the ecological processes, aquatic species, and means to reduce flood damage.”

—Kelly Susewind, Director, Washington
Department of Fish and Wildlife

Figure S-1
Chehalis Basin

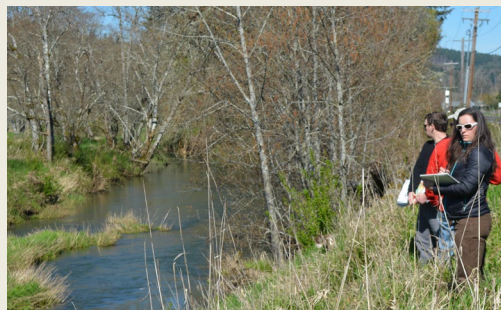


Aquatic Species Restoration Plan Development

The Quinault Indian Nation, the Confederated Tribes of the Chehalis Reservation, and the Washington Department of Fish and Wildlife have worked together with farmers, foresters, conservationists, other state agencies, local governments, and local landowners to understand opportunities and challenges and to inform the development of this plan.

The ASRP is being developed as a major component of the Chehalis Basin Strategy through a collaborative, sustained effort in three phases. This ASRP Phase 1 document illustrates what is known about the basin, explores what the program could achieve under different scenarios (or levels of effort), and presents estimated costs for each scenario. The document analyzes each of the basin's ecological regions (see Section 5), identifies geographic priorities for action, conducts modeling of expected outcomes, and refines prior outcome and investment estimates. The ASRP co-authors and the Chehalis Basin Board will use feedback received from stakeholders and the public on this ASRP Phase 1 document to inform the next phases of plan development.

Phase 2 of the ASRP includes detailed science and policy work to refine the priorities for sequencing specific projects and actions, refine cost estimates, develop a full Monitoring and Adaptive Management (M&AM) Plan, and coordinate the ASRP with other elements of the Chehalis Basin Strategy. Continued involvement by local groups and implementing parties will be needed as the ASRP continues to build strategies for successful implementation—including landowner participation, project planning, and project evaluation processes. The Chehalis Basin Board will then engage in a public process with tribes, local and state government agencies, the broader basin



Bottom photo credit: Kasia Pierzga

community, and other interested stakeholders to ultimately recommend a long-term Chehalis Basin Strategy to the Washington State Legislature. This long-term strategy will include a refined Phase 3 ASRP, which will outline desired outcomes and the associated level of investment needed to achieve those outcomes, along with the Board's recommended flood damage reduction actions. The Board's recommended long-term strategy is anticipated in late 2020.

Development of Strategies and Actions

A key element necessary for developing a restoration plan is to strategically prioritize essential actions, including where and when those actions should occur to provide the greatest short-term and long-term habitat benefits. To support the prioritization process, the basin was examined as 10 ecological regions based on underlying geology, topography, climate and hydrologic regime, and channel characteristics. The strategic prioritization was informed by the following:

- Recent scientific studies, mapping, and fish passage barrier assessments
- Current and historical knowledge and expertise from Chehalis Basin scientists and practitioners
- Pertinent historical data and mapping for the Chehalis Basin
- The Ecosystem Diagnosis and Treatment (EDT) salmon habitat model
- Baseline information from the National Oceanic and Atmospheric Administration (NOAA) salmonid life-cycle model
- On-the-ground observations and analyses by the ASRP Science and Technical Review Team
- Chehalis Basin-specific climate change modeling projections

The prioritization process identified areas within each of the basin's ecological regions with the best opportunities to protect and improve species performance and increase spatial distribution and diversity of species. This Phase 1 document provides projections of conditions the ASRP could achieve under three additive restoration scenarios (see Figure S-2), which were built from the prioritization process, along with estimated costs for each scenario. The scenarios were built on the following key themes toward sustained, long-term restoration of vital ecosystem functions:

- Scenario 1 protects and enhances existing core habitats for all aquatic species. It protects and restores more than 200 miles of river/stream habitat; corrects 200 fish passage barriers, improving access to approximately 200 miles of river/tributary habitat; and restores more than 9,000 acres of riparian and floodplain habitats.
- Scenario 2 builds on Scenario 1 to protect and enhance existing core habitat areas, with the additional focus of restoring the best opportunities to benefit multiple species and increase spatial distribution. Adding more enhancement opportunities, this scenario protects and restores more than 300 miles of river/stream habitat; corrects 300 fish passage barriers, improving access to more than 300 miles of river/tributary habitat; and restores more than 10,200 acres of riparian and floodplain habitats.

- Scenario 3 builds on Scenario 2, with an added focus of increasing spatial and life history diversity and distribution of species throughout more of the basin. It protects and restores 450 miles of river/stream habitats; corrects 450 fish passage barriers, improving access to more than 400 miles of river/tributary habitat; and restores more than 15,300 acres of riparian and floodplain habitats.

Each scenario will restore impaired ecosystem processes and protect high functioning areas by targeting the following:

- Riparian forested areas that can provide the large wood, nutrients, shading and cooling, stream bank protection, and fish and wildlife migration corridors needed by aquatic species
- Floodplain and off-channel habitats and wetlands that will improve watershed connectivity, water storage and exchange to augment low flows and reduce water temperatures, and highly diverse fish and wildlife habitat
- In-channel large wood restoration to increase cover and roughness, decrease channel incision, retain and sort sediments, create deep pools, and improve channel complexity and floodplain connectivity in strategic locations
- Correction of selected fish passage barriers to improve access to upstream habitats

To understand the potential benefits of conducting restoration, the three scenarios were compared to two baseline conditions: 1) a Base scenario, which reflects current conditions throughout the basin; and 2) a No Action scenario, which represents projected future conditions without the ASRP, based on modeling. The modeled No Action scenario accounts for potential negative effects from climate change and development pressures, as well as anticipated positive effects from the maturation of riparian forests within managed forest lands¹ as presently required under the Washington Forest Practices Act. The three restoration scenarios also incorporate the assumptions listed in this section and apply differing levels of restoration and protection actions. To evaluate potential future conditions, mid-century (approximately 2040) and late century (approximately 2080) conditions were selected for comparison based on available climate projections.

In addition to outlining and evaluating the three restoration scenarios, this ASRP Phase 1 document identifies strategies and the types of actions needed to protect unique habitats and strategic areas that support critical ecosystem functions and native species. It also outlines approaches for basin communities to more effectively plan for current and future conditions, and it discusses strategies needed to engage landowners and local governments to ensure support and implementation of the ASRP actions. The magnitude of proposed actions relies on community support through effective land use planning protections and landowner participation to be successful. Finally, this ASRP Phase 1 document identifies potential ways to build the institutional capacity of existing organizations to ensure the ASRP is truly a community-based restoration, protection, and planning program.

¹ "Managed forest lands" are defined as lands outside of federal management that are more than 80 contiguous forested acres. Managed forest lands include publicly and privately managed forest lands, most of which fall under the Washington Forest Practices Act and Habitat Conservation Plans. Most of the areas outside of managed forest lands are downstream of the publicly and privately managed forest lands.

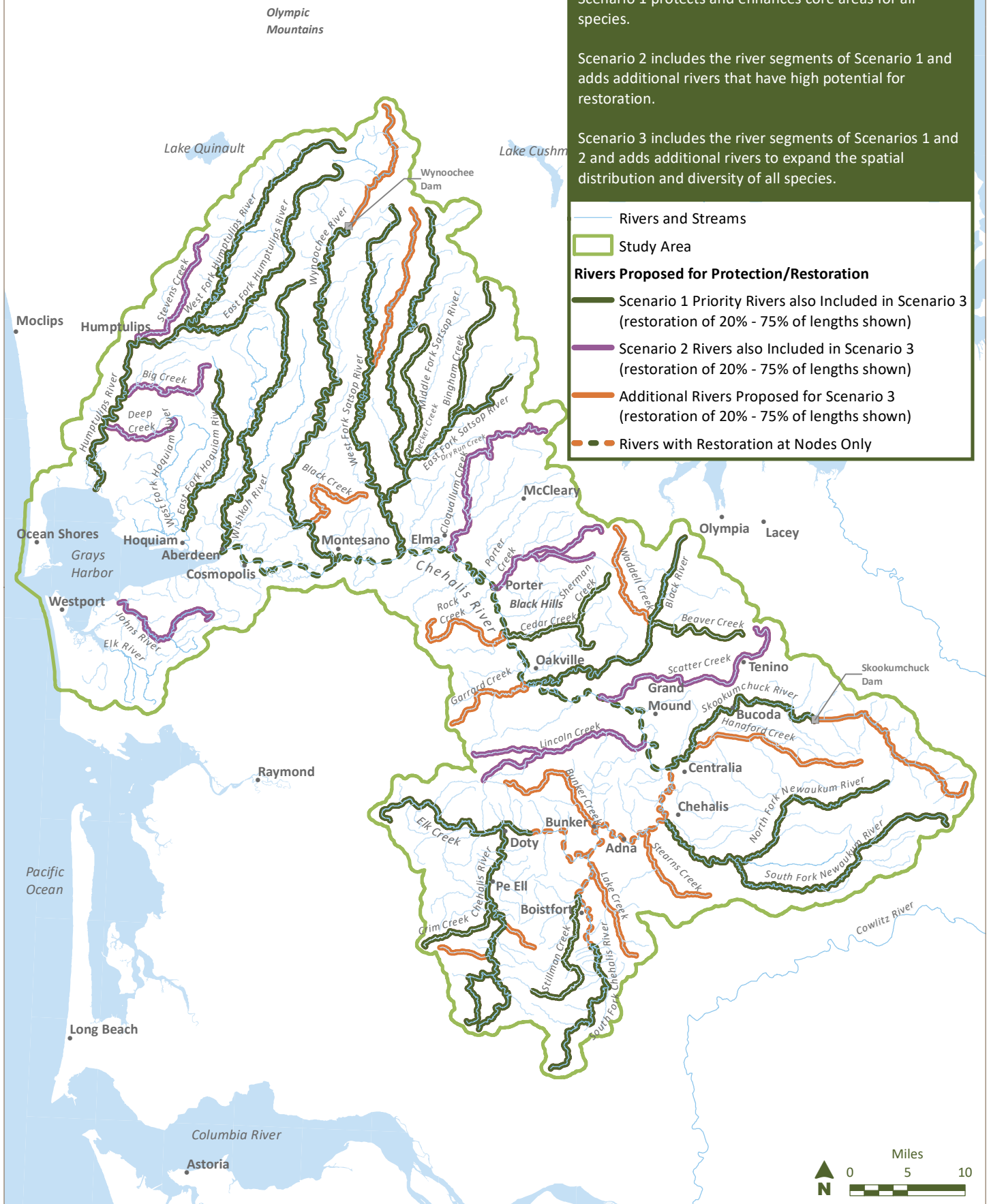
Figure S-2
Summary of Rivers Included in ASRP Protection and Restoration Scenarios

Scenario 1 protects and enhances core areas for all species.

Scenario 2 includes the river segments of Scenario 1 and adds additional rivers that have high potential for restoration.

Scenario 3 includes the river segments of Scenarios 1 and 2 and adds additional rivers to expand the spatial distribution and diversity of all species.

- Rivers and Streams
- Study Area
- Rivers Proposed for Protection/Restoration**
- Scenario 1 Priority Rivers also Included in Scenario 3 (restoration of 20% - 75% of lengths shown)
 - Scenario 2 Rivers also Included in Scenario 3 (restoration of 20% - 75% of lengths shown)
 - Additional Rivers Proposed for Scenario 3 (restoration of 20% - 75% of lengths shown)
 - Rivers with Restoration at Nodes Only



Expected Outcomes and Associated Costs

The ASRP development process has included a detailed analysis and modeling of potential climate impacts at the watershed level. If no action is taken, model results project that anticipated future climate change and habitat degradation will lead to substantial declines for all salmon and steelhead species. The effects of climate change and habitat degradation will also have similar negative effects on the suite of amphibian species. The effects are especially sobering for spring-run Chinook salmon, which are anticipated to decline to the point of becoming functionally extinct by 2080. The projected declines in salmon species are so extensive that even substantial restoration scenarios are projected to result in only modest gains (see summary in Figure S-3). These declining baseline model results point to a dire future for species in the basin unless unprecedented, aggressive action is taken immediately to reverse the trajectory for salmon and other aquatic species. The longer we wait, the harder it will be.

Understanding Expected Outcomes

It is important to note that the modeled outcomes assume all ASRP actions are implemented immediately. Implementation will take two or more decades, so additional actions may be necessary to achieve desired outcomes. If habitat conditions degrade from present-day conditions due to human activities and/or climate change impacts before ASRP implementation, the expected outcomes of ASRP actions will be reduced.

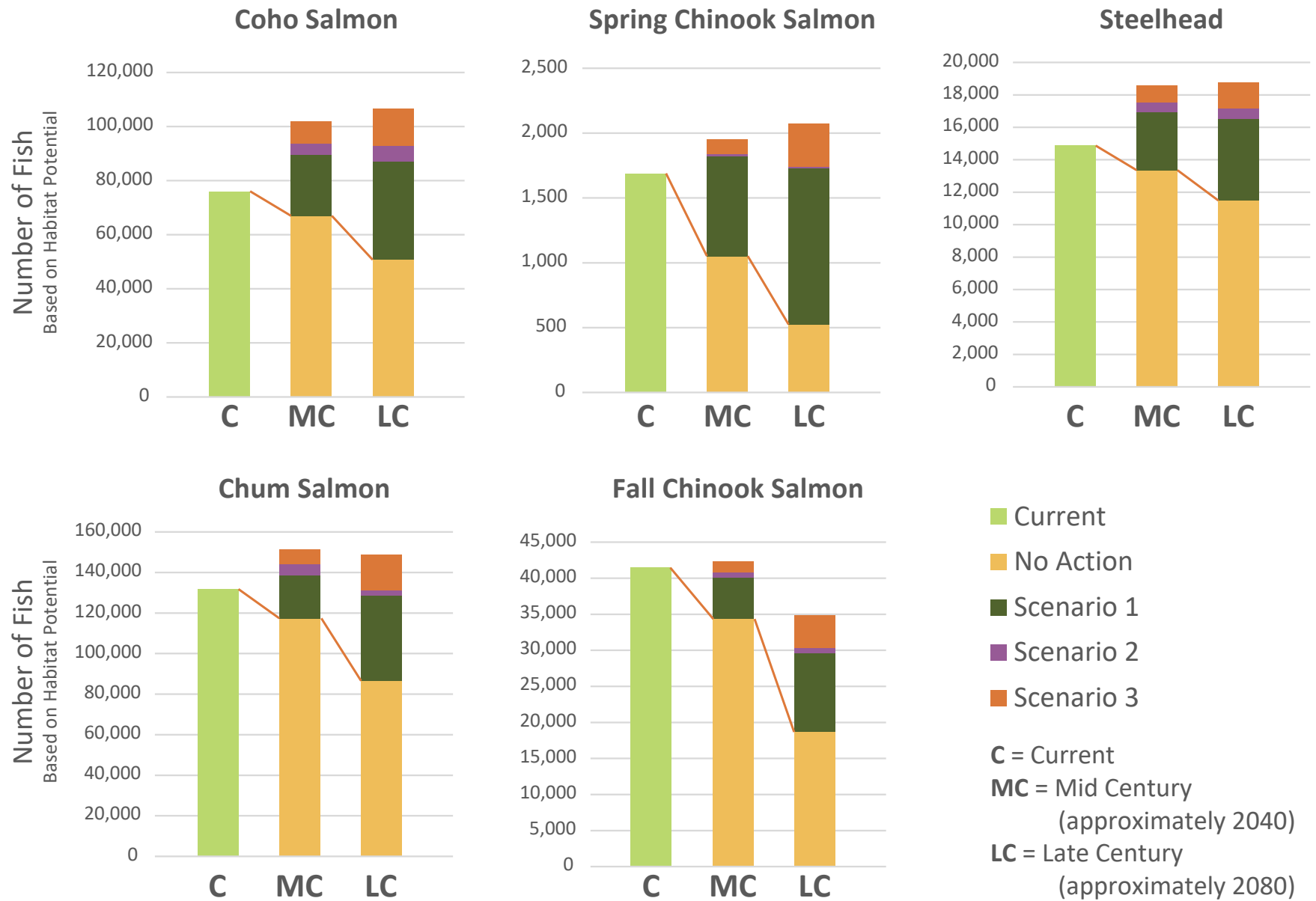
Uncertainties and variability of fish population modeling results are discussed further in Section 7.3. Population estimates are based on habitat potential—the amount of fish the improved habitat could support—and not actual run sizes. They should not be interpreted as a guarantee of the number of fish that will be produced in, or return to, the basin.

Implementing Scenario 1 would generally halt the species declines that are projected to occur from climate change in the mid-century time frame. Compared to the No Action scenario, Scenario 1 would provide substantial gains to salmon and steelhead by both mid-century and late century.

Scenario 2 would provide modest additional benefits beyond the Scenario 1 projections and focuses on important smaller sub-basins that historically produced healthy runs of coho salmon, chum salmon, and steelhead. In addition, Scenario 2 targets geographic areas that could provide significant available quality habitat for amphibian species, which is not illustrated in these modeling results.

Scenario 3 would provide more substantial habitat gains above both Scenarios 1 and 2 and also expands spatial diversity (or distribution of local populations) for coho salmon, spring- and fall-run Chinook salmon, and steelhead into more geographic areas of the basin. Scenario 3 is the only scenario that would significantly increase ecosystem resiliency, therefore reducing the risk of functional extinction for any localized population. Similar to reducing the risk of loss by diversifying a stock portfolio, enabling species to be distributed more broadly throughout the basin through Scenario 3 would reduce the extinction risk to any one localized population.

Figure S-3
Expected Outcomes for Salmon



Species Population Response

Strategies and actions proposed in this phase of the ASRP would restore and protect vital habitat and impaired processes throughout the basin. Analysis of the impact of restoration scenarios on salmon and steelhead indicates that restoration could have a substantial and tangible benefit over no action (see Figure S-3). The ability to positively affect salmon and steelhead depends, in part, on the investment in restoration and protection of their habitats.

The outcomes for aquatic species other than salmonids have not been quantified to the same extent at this time because much less information exists about these species. The restoration and protection actions in this ASRP Phase 1 document are likely to result in substantial positive outcomes for the range of potential aquatic indicator species within the ASRP. Further recommendations for other native aquatic species will be developed in the next phases of the ASRP.

Cost Estimates

Cost estimates have been developed for the three scenarios and additional investments needed to ensure a resilient future for the Chehalis Basin. The combination of sustained aggressive funding, basin-wide landowner willingness, large-scale political support, and committed implementation are vital to the success of this plan. The cost estimates for the restoration scenarios range from a low of \$300 million to \$600 million for Scenario 1 to a high of \$550 million to \$1.1 billion for Scenario 3. These estimates include costs associated with protection of existing habitat conditions from human activities, removal of fish passage barriers, placement of large wood and logjams in stream channels, planting native trees and shrubs in riparian zones, reconnecting side channels and wetlands, and restoring floodplain habitats for aquatic species.

The biggest contributor to the cost estimates is the construction of riparian and floodplain habitats as outlined in Section 8. Funding the restoration and protection actions at the scales proposed would directly address the most significant limiting factors for aquatic species in sub-basins throughout the Chehalis Basin. In addition to costs associated with riparian and instream restoration and protection, estimates include costs for land use planning and process protection strategies, community involvement actions, and ongoing operations and maintenance. The sustained and holistic funding and implementation of the ASRP is a long-term investment in the communities of the Chehalis Basin.

A real potential exists for significantly improving wild salmon runs and other aquatic species in the Chehalis Basin—improvements that will be resilient to the threats of climate change and deliver sustainable ecological services and other cultural and economic benefits to the basin and its residents.



Following review of this document, additional analysis will occur to develop a refined ASRP scenario that can be selected by the Chehalis Basin Board to be carried forward as a final plan. In addition, further refinements to actions, outcomes, and costs will be provided; a detailed implementation and sequencing plan will be developed; and efficiencies between projects will be identified.

Through the strategies documented in this plan, the ASRP provides a detailed, science-based roadmap for restoring habitat and protecting unique ecosystem features for aquatic species along the rivers and streams in the Chehalis Basin—areas where climate change and habitat degradation pose grave risks to the native species that depend on the freshwater environment. The ASRP is a historic opportunity to reverse the alarming trends of decline by using a collaborative, community-driven, science-based approach. When implemented, the ASRP will protect and restore ecosystem resiliency throughout the Chehalis Basin, now and into the future. Through aggressive investment, landowner participation, sustained political commitment, and community planning, the ASRP can not only halt the decline of native species—it can also build a resilient ecosystem that sustains aquatic species for future generations.