Lower Columbia Estuary Partnership

Comprehensive Conservation and Management Plan 2025 Update

The Lower Columbia Estuary Partnership is a National Estuary Program administered by the U.S. Environmental Protection Agency and supported by the States of Oregon and Washington and the U.S. Congress.

Our Mission:

To restore and care for the waters and ecosystems of the Lower Columbia River, for current and future generations of fish, wildlife, and people.

Contents

Introduction

In 1987, Congress created the National Estuary Program (NEP) to protect and restore estuaries around the nation that are important because of their economic, environmental, and cultural significance. The authorizing language in Section 320 of the Clean Water Act requires that NEPs be locally driven, cross political boundaries, involve diverse interests, and use science to get actions on-the-ground that improve the nation's significant estuaries. The authorizing language requires that NEPs be locally driven, cross political boundaries, involve diverse interests, and use science to get actions on-the-ground that improve the nation's significant estuaries. NEPs support and expand local efforts, such as by securing additional resources for the region. NEPs also empower community members from all sectors to engage, take responsibility for improving their estuary, and be accountable to future generations. The National Estuary Program focuses on improving water quality and maintaining the integrity of the whole system: its chemical, physical, and biological properties, as well as its economic, recreational, and aesthetic values. An NEP is not a single program or the staff of an agency or organization; instead, it is a regional, community-based collaboration made up of many partners, interests, and perspectives.

NEPs must:

- Create a governing structure that is inclusive, with stakeholders guiding decision-making.
- Collect and assess scientific information about the conditions of the water body.
- Develop a Comprehensive Conservation and Management Plan (Management Plan) that summarizes the ecosystem conditions and problems and identifies actions to address those problems.
- Implement the Management Plan as a regional collaboration, adapting the plan as progress is made or new information emerges.

In establishing the lower Columbia NEP in 1995, the U.S. EPA and governors of Washington and Oregon created a regional entity of public and private stakeholders to act as a coordinator and convener, to advance scientific understanding, and to get on-the-ground results for the lower Columbia River and estuary. They saw a need for a force that could increase integration and coordination. The Lower Columbia Estuary Partnership, referred to as the Estuary Partnership going forward, has operated as a nonprofit corporation since 1999, with a Board of Directors that represents the diverse interests and geography of the study area. This includes the tidally influenced portion of the Columbia River, which extends 146 miles from Bonneville Dam to the Pacific Ocean in Oregon and Washington. The Estuary Partnership Science Work Group includes more than 60 core technical experts from the public and private sectors who guide Estuary Partnership ecosystem restoration, monitoring, research, and toxic reduction activities. The Estuary Partnership works with a large body of educators and other partners to guide us in our environmental education work. We also aid many local governments, nonprofits, and others in their efforts to improve the lower river. By coordinating regional resources and expertise, we help streamline activities, get results on the ground, and unify the region.

Estuary Partnership Mission

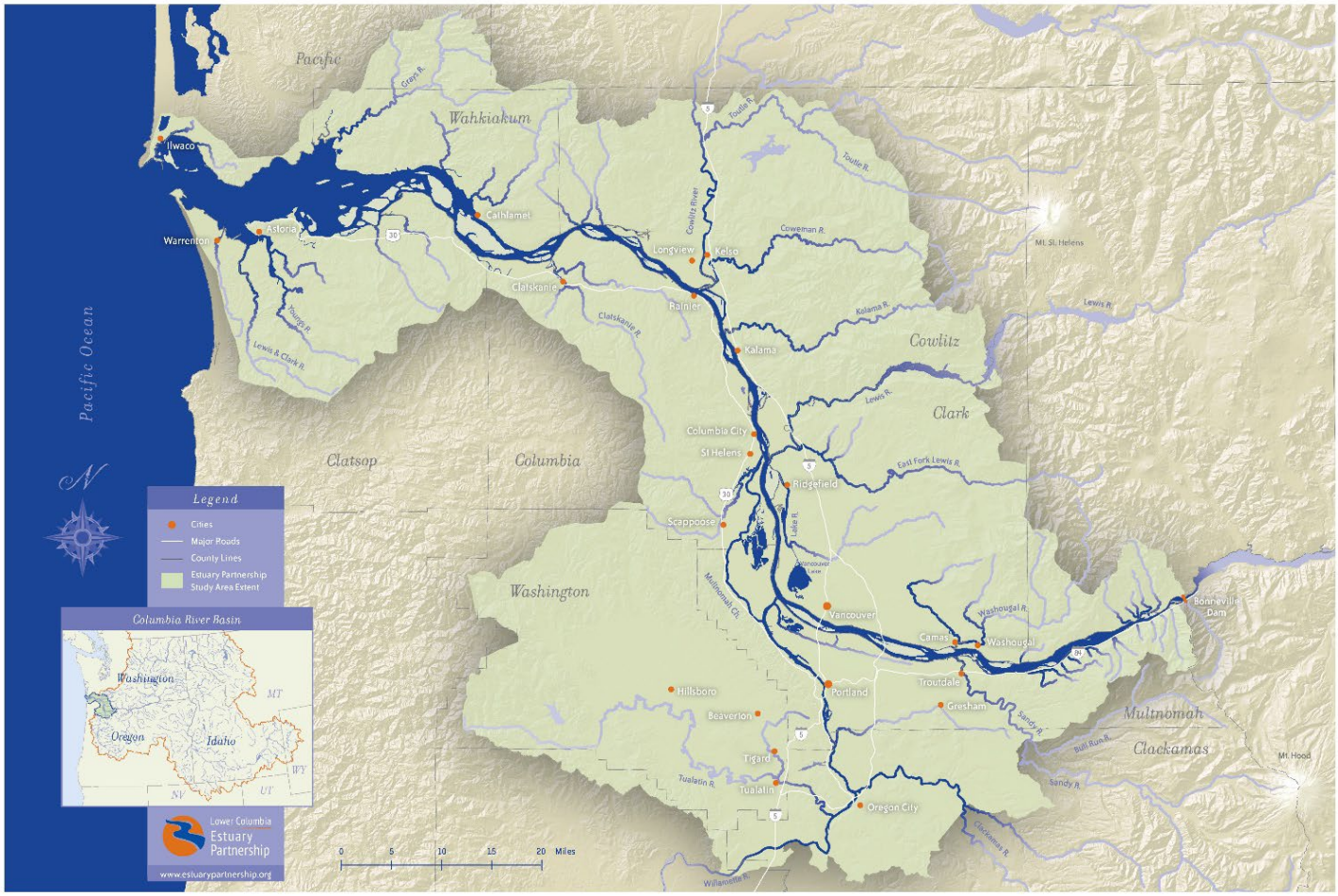
The mission of the Estuary Partnership is to restore and care for the waters and ecosystems of the lower Columbia River, for current and future generations of fish, wildlife, and people. Our primary goals are to foster stewardship, provide objective scientific information, increase resiliency for the benefit of the river and those who depend on it, and facilitate consensus regarding regional goals to protect the lower Columbia River and estuary. The Estuary Partnership builds on current efforts, provides a regional framework for

action, develops new tools, and fills gaps in scientific understanding and planning, restoration, green stormwater infrastructure, and educational activities. Our on-the-ground approach is to restore habitat while advancing science, to improve river conditions as we learn from the effectiveness of our actions and the condition of habitats, to work with communities and partners to address the impacts of recurring extreme weather, and to expand the knowledge and experiences of the next generation of decision makers.

Geographic Area

The Estuary Partnership's area of study reflects the broader definition of estuary from the Clean Water Act to include tidally influenced waters of rivers. The Estuary Partnership study area extends from the Pacific Ocean to Bonneville Dam, at river mile 146, in recognition of the far-reaching effects of the ocean's tides. It also includes the near-coastal waters from the mouth of the Columbia out three miles, to the extent those waters are influenced by the plume of fresh water flowing out of the Columbia River, as well as tributaries of the Columbia to the extent of historic tidal influence. The study area covers approximately 4,300 square miles and contains a wide variety of habitats associated with marine, estuarine, and freshwater influences.

Lower Columbia Estuary Partnership Study Area



Comprehensive Conservation and Management Plan

The Estuary Partnership Management Plan was originally developed from 1996 to 1999 using the extensive scientific research and analysis developed by the Estuary Partnership's predecessor, the Bi-State Water Quality Program, and other contemporary and historical data.[1] The management committee that developed the Management Plan was composed of 34 representatives of various river interests and used extensive and innovative constituent and public input to ensure that the Management Plan met local needs, represented local and regional values, and was supported by local communities and people. The Management Plan identified 43 actions, complete with environmental goals and objectives, to address ***seven priority issues***:

- biological integrity
- habitat loss and modification
- impacts from human activity
- conventional pollutants
- toxic contaminants
- institutional constraints
- public awareness and stewardship

The seven priority issues are interrelated. The Estuary Partnership's fundamental goal is to achieve a high level of biological integrity for the lower Columbia River and estuary. That integrity has been degraded by human activity and growth over the last hundred plus years. The degradation is evidenced by habitat loss and modification, conventional pollutants (such as elevated temperature, increased dissolved gas, bacteria, and sediment), and toxic contaminants in fish tissue and sediments. Institutional constraints from multiple jurisdictions and lack of public awareness and stewardship make protection of the river challenging.

The Estuary Partnership's Management Plan was the first regional, two-state plan that articulated the estuary's importance and identified a set of actions to address ecosystem degradation. The plan considers individual species and conditions within the context of the whole ecosystem. It guides the region in knitting together disparate efforts so that together we make the most cost-effective investments in the lower river and estuary.

The Management Plan continues to serve as the governing document for the Estuary Partnership; the actions contained in Chapter 5 are the heart of the Management Plan. It is a long-range plan and many actions need to be sustained to ensure the long-term health of the ecosystem. In 1999, EPA and the governors of Oregon and Washington signed an implementation agreement endorsing the Estuary Partnership's Management Plan and committed to its implementation. The Estuary Partnership began implementing the 43 actions in 1999. In 2000, the governors asked the Estuary Partnership to convene a policy-level committee to coordinate responses among federal, state, and local entities to the recovery of threatened and endangered species. The organization worked with the Northwest Power and Conservation Council and NOAA to align their fish and wildlife planning and recovery efforts to ensure consistency, and to produce their plans. In 2010, the governors and EPA signed a second agreement, recommitting them and the region to the Estuary Partnership and the Management Plan.

Management Plan Updates

The Estuary Partnership Board of Directors has updated specific actions, Chapter 5 of the 1999 Management Plan, three times. In 2001, the Estuary Partnership aligned its restoration goals with the 2000 Biological Opinion. In 2009, the organization set a new target for habitat restoration when the region reached the first goal of 16,000 acres. In 2011 a more substantive update of the actions was undertaken to recognize the experience gained in implementing the Management Plan over the preceding twelve years.

[1] The Management Plan is available at *www.estuarypartnership.org*, (formerly *www.lcrep.org*) along with a description of how it was developed.

In 2022, the Board of Directors initiated a subsequent update of the actions to incorporate the increased knowledge gained from nearly three decades of implementing the Management Plan, to recognize the work of partners, and to incorporate emerging science. As in 2011, the Estuary Partnership met some intermediate goals, partners have advanced their activities in several areas, and the organization has learned a great deal more about the lower Columbia River ecosystem. The Estuary Partnership has had almost thirty years to develop the Lower Columbia Estuary Partnership National Estuary Program, establishing a program office, building capacity, developing partnerships, identifying niches, and making on-the-ground improvements.

The overall goals and focus of the 1999 plan and subsequent updates have not changed, and the Estuary Partnership acknowledges that it is far from finished restoring adequate habitat for species survival or removing pollutants. The science and knowledge we have gained in the past two plus decades do not change the objectives or direction of the original plan. Since 2011, many regional plans have been developed that continue to support and build on the objectives of the Management Plan. Among them are the Northwest Power and Conservation Council's Fish and Wildlife Program Plan[2], NOAA Fisheries Estuary Recovery Plan Module[3], EPA's 2022-2026 strategic plan[4], Washington and Oregon's salmon recovery plans, the 2020 Columbia River System Operations Environmental Impact Statement and Record of Decision[5], and many others. Like the Estuary Partnership Management Plan, these plans all call for reducing the effect of the hydro system, restoring habitat, addressing toxic contaminants, slowing the introduction of non-native invasive species, and managing uncertainty. In addition to the substantial body of work being accomplished regionally, the Estuary Partnership has completed plans that guide how we complete our work and how we think about our place in the region, including our Strategic Direction[6].

In addition to the many plans that address the lower Columbia and larger Columbia River Basin, the Estuary Partnership and our partners have completed assessments and research that will inform the current Update as well as our work in the future. These assessments include the sea level rise interactive mapping tool that is available on the Estuary Partnership website[7], the Estuary Partnership's Cold Water Refuge Study[8].

The 2011 Update of the actions recognized the integrity of previous research and planning and sought to streamline the actions. The result of the 2011 Update was a set of 17 actions that provided concise direction for the region and provided specific targets. The goals of the original Management Plan and the 2011 Update continue to require extensive collaboration and synergy. The format and approach to the actions in the 2011 Update provided a clear and easy to follow format for identifying and presenting a complex set of actions and targets; we will continue to utilize this same format while amplifying the objectives of this 2025 Update, which are:

1. Assess the current actions for their relevancy and consideration of recurring extreme weather events on the estuary, vulnerable communities, access, recreation, and community education.
2. Update measures and provide updated targets where appropriate.
3. Integrate updated habitat restoration targets and ensure the Update reflects our learning and progress from 30 years of work.

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[2] https://www.nwcouncil.org/reports/2014-columbia-river-basin-fish-and-wildlife-program/
[3] https://www.fisheries.noaa.gov/resource/document/columbia-river-estuary-esa-recovery-plan-module-salmon-and-steelhead
[4] https://www.epa.gov/system/files/documents/2022-03/fy-2022-2026-epa-strategic-plan.pdf
[5] https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll7/id/16248
[6] https://www.estuarypartnership.org/who-we-are/strategic-direction-2022-2025
[7] https://lcep.maps.arcgis.com/apps/webappviewer/index.html?id=90de906767444d3b97cebf7491c1d74d
[8] https://www.estuarypartnership.org/sites/default/files/resource_files/LCEP%20Lower%20Columbia%20Thermal%20Refuge%20Report%20FINAL_small.pdf

4. Update actions and integrate measures that are informed by the identification and assessment of vulnerabilities in the estuary including the Estuary Partnership's assessments[9] of sea level rise, cold water refuges, and carbon and methane fluxes.

Progress Since 2011

Here's a look at our efforts since the 2011 Update of the Management Plan. While the Estuary Partnership is responsible for reporting on the efforts and accomplishments contained in this Comprehensive Conservation and Management Plan, the work is accomplished by local, state, regional, tribal, and federal agencies and partners, communities, students, and volunteers. Below are some of the highlights from what was accomplished since 2011; there is no way to list all that has been accomplished by the Estuary Partnership and partner efforts.

Habitat Restoration

- Completed the largest habitat restoration project to date on the lower Columbia River at Steigerwald Lake National Wildlife Refuge. The 965-acre collaborative project reconnected the floodplain to the Columbia; reduced flood risk from Gibbons Creek to Washington State Route 14, the Port of Camas-Washougal, and the neighboring community; created 115 acres of new wetlands; planted over 700,000 native trees and shrubs,14,000 pounds of native seeds, and 2,000 wapato tubers—an important first food source for local Tribes; and created a new trail system. The Steigerwald Reconnection Project generated 550 local family wage jobs and brought thousands of local students and volunteers to the site.
- Secured funding and completed designs for a 3-river mile floodplain restoration project on the East Fork Lewis River.
- Since 2000, the Estuary Partnership has completed 84 projects to restore or protect 5,149 acres and opened more than 83.7 miles of stream habitat. Combining this work with the work of partners throughout the lower Columbia, more than 38,861 acres have been restored or protected in 336 completed projects.

Water Quality and Toxics Reduction

- Completed annual ecosystem conditions monitoring at five minimally disturbed tidal wetland sites to track habitat, fish, and food web condition trends; provide reference sites for habitat restoration projects; and analyze the impact of management actions on the broader lower Columbia ecosystem.
- Continued the collection of data before and after management actions to better understand the impact of habitat restoration activities on site ecology and the trajectory of its recovery.
- Completed annual water quality monitoring at thirteen sites in Columbia County, Oregon, since 2017. This long-term water quality monitoring project is used by local policy makers and public health officials to set priorities and address water quality issues in a quickly urbanizing environment.
- Developed and completed a marine debris survey of 75 miles of the shoreline along Multnomah Channel, Sauvie Island, and Portland Harbor. Completed a clean-up of the surveyed area that included removal of more than 200 tires, 6,840 pounds of mixed garbage, 2,460 pounds of metal, and one 20-yard drop box of Styrofoam.

Science

- Completed an analysis and report on cold water refuges in the lower river and an exploration of techniques to create protected pockets of cold water at tributary confluences.

[9] https://estuarypartnership.sharepoint.com/:b:/g/EWvUXoptTYtErjLLxztOxKABnx-6JESWUEE3KAhk6odOKw?e=OzrTR6

- Completed an analysis, report, and mapping of potential sea level rise scenarios as well as potential future loss of habitats from coastal squeeze in the lower Columbia[10].
- Incorporated the use of unpersonned autonomous vehicles (UAVs or drones) and multiple sensors into research and monitoring programs.
- Working with partners and community members, completed a comprehensive, community-based, flooding and weather resilience planning process in Southwest Washington's Baker and Grays bays which resulted in the creation of a Resilience Plan and further, locally led projects to identify and implement resilience projects.
- Initiated and completed the initial three years of a multiple year project to collect data, analyze, and quantify the capacity for different wetland habitat types to sequester carbon for emissions reduction potential.
- Completed annual collection of biomass detrital flux multiple times over each year to assess variability in food web support for salmon and steelhead and other fish that migrate rapidly through the mainstem.
- Initiated the update of the 2009 landcover dataset which will provide the ability to track progress in recovering habitats in the lower river and where land conversions imperil that progress
- Hosted a biennial Columbia River Estuary Conference that brings together over 150 researchers, scientists, and resource managers to exchange information, discuss emerging issues and science, and improve collaboration and communication amongst partners working in the lower river and nearshore ocean.
- Hosted Science to Policy Summits[11] on the Effects of sea level rise and recurring excessive weather events on the Estuary; Management Implications of Emerging Science; Communicating Science; the Columbia River Treaty; Toxics Reduction and Toxic Contaminants; Reducing Single Use Plastics; and Using Carbon Programs to Protect and Restore Ecosystems.

Education and Stewardship

- Since 2000, Environmental Educators have engaged with 3,713 classrooms. The Education Program has reached 98,595 students and provided 490,091 instructional hours of programming.
- Since the 2011 Update, 48,382 students have participated in field trips, classroom activities, and service learning projects. Students, teachers, and adult chaperones planted 100,640 native trees, plants and shrubs, and removed 573 truckloads of invasive plants from project sites.
- Created and maintained a library of 20 teacher check-out kits that include all the materials, supplies, and lesson plans to integrate outdoor environmental activities into a school day. Since 2018, the kits have been utilized by 100 different schools in the study area.
- Developed online lessons including virtual field trips, STEM career videos, self-guided educational maps, and hands-on home ecology kits distributed to 2,400 students in 2020-21 for place-based learning around Vancouver Lake.

Regional Coordination

- Continuing to implement the primary two-state management plan addressing ecosystem structure and function, species recovery, and stakeholder engagement for the lower river.
- Provided data from monitoring and restoration projects to the region online (and print by request) of all restoration and protection projects in the lower river. Maintained the Restoration Inventory geodatabase with all Estuary Partnership and reported partner projects and their status—planned, underway, or completed. Disseminated ecosystem condition and action effectiveness data through Tableau, an interactive program that allows multiple statistical analyses, data download capabilities, and other features to partners through a dashboard[12].

[10] https://www.estuarypartnership.org/sea-level-rise-impacts-lower-columbia-river-and-estuary
[11] https://www.estuarypartnership.org/our-work/science-policy-summits
[12] https://public.tableau.com/app/profile/aemr.epmonitoring/vizzes

- Host State of the Estuary reports[13] every five years, with the most recent released in StoryMap format in 2020. The reports disseminate up-to-date information on the condition of the lower river using the best available science.
- Secured the first appropriations connected to the authorized Columbia River Basin Restoration Act of 2016 in Congress to recognize its economic and environmental benefits to the nation and create funding authority to reduce contaminants.
- Convened the Estuary Partnership Science Work Group with members from the public, private, tribal, and non-profit sectors as a regular forum to share information.
- Coordinated regional restoration project development meetings to reduce overlap and ensure efficiencies.
- Continued hosting the Columbia River Estuary Conference and Science to Policy Summits. These regional opportunities for information exchange, coordination, and collaboration focus on research, restoration, reducing contaminants, the effects of recurring extreme weather events on the estuary, including the identification and assessment of vulnerabilities in the estuary and the development and implementation of adaptation strategies, emerging science, and the interrelationship of western science and traditional ecological knowledge and ways of knowing.

Stormwater Green Infrastructure

- Completed stormwater retrofit projects and depaving projects at 15 schools in the Portland and Vancouver metropolitan areas where the benefits of reduced stormwater runoff, reduced heat islands, and improved school spaces may have significant positive benefits for disadvantaged communities. Each of the projects included a paired environmental education and stewardship component.
- Planned and are in final stages of completing a large stormwater retrofit project in Ilwaco, Washington, where 80% of the stormwater runoff from a large area of impervious surface drains directly to Baker Bay and the Columbia River.
- Completed a stormwater retrofit project in Rainier, Oregon that treats 13,149 square feet of impervious surface that drains directly to the Columbia River.
- Completed construction and placement, with the assistance of partners and volunteers, of 26 Grattix Boxes[14] to provide contained stormwater treatment for large, metal-roofed structures in port and industrial areas in the lower Columbia region.

Partnerships

- Participated in and sponsored the Confluence Field School, a cultural literacy workshop centered on the living histories, cultures, and ecological knowledge of the Indigenous people of the lower Columbia River. Provided funding for staff, board members, and partners to participate.
- Supported the formation of the iTeck partnership, the Landcare Collective focusing on Indigenous land care methods and restoration of sites with important cultural significance, including the planned restoration of a cattail marsh at the Sandy River Delta.
- Collected annual accomplishments from a wide range of partners in the lower river and updated our practices to better reflect the work completed by partners in accomplishing the goals of the Management Plan.
- Increased partnerships with organizations led by and for people of color in the Portland metropolitan area to support opportunities for engagement along the Willamette River, including a Summer Paddle Leader position for on-water programming experience.
- Participated as a signatory Policy Committee member of the Pacific Coast Lamprey Initiative.

[13] https://www.estuarypartnership.org/state-of-the-estuary

[14] https://www.estuarypartnership.org/our-work/stormwater-projects/grattix-box-project

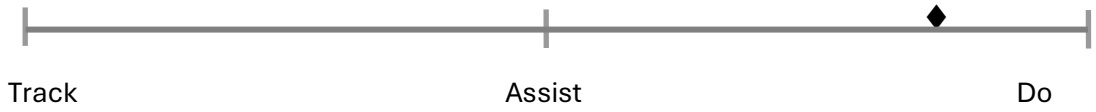
About the Actions

The 2011 Update established a clear format for identifying Actions as well as the key activities, issues, and targets aligned with each action. This 2025 Update will continue to utilize this same presentation of Actions. The Management Plan is a comprehensive regional plan that is implemented through the coordinated efforts of many partners. Some actions fall under the purview of existing entities, some require the involvement of many entities and for others, the implementation needs have not yet been addressed. The Estuary Partnership augments existing efforts, fills voids where needed, and supports and expands the work of other entities. In implementing actions, the Estuary Partnership plays various roles that fall along a spectrum from merely tracking implementation to being one of the implementers. The Estuary Partnership tracks some actions and identifies successes and challenges. The Estuary Partnership also periodically reports on the state of the lower Columbia River and estuary using a consistent set of indicators; this involves collecting and tracking some data and securing additional data from other partners when possible.

Actions are grouped by the program area they relate to habitat restoration, land use practices, water quality and contaminants, education and stewardship, and regional coordination and synchronicity. For each program area there is a statement of its **environmental significance** that describes what the actions are and the potential benefits of implementing them.

Individual Action Descriptions include:

- 'Hows' offer key activities that will help implement the action.
- Priority issues that particular action addresses. (Most actions address more than one priority issue; we listed the primary ones.)
- Targets give specific objective measures by which to evaluate progress. The baseline for targets is 1999, the year the original Management Plan was completed. Targets must be quantifiable to some degree, be likely to be tracked by either the Estuary Partnership or a lead entity, and be related to the action itself, rather than to its component activities. These criteria allow for adaptive management as the action is being implemented.
- The Lead Entity is primarily responsible for implementing the action.
- The Estuary Partnership's role, as noted above, varies with each action:



Track: The Estuary Partnership tracks progress and helps coordinate implementation.
***Assist*:** The Estuary Partnership helps partners implement actions.
***Do*:** The Estuary Partnership takes the lead to implement the action.

All actions take place within the lower Columbia River and estuary in the Estuary Partnership study area.

Actions

Habitat Restoration

ACTION 1: Inventory habitat types and attributes in the lower Columbia River and estuary and prioritize those that need protection and conservation; identify habitats and environmentally sensitive lands that should not be altered. Update periodically to reflect emerging science and issues.

ACTION 2: Protect, conserve, restore, and enhance priority habitats, particularly wetlands, on the mainstem and within tributaries of the lower Columbia River and in the estuary.

ACTION 3: Monitor status and trends of ecosystem conditions and effectiveness of management actions.

ACTION 4: Establish and maintain Columbia River flows to meet ecological needs of the lower Columbia River and estuary.

ACTION 5: Avoid the introduction and reduce the prevalence of non-native invasive species.

ACTION 6: Manage human-caused changes in the river morphology and sediment distribution within the Columbia River channel and estuary to protect native and desired species.

Land Use Practices

ACTION 7: Develop floodplain management and shoreland protection programs.

ACTION 8: Reduce and improve the water quality of stormwater runoff and other non-point source pollution.

ACTION 9: Ensure that development is ecologically sensitive and reduces greenhouse gas emissions.

Water Quality and Contaminant Reduction

ACTION 10: Expand and sustain regional monitoring of toxic and conventional pollutants.

ACTION 11: Reduce conventional pollutants.

ACTION 12: Cleanup, reduce, or eliminate toxic contaminants, particularly contaminants of regional concern.

Education and Stewardship

ACTION 13: Provide information about the lower Columbia River and estuary that focuses on water quality, endangered species, habitat loss and restoration, biological variety, and the effects of recurring extreme weather events on the estuary, to a range of users.

ACTION 14: Create and implement education and volunteer opportunities for community members of all ages to engage in activities that promote stewardship of the lower Columbia River and estuary.

ACTION 15: Identify and improve public access to the river.

Regional Coordination and Synchronicity

ACTION 16: Facilitate and assist federal, tribal, state, and local governments' protection of the lower Columbia River and estuary.

ACTION 17: Create and maintain a regional entity (Lower Columbia Estuary Partnership) to advocate for the lower Columbia River and estuary and unify and coordinate Management Plan implementation.

Habitat Restoration - Environmental Significance

♦ Historically, fish and wildlife in the lower Columbia River relied on a unique and varied combination of habitats to feed, take shelter, rear, and perform other critical life functions. But during the last century, up to 84,000 acres of lower river floodplain were converted to agricultural, urban, or other uses. This represents a habitat loss of more than 50 percent since the 1880s. Juvenile salmon were cut off from important rearing areas by dikes and tide gates, and remaining habitats were simplified and degraded. Today as we feel the effects of habitat loss and degradation in the lower Columbia through Endangered Species Act (ESA) listings, the decline of the local salmon fishing industry, and the economic challenges of dealing with contaminated materials in the environment, we are also feeling the impacts of recurring extreme weather, sea level rise, and other emerging threats. The simplification of the lower river eliminated pockets of cooler water and thermal variability, while warmer temperatures have made cooler water pockets more important to cold water species.

An ecosystem's stability and health come from its complexity. In an estuary, fresh river water mixes with salt water from the ocean in a unique environment of islands, mud flats, and salt marshes. This transition zone gathers and holds an abundance of life-giving nutrients from the land and the sea. The estuary contains more life per square inch than the richest farmland. It also maintains water quality, attenuates floods, and provides recreational and aesthetic opportunities for all of us—because it is complex. The greater the number of distinct habitats within an ecosystem the more species it supports, the more ecological processes and functions it provides, and the better it withstands disturbances.

The lower river's naturally wide range of complex, diverse habitats has been greatly diminished, to the point that salmon and other native species are at risk. Every migratory salmon in the Columbia Basin depends on the lower river and estuary during its life cycle. Salmon need a complex mix of habitat conditions to thrive; food sources such as terrestrial and aquatic insects; cool water with appropriate levels of oxygen, clarity, and salinity; shallow off-channel habitats for resting, feeding, and refuge; spawning gravel at the appropriate depth; and the right channel contours and current velocities. But dikes, tide gates, and flood control devices have radically changed the landscape, keeping the Columbia from inundating riparian areas in the estuary and restricting juvenile salmon's access to important rearing habitats. Warming temperatures and longer, drier summers are exacerbating stressful conditions in summer months for migrating salmon and steelhead. Reestablishing the river's tidal influence in key areas improves water quality, restores a more natural food web for salmon, and allows fish to reach habitat that has long been blocked. And improving habitat quality and complexity can reduce the impacts of warmer summers by providing variability in water temperatures.

The listing of 13 salmonid species as threatened or endangered symbolizes the consequences of habitat degradation and loss in the lower river, but salmon are not alone. Many other fish, plant, bird, and mammal species native to this ecosystem are now listed under the ESA. The Pacific lamprey failed to receive listing in the ESA due to a lack of information related to population declines[15] in 2003. Since that 2003 decision, the importance of this species to Indigenous peoples and the ecosystem has come into focus, and increased attention has been given to restoring lamprey habitat and populations. Reconnecting and restoring riparian areas provides spawning and rearing habitat that is critical to the recovery of ESA-listed salmon, and other imperiled species, such as the Pacific lamprey. Healthy riparian zones reduce sediment erosion and runoff from construction, development, forestry, ranching, farming, and road building. Healthy riparian areas shade streams, helping to maintain low water temperatures required by salmon. They also provide habitat and food sources for fish and wildlife, supply woody debris to streams, lessen the effects of pollution, and store water during high flows. To maintain these important functions, we must identify key habitats for

[15] https://www.fws.gov/story/2023-10/protecting-pacific-lamprey

protection and provide incentives and guidance to landowners and governmental bodies on how and where to restore degraded habitat.

Taking Action

Actions 1 through 6 calls for more habitat and better habitat function. They envision regional approaches through the use of action effectiveness monitoring to identify the most successful restoration techniques, and to restore habitat for multiple species. The actions will be implemented by many different entities, but the Estuary Partnership will collect and compile data to fill information gaps needed to improve the science of restoration and will coordinate with its partners on how to strategically prioritize restoration. The Estuary Partnership will also implement restoration projects. This approach to action connects and coordinates the work of various regional partners to increase the net impact of our collective restoration effects. The goal is to restore ecological functions that have been lost—to increase survival for multiple species and improve the overall health of the ecosystem. Implementation of activities that support the goals of the CCMP happen within a mosaic of local, state, and federal regulatory oversight. The Estuary Partnership will maintain coordination and communication with all regulatory entities and ensure that considerations for changes in federal, state or local regulatory authorities may affect protection and restoration priorities. The Estuary Partnership will continue to work with each of those regulatory authorities to support permitting reform, cooperative federalism, and cross-agency partnership.

Habitat Restoration - Actions

ACTION 1: Inventory habitat types and attributes in the lower Columbia River and estuary and prioritize those that need protection and conservation; identify habitats and environmentally sensitive lands that should not be altered. Update periodically to reflect emerging science and issues.

How:

- Expand and update maps of habitats including those important to threatened and endangered species and other populations at risk. Habitat types include but are not limited to tidal wetlands, riparian habitats, habitat corridors, shallow and deep water environments, and other ecologically significant "critical" areas such as migratory, nursery, and spawning areas; cold water refuges; and areas of high species variability.
- Identify factors that limit the proper function of habitat, including the presence of toxic and conventional pollutants, and the impacts of recurring extreme weather events, accelerated land loss, and sea level rise, on the estuary.
- Identify and prioritize habitats to be protected and restored including habitat migration zone pathways.
- Assess current habitat protection measures and implementation. Develop and update appropriate regional protection and restoration techniques and guidelines, including habitats that may be especially susceptible to sea level rise and accelerated land loss.
- Identify ecosystem services impacted by conversions to development, including greenhouse gas sequestration from natural lands that are emitted during conversion, and assess the potential impacts of proposed development.
- Develop an inventory of greenhouse gas sequestration potential by habitats across the lower river. Track conversions of these habitats and emissions associated with these conversions, and conversely restoration and sequestration.
- Expand and refine regional carbon calculators to include riparian and riverine restoration and conservation actions so that these areas can be used as natural mitigation solutions and ultimately within carbon programs.

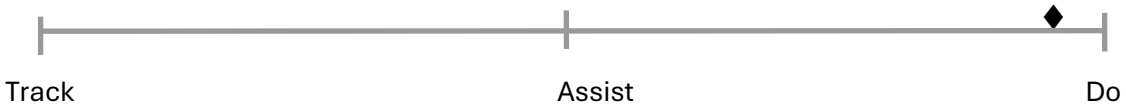
Priority Issue(s) Directly Addressed: Biological Integrity, Habitat Loss and Modification.

Targets

1. Update the map of habitats every ten years.
2. Develop a map that estimates greenhouse gas sequestration potential by 2030.
3. Maintain and update criteria and tools to identify priority species and maps of their priority habitats.
4. Update and maintain maps that provide information and tools related to vulnerabilities in the estuary due to recurring extreme weather events, accelerated land loss, and sea level rise.

Lead Entity: The Estuary Partnership.

The Estuary Partnership Role:



ACTION 2: Protect, conserve, restore, and enhance priority habitats, particularly wetlands, on the mainstem and within tributaries of the lower Columbia River and in the estuary.

How:

- Work with agencies to encourage shared management with tribal governments.
- Work with private landowners to develop an understanding of full effects of restoration, including where land may be lost to flood storage, increased habitat for fish and wildlife, or public access.
- Preserve and restore the structural complexity of vegetation in tidal wetlands, swamps, and marshes while considering the impacts of warming temperatures and recurring extreme weather patterns on species variability and migration.
- Support land acquisition programs (fee simple purchases, conservation easements) to conserve important wetland habitats, tidal wetlands, environmentally sensitive lands, and coastal lands important for offsetting coastal squeeze or threatened by development or conversion.
- Use appropriate site-specific techniques, including nature-based solutions and process-based restoration along with dike removal or breaching, to restore habitat and floodplain connectivity.
- Identify techniques for cost-effective revegetation of native species and management of invasive non-native species.
- Provide incentives (start-up grants, tax breaks, etc.) and technical assistance to encourage local landowners, diking districts, businesses, corporations, and trustee agencies to improve and protect wetland and riparian areas, including reclaiming habitat.
- Protect upland habitats to allow for coastal wetland migration (through setbacks, density restrictions, and land purchases).
- Consider modeled species range shifts in planting plans.
- Enhance or create beach areas and/or shallow water habitat through the beneficial addition of sediment to shorelines where appropriate.
- Pursue opportunities to undertake water quality and quantity improvements that leverage restoration actions, especially where these actions could build upon each other.
- Apply consistent wetland, riparian, and in-stream habitat protection standards, protocols, and actions to increase the quality and quantity of protected habitat to protect aquatic species. The preferred order of mitigation is restoration, enhancement, preservation, creation, cash mitigation.
- Identify ecosystem services impacted by conversions to development, including greenhouse gas sequestration from natural lands that are emitted during conversion, and assess the potential impacts of proposed development.
- Explore ecosystem service markets and options including carbon markets for the lower Columbia River and estuary.

Priority Issue(s) Directly Addressed: Biological Integrity, Habitat Loss and Modification.

Targets

1. No net loss of native habitats from the 2009 baseline;
2. Recover 30% (10,382 acres) of the historic coverage of priority* native habitats by 2030; and
3. Recover 40% (22,480 acres) of the historic coverage of priority native habitats by 2050.

*Priority habitats are those identified in 2016 as rare habitats historically and those that the lower Columbia River has lost the most of from conversions to urban, industrial, and agricultural development.

The Estuary Partnership Role: Implement projects; secure resources; support partners; coordination; track regional progress.

Track Assist Do

ACTION 3: Monitor status and trends of ecosystem conditions and effectiveness of management actions.

How:

- Use environmental indicators to measure and track ecosystem conditions. Adapt the indicator system as scientific knowledge of the lower river evolves.
- Collect baseline data for identified indicators and track conditions over time.
- Maintain the ecosystem monitoring program.
- Integrate toxic contaminants into ecosystem monitoring.
- Adaptively manage research and monitoring to respond to emerging data, findings, and trends.
- Monitor habitat protection, restoration, and mitigation projects for effectiveness, durability, and ensure they are adequately maintained for long-term viability.
- Leverage the use of technology such as remote sensing (e.g., UAVs) to collect data and increase efficiency of monitoring efforts.

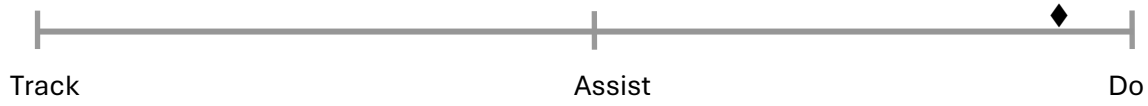
Priority Issue(s) Directly Addressed: Biological Integrity, Habitat Loss and Modification, Conventional Pollutants, Toxic Contaminants

Targets

1. Assess at least 20 additional projects representing a broad geography, restoration method, and type of habitat in the habitat effectiveness monitoring program by 2035.
2. Continue to sample and analyze a full suite of indicators at fixed sentinel locations that represent the estuarine-tidal freshwater gradient through 2035 as part of the ecosystem monitoring program.

Lead Entity: The Estuary Partnership; public and private entities; state, federal and local governments.

The Estuary Partnership Role:



ACTION 4: Establish and maintain Columbia River flows to meet ecological needs of the lower Columbia River and estuary.

How:

- Identify and maintain flows needed to support fish and wildlife, water quality, beneficial uses, and treaty obligations.
- Incorporate consideration of sea level rise, recurring excessive weather events, and flooding impacts into planning for minimum flows, flow levels, and flow timing.
- Provide best possible natural spring freshet flow regime given forecasted impacts on the Northwest snowpack.
- Identify tributary streams where flow conditions are limiting ecological health.
- Evaluate the cumulative impact of all proposed water withdrawals, diversions, or in-stream structures, on flows, incorporating anticipated weather impacts.
- Review water withdrawal applications and recommend appropriate conditions or limitations on permits to protect flows. Incorporate long-range weather, sea level rise, and recurring excessive weather forecasts into decision-making.
- Initiate water conservation, water markets, and acquisition of water rights to improve flows where needed.
- Encourage rainwater harvesting, water reuse, and other water saving actions to lessen water demand.

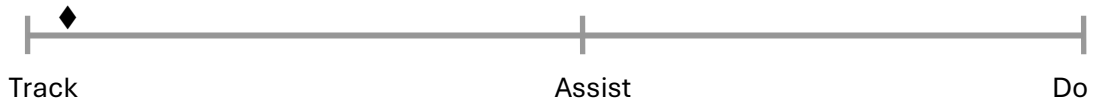
Priority Issue(s) Directly Addressed: Biological Integrity, Habitat Loss and Modification, Conventional Pollutants.

Targets

1. Increase the amount of water dedicated to meeting minimum flows between 1999 and 2035.

Lead Entity: Multiple agencies of federal and state government, including Bonneville Power Administration (BPA), Army Corps of Engineers, and water resource agencies.

The Estuary Partnership Role: Track activity.



ACTION 5: Avoid the introduction and reduce the prevalence of non-native invasive species.

How:

- Periodically inventory existing populations of non-native species and maintain a current list of all identified species.
- Expand monitoring to identify new invasive species.
- Research the relationship between native species, invasive species, and the impacts on the food chain.
- Manage native species when appropriate to protect other native species and prevent harm to the ecosystem.
- Provide programs and technical assistance to eradicate or manage non-native invasive species, remove invasive species, and restore native species.
- Strengthen and apply rules that prevent the introductions of invasive species (e.g. mandatory boat inspections, restrictions on retail sales of invasive plants and animals).
- Pump ballast water at sea instead of in the estuary or the river and treat ballast water consistent with international conventions.

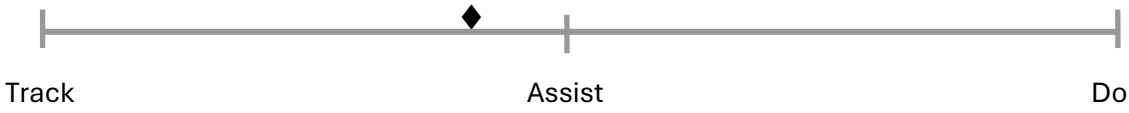
Priority Issue(s) Directly Addressed: Biological Integrity, Habitat Loss and Modification.

Targets

1. Update the inventory of invasive species by 2035.
2. Provide programs and technical assistance to encourage the restoration and protection of native species with high cultural value such as wapato, cattail, and lamprey.
3. Make state lists of banned plants and invasive species accessible to a range of issuers and users, e.g. nurseries, etc., and update banned list every five years.

Lead Entity: Natural resource and environmental agencies of federal, state, and local government.

The Estuary Partnership Role: Inventory, monitor, research, provide funds or technical assistance.



ACTION 6: Manage human-caused changes in river morphology and sediment distribution within the Columbia River channel to protect native and desired species.

How:

- Identify proposed and current activities that will cause significant changes in the morphology and sediment distribution within the river channel and estuary.
- Monitor the impacts of changes in the river's morphology and sediment distribution on native and desired species.
- Incorporate impacts of more extreme weather, sea level rise, and accelerated land loss into dredged material siting and explore using dredged material for beneficial uses—to promote wetland accretion, to create habitat suitable for native species, to provide beach nourishment, and to protect infrastructure or important habitats.
- Create or update a regional plan for sediment management to compile sediment transport and distribution information and provide a decision-making framework for sediment placement and flow management.

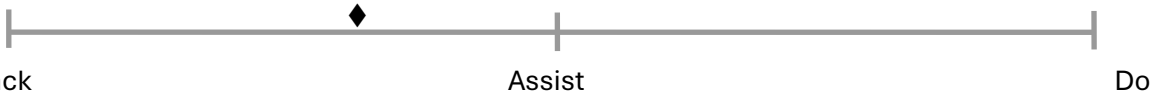
Priority Issue(s) Directly Addressed: Biological Integrity, Habitat Loss and Modification.

Targets

1. Develop a sediment transport model for the lower river to inform appropriate locations for dredge material placement.
2. Inventory and map in-water structures that affect flow as part of the shoreline inventory every five years.

Lead Entity: Multiple agencies of federal and state government, including Army Corps of Engineers, Bonneville Power Administration, and industry.

The Estuary Partnership Role: Assist with sediment budget and sediment plan.



Land Use Practices - Environmental Significance

♦ Human population growth in the Portland-Vancouver metropolitan area has placed increased demands on our land and water. The activities of modern life cause runoff, erosion, sedimentation, and pollution that impair water quality and habitat, and disproportionately impact overburdened communities. Projected increases in the region's human population will continue to further tax these resources while recurring extreme weather and related impacts will continue to alter the landscape It is not a question of whether we grow and develop, but how we do so—and where. ♦

Development activity changes the ability of water to infiltrate the ground. As water seeps into the ground, it regulates flow to surrounding lakes and rivers and makes pollution more diffuse, thus weakening its impact on ecosystem health. Thirty years ago, the primary source was point sources—discharges from manufacturing plants, treatment facilities, or other single sources of entry into the water body. Today, most pollution enters the Columbia River from thousands of scattered, non-point sources, such as roadways, farms, and lawns. As progress has been made by reducing contaminants from point sources, pollution from these more dispersed sources has increased.

Increasing the amount of roofs, driveways, roads, and other paved surfaces reduces the land's ability to absorb and filter rainwater. The result is more and faster-moving runoff, which causes erosion and sedimentation in streams. Often this sediment has heavy metals and toxic contaminants, which are transported to our public waterways. Runoff from farms, nurseries, forestry operations, construction sites, and residential and commercial areas contributes significant amounts of pollution to the Columbia River. Fertilizers, pesticides, automobile emissions, animal waste, waste from tree cutting and the transportation system—all of these are readily transported by runoff. Unfortunately, runoff is efficient at collecting contaminants from non-point sources throughout the Columbia Basin and delivering those contaminants to streams and rivers that eventually flow into the Columbia River estuary.

The impact of runoff affects water quality directly. In areas of residential development with less than ½ unit per acre, the amount of surface area covered by impervious materials typically is between 10 and 20 percent; stormwater runoff in these areas increases by 20 percent. In commercial developments, on roadways, and in paved or unpaved parking areas, the amount of impervious surfaces is between 75 and 100 percent and runoff increases by 55 percent. That impervious surface delivers more pollutants to water bodies. Streams in watersheds where impervious surfaces cover 25 percent of the watershed cannot support aquatic life. Increases in runoff of as little as 10 percent increase erosion, causing loss of trees and vegetation along the banks. Pollutant loads and the incidences of shellfish disease increase, along with stream temperatures. Higher temperatures interfere with many biological processes. Bacteria levels rise, too—often as a direct result of household pet waste. The volume of runoff coming from an area with just 10 percent impervious surfaces causes a stream bed to double in size. How we use land and the consumer choices we make directly affect water quality and habitat.

Increasing temperatures are particularly challenging in urbanized areas; and most impacted are low-income, high-density neighborhoods that have more pavement and fewer trees, creating urban heat islands. Open space, trees, and shrubs not only provide habitat for birds and wildlife, but they also provide recreation, enjoyment, and mental health benefits to residents as well as thermal cooling. This is especially important for underserved communities.

Taking Action

Actions 7 through 9 identify tools and techniques that can be incorporated into building, planning, and land use practices to protect habitat and the environment and reduce impacts on adjacent properties. Many of these tools and techniques already are being successfully implemented by many partners.

2. Conserving land reduces runoff, allowing more natural infiltration. Conserving lands is also much less expensive than restoring habitat after it has been degraded or converted.

- Concentrating development where infrastructure and services already exist is cost-effective and protects natural resources from unnecessary degradation.
- Using paving materials or patterns that allow natural water infiltration reduces runoff of pollutants.
- Maintaining growth boundaries encourages population growth and development where infrastructure can support it without unnecessarily compromising suburban, agricultural, and forested land.
- Limiting floodplain development allows the river and riparian area to perform vital functions, such as providing habitat for endangered species, filtering out pollutants, and attenuating flood flows. It allows floodwaters to create new aquatic and riparian habitats. It also lessens property damage and economic losses typically associated with periodic flooding.
- Minimizing or eliminating pollution is more efficient and less costly than cleaning or removing it.

3. Continuing to identify and learn about emerging pollutants including 6PPD-Q helps prioritize actions that have the greatest impact on aquatic organisms.

Land Use Practices - Actions

ACTION 7: Develop floodplain management and shoreland protection programs.

How:

- Redefine riverine floodway and floodplain designations to account for the increasing frequency and strength of storms (e.g. designation based on a 200-year storm versus a 100-year storm).
- Encourage and augment efforts to relocate existing floodway and floodplain structures (rolling easements, land exchange programs, buy out programs).
- Limit construction in the floodway and floodplain to water dependent structures or infrastructure.
- Align shoreline setbacks with floodway and floodplain designations.
- Protect undeveloped shorelines and floodplains.
- Replace shoreline armoring or other hard shorelines with living shorelines through beach nourishment, vegetation planting, etc.

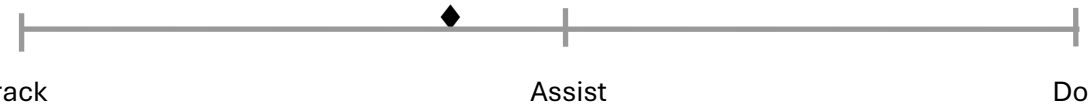
Priority Issue(s) Directly Addressed: Biological Integrity, Habitat Loss and Modification, Impacts of Human Activity and Growth.

Targets

1. Reduce by 10% armored or structured shoreline by 2030.
2. Reduce by 30% non-water dependent structures in the floodplain and floodway by 2030
3. Map and make publicly available a 200-year floodplain map by 2030.
4. Update the Estuary Partnership shoreline inventory every ten years.

Lead Entity: Multiple agencies of federal, state, and local government.

Estuary Partnership Role: Map and track trends; provide technical assistance or resources.



ACTION 8: Reduce and improve the water quality of stormwater runoff and other non-point source pollution.

How:

- Base stormwater management calculations, infrastructure, and facility sizing on the increased storm frequency and intensity expected (e.g. 50-year storms instead of 25-year storms that are currently standard).
- Promote practices through various means (e.g. print materials, websites, workshops) to reduce volume and velocity of runoff from developed sites by such means as disconnecting downspouts, using onsite infiltration, installing green roofs, promoting natural buffers, building narrower sidewalks, removing impervious surface, and other Low Impact Development techniques on new development and redevelopment.
- For transportation infrastructure, use techniques such as green streets, narrower streets, streetside infiltration, porous concrete and pavement, and gravel parking to reduce runoff.
- Develop extensive tree planting campaigns, particularly in urban areas to capture and evapotranspire water, provide shade, and reduce temperatures. Focus on planting large, evergreen, long-living trees.
- Use farming practices including regenerative techniques to keep livestock out of streams, minimize chemical application, reduce erosion, provide habitat and corridors for wildlife, and sequester greenhouse gases.
- Promote cleanup of domestic pet waste.
- Use sustainable and ecosystem friendly forestry practices for such aspects as logging, road building and maintenance, chemical applications, etc.

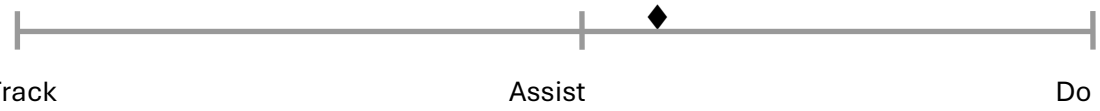
Priority Issue(s) Directly Addressed: Biological Integrity, Impacts of Human Activity and Growth, Conventional Pollutants, Toxic Contaminants.

Targets

1. Increase on-site retention by 35% by 2035.
2. Increase regenerative and environmentally sustainable practices on farms, roadway rights-of-way, and forestry lands by 2035.
3. Complete at least 2 stormwater retrofit projects annually, beginning in 2024.

Lead Entity: Multiple agencies of federal, state, and local government.

Estuary Partnership Role: Provide assistance or information or undertake projects that demonstrate environmentally sensitive practices; make information accessible; map and track trends.



ACTION 9: Ensure that development is ecologically sensitive, reduces greenhouse gas emissions, and reduces "heat island" effects.

How:

- Establish and maintain urban growth boundaries or growth management areas.
- Promote clustered development with dedicated open space that protects environmentally sensitive land, such as critical habitat, wetlands, and steep slopes. Hold open space in perpetuity.
- Encourage redevelopment of abandoned or under-utilized sites before development of undisturbed sites.
- Encourage infill and infill designs that maintain neighborhood integrity.
- Provide infrastructure and adequate capacity at wastewater treatment facilities and stormwater management facilities before development occurs. Incorporate consideration of vulnerabilities in the estuary related to recurring extreme weather events and the development and implementation of adaptation strategies into planning for new infrastructure.
- Map land cover at regular intervals to track growth and land use and measure impervious surface.
- Build data on projected growth into local planning and development processes.
- Assess current local ordinance provisions to identify requirements and provide alternatives that encourage environmentally sensitive development.
- Identify cumulative impacts of development and assess the potential impacts of proposed development.
- Monitor the impacts of new developments to better define how land use, habitat condition, increasing temperatures, recurring extreme storms, stormwater runoff, and fish and wildlife survival interrelate.
- Measure vehicle miles driven in the metro area every five years and compare to increase in biking or pedestrian miles.
- Identify urban and rural techniques for restoration and preservation. Develop new techniques, such as 'daylighting' urban streams (opening up streams that have been submerged in conduits), exploring dike removal and alternatives to dewatering wetlands, and discouraging the use of riprap and other shoreline hardening.
- Ensure culverts allow for fish passage.
- Allow coastal wetlands to migrate inland (e.g. through setback, density restrictions, land purchases).
- Ensure adequate tree and plant cover to reduce urban "heat island" effects. Preserve open spaces for the ecosystem, temperature reduction, and mental health benefits they provide.

Priority Issue(s) Directly Addressed: Biological Integrity, Habitat Loss and Modification, Conventional Pollutants, Toxic Contaminants, Impacts of Human Activity and Growth.

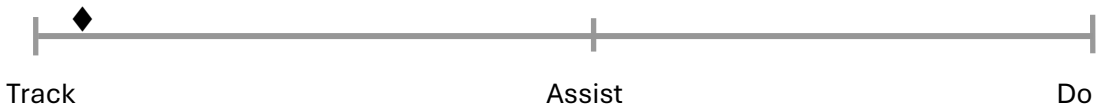
Targets

1. Decrease impervious surface in tracts with high disparity (disadvantaged) by 5% by 2035[16].
2. Increase by 10% mass transit, carpooling, walking, and bicycle commuting in the metro area by 2030.
3. Reduce by 30% the ratio of converted land to population growth by 2030.
4. Increase coverage of open space and trees and shrubs in urban areas by 35% by 2035.

[16] https://regionalbarometer.oregonmetro.gov/apps/e217e87f6da2496c90b919756f4107b6/explore

Lead Entity: Multiple agencies of state and local government.

The Estuary Partnership Role: Map and track trends; make information accessible.



Water Quality and Contaminants – Environmental Significance

♦ Toxic contaminants in the water, sediment, and fish of the Columbia River affect human health and put species at risk. The impacts on species health, including humans, will increase. Over the last fifteen years, monitoring of toxic contaminants in the lower Columbia has waned, even as new contaminants have come on the scene. Toxics reduction and cleanup efforts also are limited. ♦

Many toxic contaminants banned in the 1970s, such as DDE, DDT, and PCBs, are present today in salmon tissue and sediment. PAHs are present in salmon prey. In some cases, the levels of toxic contaminants exceed thresholds for delayed mortality, increased disease susceptibility, and reduced growth. Toxic contaminants have impaired the reproductive organs of male river otters and thinned eggshells of osprey and bald eagles. Along a twenty-mile section of the lower river, eagles reproduce at half the rate as bald eagles elsewhere. In the early 1990s, the Bi-State studies identified dozens of sites in the lower river as "hot spots" (locations of concern) because contaminants there exceeded water quality standards; sediment standards for pesticides, semi-volatile organics, dioxins/furans, metals, and cyanide, and reference levels for dioxin/furan, PCB, and DDE burdens in fish tissue.

In 2014, the Columbia River Toxic Reduction Working Group released the Toxics Reduction Plan[17] that identified 49 chemicals of emerging concern (CEC) at 22 of 23 sites sampled. The CECs contain endocrine disrupting compounds that block or mimic hormones in the body and cause harm to fish, plants, and humans[18]. The study also found a "myriad" of pharmaceuticals and personal care products in the discharge of wastewater treatment plants that discharge to the Columbia[19].

Flame retardants—PBDEs—continue to be a concern. These are widespread in the lower river, especially in urban and industrial areas. PBDEs are known to reduce the number of ospreys produced per nest and are thought to be similar to PCBs in their effects on salmon (i.e., causing neurotoxicity, hormone disruption, and other problems). Laboratory animals exposed to PBDEs show deficits in learning and memory. PBDEs also affect thyroid levels in laboratory animals and wildlife and may cause birth defects. Some evidence raises concerns about the relationship between PBDEs and estrogen-positive cancers. They have found their way into human blood, breast milk, and umbilical cord blood, and their presence in the environment is doubling every five years.

The problems are extensive, yet there is no sustained monitoring of contaminants on the mainstem Columbia and no concentrated toxics reduction or cleanup efforts. During the past thirty years, fewer and fewer sites have been monitored and investment in monitoring has decreased. Now just one site on the lower river is being monitored consistently. Hot spots of contamination identified in the early 1990s have not been reassessed or cleaned up. Legacy contaminants and newly emerging toxics continue to concentrate in the lower river and estuary from a drainage basin that is larger than the state of Texas. Society is investing millions of dollars to restore and maintain habitat, yet the full benefits of this will not be achieved if water and sediment are contaminated.

Taking Action

Actions 10 through 12 calls for reducing pollution; cleaning up contaminated sites; assessing changes over time in contaminant sources, levels, and movement through the system; and evaluating the full impact of

[17] https://www.epa.gov/sites/default/files/2014-07/documents/columbia-river-cec-strategy-july2014.pdf

[18] Nilsen, E.B., Furlong, E., Rosenbauer, R., 2014. "Reconnaissance of contaminants of emerging concern in streambed sediments of the lower Columbia River basin, OR and WA," *Journal of the American Water Resources Association*.

[19] Morace, J.L., 2012, "Reconnaissance of contaminants in selected wastewater-treatment-plant effluent and stormwater runoff entering the Columbia River, Columbia River Basin, Washington and Oregon, 2008–10," U.S. Geological Survey Scientific Investigations Report 2012–5068, 68 p.

contaminants on human health and ESA-listed fish. Keeping contaminants from entering the system is the ideal. It does not require costly cleanup activities, workers do not have to handle toxic waste, and impacts on the environment are minimized. What is there must be cleaned up, removed, or reduced. Examples abound. Providing opportunities for community members to dispose of contaminants helps keep toxics from entering the water body through improper storage or disposal. Responsible handling of boat fuels and waste minimizes or eliminates the impact of spills. Reducing contaminant inputs so that sediment stays clean helps keep shipping channels and ports functioning. In those areas that already are contaminated, cleanup is critical to improving the health of the ecosystem, economic viability, and human health. On a larger scale, modifying land use practices throughout the Columbia Basin reduces adverse impacts in the lower river and estuary.

Water Quality and Contaminant Reduction - Actions

Action 10: Expand and sustain regional monitoring of toxic and conventional pollutants.

How

- Maintain a regional monitoring strategy.
    - Compile, analyze, and evaluate water quality data on toxic and conventional pollutants throughout the basin. Include legacy, bioaccumulative, and emerging contaminants.
    - Identify gaps in knowledge and sampling, including the synergistic effects of contaminants. Devise studies to fill gaps.
    - Prioritize contaminants of regional concern.
    - Build in evaluation mechanisms and flexibility to allow for changes as knowledge evolves.
    - Build on state and federal monitoring strategies.
- Monitor a minimum number of sites, at regular intervals, for a full suite of pollutants to establish a scientifically defensible means to:
    - Identify status and trends
    - Identify sources and pathways
    - Evaluate real and potential effects on fish, wildlife, water quality, habitat, sediment, and human health.
- Continue regional and national scientific efforts to develop, test, and implement protocols for evaluating and monitoring sediment, water, and tissue samples.
- Develop and adopt standards for contaminants of regional concern in sediments, habitat, water, fish, and wildlife that protect fish, wildlife, and human health.
- Research the impact of toxic contaminants on fish, wildlife, water quality, habitat, sediment, and human health, particularly threatened and endangered salmonids.
- Ensure water quality standards are adequate to protect public health and ecosystem health.

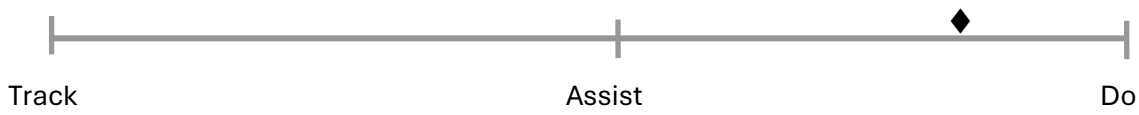
Priority Issue(s) Directly Addressed: Biological Integrity, Habitat Loss and Modification, Conventional Pollutants, Toxic Contaminants

Targets

1. Update the monitoring strategy through a collaborative process by 2035 and every ten years thereafter.
2. Review and update a regional list of priority contaminants targeted for reduction by 2030.
3. Regularly monitor and analyze the full suite of priority contaminants at a minimum of 30 sites by 2030 and report on impact on ecosystem and human health.
4. Identify trends in contaminants and impacts of reduction actions by 2035 to adaptively manage.

Lead Entity: The Estuary Partnership with scientific community, federal, and state environmental and health agencies, agriculture, industry, transportation, manufacturing, watershed councils, and other interested parties.

The Estuary Partnership Role: Coordinate monitoring plans and strategies; secure regional resources for targeted projects and monitoring; assist with projects to fill gaps; assist with science and information exchange and accessibility.



Action 11: Reduce conventional pollutants.

How

- Update 303(d) lists.
    - Prioritize waters on the 303(d) lists and schedule waters for total maximum daily load (TMDL) development.
    - Develop and implement TMDLs for listed impairments, such as temperature and total dissolved gas.
    - Re-establish native vegetative cover along tributaries.
    - Develop predictive models for temperature, total dissolved gas, and other conventional pollutants as needed.
- Increase Columbia River velocity or flows during warm weather or low flow to assist in maintaining conditions to sustain native species.
- Make physical and operational alterations to dams in the Columbia River system to maintain water quality standards. For example, draft water from reservoirs with sufficient thermal gradient to cool downstream waters.
- Reduce point source discharges and ensure they meet water quality standards.
- Control and continue to reduce sanitary and combined sewer overflows.
- Contain contaminants generated through agriculture, forestry, and other land use practices on site to reduce discharge of animal waste, nutrients, and fertilizers.
- Maintain onsite sewage disposal systems to reduce contamination.
- Provide approved and accessible sewage and bilge pump-out facilities at marine facilities.
- Contain sewage on board all boats and ships.
- Improve permitting and regulatory processes to encourage "green" practices.
- Use pollution prevention and green technology.
    - Provide technical assistance and incentives that reduce pollution through appropriate prevention strategies or green technologies. Incentives may include reducing the number of inspections, the number of reports, discharge fees, or trading programs.
    - Develop a network of information sharing to provide examples that address conventional pollutant reduction for specific users, including farmers, foresters, and developers.

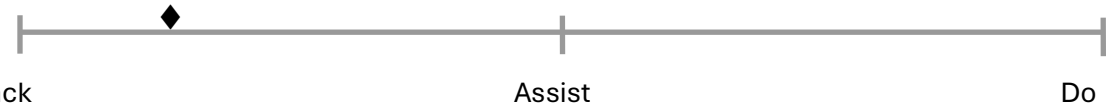
Targets

1. Decrease by 50% the number of streams that do not meet water quality standards by 2030.
2. Reduce discharges by 25% from nonpoint sources by 2035.
3. Put in place trading opportunities among dischargers by 2035

Priority Issue(s) Directly Addressed: Biological Integrity, Habitat Loss and Modification, Conventional Pollutants

Lead Entity: Natural resource, environmental, and health agencies of federal, state, and local government.

The Estuary Partnership Role: Secure regional resources for targeted projects; assist with projects to fill gaps; assist with science and information exchange and accessibility.



Action 12: Clean up, reduce, or eliminate toxic contaminants, particularly contaminants of regional concern.

How:

- Clean up or contain contaminated sites, including legacy hot spots and in-water contaminated sediment.
    - Provide collection opportunities for hazardous materials in urban and rural areas (pesticides, fluorescent light bulbs, car batteries, pharmaceuticals, etc.).
    - Identify landowners of abandoned sites, identify responsible parties, and use existing authorities.
    - Secure funds for cleanup of sites where responsible parties are unknown or unable to fund cleanup.
    - Clean up hazardous waste sites including Superfund and brownfield sites.
    - Remove marine debris, including derelict vessels.
- Reduce hydrocarbon (PAHs) and heavy metal discharges.
    - Encourage mass transit and alternative transportation, buy-back programs for non-complying vehicles, registration fee based on miles driven, removing exemptions from mileage performance standards for certain types of vehicles, and low sulfur fuels.
    - Phase out 2-cycle engines such as outboard motors, leaf blowers, and lawnmowers, and minimize the use of petroleum-powered engines with incentives for innovative approaches (i.e. buy-back programs).
- Encourage use of alternatives to metals, including copper, in brake pads.
- Phase out the use of wood preservatives on aquatic structures.
- Phase out the use of chlorine for disinfection from permitted discharges.
- Ensure all marine facilities have safety spill prevention and clean-up plans and have pump out facilities and treatment procedures; ensure all vessels use pump out facilities.
- Reduce discharges from point sources and ensure they meet water quality standards.
- Contain contaminants generated from agriculture, forestry, and other land use practices on site. Encourage the use of non-toxic fertilizers and pesticides.
- Provide technical and monetary assistance to wastewater treatment facilities to test for toxic contaminants entering their facilities and identify sources.
- Improve permitting and regulatory processes to encourage “green” practices.
- Use pollution prevention and green technology.
    - Provide technical assistance and incentives to point sources dischargers to use techniques that reduce pollution or use alternatives (e.g. reducing the number of inspections, discharge fees, trading programs).
    - Promote closed-loop systems that use materials and products efficiently.

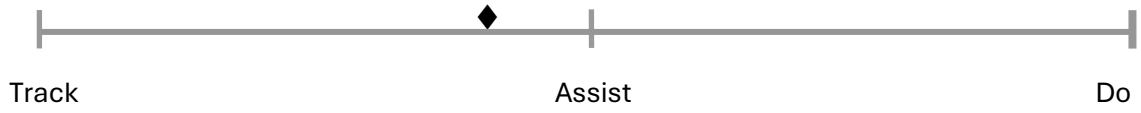
Targets

1. Clean up a minimum of five “hot spots” by 2030.
2. Render hazardous waste sites harmless by 2050.
3. Reduce sales of products containing contaminants (fertilizers, pesticides, personal care products) by 2030.
4. Expand regional pharmaceutical take back programs with law enforcement and medical providers by 2030.
5. Hold pesticide and fertilizer take back programs in multiple locations annually.
6. Remove marine debris at a minimum of 40 sites by 2035.
7. Remove another 10% of mapped derelict vessels by 2030.
8. Remove chlorine from wastewater treatment and industrial processes by 2040.

Priority Issue(s) Directly Addressed: Biological Integrity, Habitat Loss and Modification, Toxic Contaminants.

Lead Entity: Environmental agencies of federal and state government and private industry.

The Estuary Partnership Role: Secure regional resources for targeted projects; assist with projects to fill gaps.



Education and Stewardship - Environmental Significance

♦ Environmental problems are increasingly complex. The scope of problems can be overwhelming; the problems so big, an individual action may not feel as though it matters. We want to know our actions will make a difference. A great deal of data exists about the river, some accessible and some not. We are bombarded with information from a variety of sources. Giving information about the river can show how daily decisions affect the environment. Some of us may want to learn how we can help improve it. Some may use the river for enjoyment, recreation, fishing or commerce. Reaching community members in ways that are useful to them is key. ♦

Many of the decisions of our daily lives directly affect the water quality and habitat of the lower Columbia River: how much we drive; how we take care of our lawns and parks; the products we buy; how and where we build our houses, stores, and roadways. Yet all the information can be as complex as the issues or hard to find. School budget cuts and the fast pace of modern life make it difficult to get kids outdoors, where they can make a lasting connection with nature. Even adults sometimes don't know where and how to recreate on the Columbia River safely, or how their choices affect the river's health. Education and stewardship can make a difference in protecting the river. The key is to engage community members, get them out into the environment and provide them with accurate, scientifically based information about the problems—and the solutions.

Nothing builds a sense of connection to a place more than being there. Research has shown that "time outdoors during childhood and adult role models are primary factors" for developing a commitment to the environment.[20] Today, kids need more opportunities to learn about their local environment and experience it during their formative years. Too many young people have never been on the river or do not have easy access to a natural space (even if they live near one). Many have not seen an eagle, watched an osprey dive for a fish, or felt the pull of the tide. Getting children outdoors is challenging. Teachers have limited time, resources, and experience to provide outdoor programs. Budgets for field trips have been reduced or eliminated.

People's direct connection to nature has weakened in recent decades and the outdoors can seem forbidding and inaccessible. The Columbia River itself is a big system, it carries a lot of water and cargo, and its tides and currents pose real safety challenges. Simply knowing how to access the river can be daunting. But experiencing the river firsthand can leave a lasting impression: studies show that we retain as much as 80 percent of what we see, hear, and **do**, compared to just 20 percent of what we see and hear.

Taking Action

Actions 16 and 17 direct the Estuary Partnership to help improve information and access for all community members. Maintaining up-to-date, accessible, scientifically based information about the Columbia River benefits everyone. It helps scientists, managers, and policy makers understand the complexities of the river. It supports better decision-making and resource management. It helps community members make informed decisions and see how they can make a difference. Providing information that lets people draw their own conclusions is an ideal way to build their own connection to the river. Sharing information among peers helps demonstrate the economic and ecosystem benefits of improved land use practices. Integrating classroom lessons, field experiences, and on-river trips increases students' understanding of the environment, exposes children to natural systems, and empowers them to believe that individual actions can improve the environment. It makes classroom work more relevant and improves critical thinking skills. It can connect students to their surroundings and spark curiosity about the outdoors. For adults, practical

[20] Cagle, N.C., (2017). Changes in experiences with nature through the lives of environmentally committed university faculty. Environmental Education Research

information can be the key that unlocks the river. People need simple, easy-to-access information on where to hike, where to start and end a paddle, where it is safe to swim, how to be safe on the water, and how to follow the "leave no trace" ethic. With this sort of information, everyday folks can experience the river and start making their own connections to the lower Columbia. Engaging community members isn't telling them what we want them to know. It's giving them the information they need to connect.

Education and Stewardship - Actions

ACTION 13: Provide information about the lower Columbia River and estuary that focuses on water quality, endangered species, habitat loss and restoration, biological variety, and the effects of recurring extreme weather events on the estuary to a range of users.

How:

- Using established environmental indicators, report regularly on ecosystem trends and health.
- Build data management and information sharing capability to provide interactive access to data and information to a range of users, taking steps to ensure accessibility.
- Develop educational materials that convey river issues and conditions (including targeting individual consumers), along with how daily actions affect one's carbon footprint and river health and provide specific actions or changes that individuals and organizations can take to help reduce adverse impacts. Include such topics as the impacts of toxic contaminants, contaminants of concern, and land use practices.
- Educate land and property owners about the actions they can take to manage on-site or reduce stormwater runoff generated by their homes or building footprints, driveways, yards, fields, parking areas, etc.
- Identify "environmentally friendly" products and ingredients and promote their positive impact on the environment and the economy.
- Promote or provide regional activities such as take back collection events or ingredient information for personal care products.
- Emphasize green technology and the pollution prevention hierarchy of prevent, reduce, reuse, and recycle.
- Develop a network of information sharing to provide examples that address toxics contaminant reduction for specific users, including farmers, foresters, and developers.

Priority Issue(s) Directly Addressed: Impacts of Human Activity and Growth, Public Awareness and Stewardship.

Targets

Reports, publications, and information:

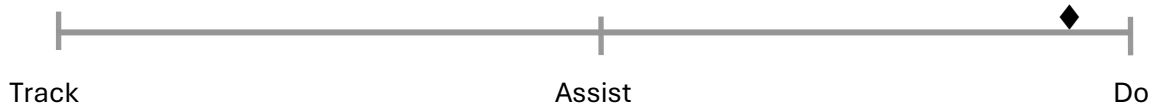
1. Issue a state of the estuary report that tracks indicators and reports natural resource trends and Estuary Partnership activities every five years.
2. Publish technical analyses of topics including toxic contaminants by 2027 and every ten years thereafter.
3. Publish the inventory and status of habitat restoration efforts in the region annually.
4. Consistently distribute information to consumers and land users through various means, e.g., media, print materials, websites, workshops.

Exchange and sharing of information:

1. Host at least one Science to Policy Summit every two years.
2. Host or co-host a regional scientific workshop or conference at least every three years.
3. Update technical information on website annually.

Lead Entity: The Estuary Partnership.

The Estuary Partnership Role:



ACTION 14: Create and implement education and volunteer opportunities for community members of all ages to engage in activities that promote stewardship of the lower Columbia River and estuary.

How:

- Develop and implement year-round hands-on river education opportunities. Conduct on-river trips, classroom programs, and field programs for adults and schoolchildren, including curricula preparation and refinement.
- Routinely evaluate and explore gaps in non-school based programming and assess opportunities to create curricula or direct resources to fill gaps.
- Work with existing educational programs to build capacity and fill gaps.
- Regularly assess and update environmental education curricula to ensure consistency with state science standards by grade level and to meet the needs identified in state student science assessments.
- Engage new public and private partners to implement and promote stewardship activities.
- Develop and implement teacher professional development opportunities.
- Develop curricula on a range of topics related to the Columbia River, for example oceans, macroinvertebrates, stormwater, water quality, geology, history, demography, and species.
- Organize volunteer activities to plant riparian corridors, remove invasive species, test water quality, maintain stormwater and restoration sites, and engage in other river stewardship activities.
- Develop and maintain a library of resources available for teachers, parents, and families to use outside of formal Estuary Partnership activities, including take home kits, online activities and resources, and guides for place-based education.

Priority Issue(s) Directly Addressed: Public Awareness and Stewardship.

Targets

1. Provide a minimum of 20,000 hours of river and environmental education programs to at least 3,000 students in K-12 grade annually.
2. Organize a minimum of ten volunteer opportunities engaging a minimum of 250 volunteers contributing 750 hours of volunteer time annually.
3. Update curriculum at least once a year.
4. Create community outreach and education plans for at least 50% of restoration projects that identify opportunities for education and public stewardship; include accessibility plan (if appropriate); create listservs, social media, and other opportunities for community learning and engagement.

Lead Entity: The Estuary Partnership, partner public and private organizations, state and local governments, and others.

The Estuary Partnership Role:

Track Assist Do

ACTION 15: Identify and improve public access to the river.

How:

- Provide information on clean boating, invasive species prevention, and other activities to minimize impacts on habitat, wildlife, and water quality.
- Create and make available study area map(s) to showcase activities along the river: existing public access, safe swimming locations, businesses, refuges, camping, and Estuary Partnership activities such as habitat restoration projects and river education.
- Assist partners in establishing and caring for safe swimming areas including signage and wayfinding; safe and accessible paths that allow people of all abilities to access the water; and a water edge that is comfortable and provides direct access to the water.
- Assess adequacies of existing sites and trails and identify additional sites and trails where the environmental or cultural impacts are neutral or positive.
- Engage community members in siting, restoration, and development of access points.
- Engage and partner with Tribes and Indigenous people to improve access to important cultural resources and areas to forage and care for.
- Assist in providing and enhancing responsible public access to the river.
- Provide opportunities for children and adults to participate in on-river and in-river experiences.
- Acquire sites through purchase, easement, etc.
- Develop interpretive sites throughout the study area. Develop a connection between the history of the region and the effect of human activity on water quality and natural resources. Assess appropriate locations with high public access potential; develop and construct interpretive materials; acquire permission and install.
- Assist partners in consideration and development of nonmotorized boat launch sites, swimming sites, and other near- or on-water recreation opportunities for community members with different mobility needs.
- Maintain Water Trail website.

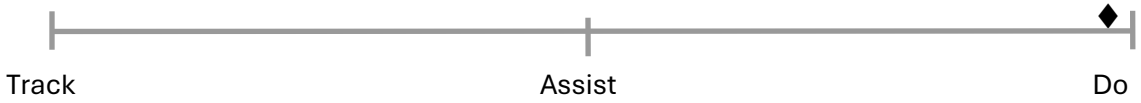
Priority Issue(s) Directly Addressed: Public Awareness and Stewardship.

Targets

1. Update the Water Trail website at least annually.
2. Install Water Trail wayfinding signs at locations of interest, campgrounds, and other sites by 2027.
3. Conduct at least one cleanup or maintenance of a Water trail site annually as part of the volunteer program.
4. Conduct at least one cleanup or maintenance of a swimming area along the Willamette, as part of the volunteer program, annually.
5. Conduct at least twenty-five paddles annually with partners and community members.
6. Complete testing at one site used for harvest of culturally important first foods at least annually.

Lead Entity: The Estuary Partnership.

The Estuary Partnership Role:



Regional Coordination and Synchronicity - Environmental Significance

♦ Degradation of the lower Columbia River and estuary affects local economies, human health, and native fish and wildlife species, including every threatened or endangered salmonid in the Columbia Basin. Efforts to address the problems are complicated by the fact that hundreds of governments, agencies, nonprofits, and industries either are involved in or have jurisdiction in the lower river. Also, relatively little money is being invested to restore the lower river to health. The lower Columbia River and estuary needs a champion—an entity to focus attention on this unique ecosystem, foster collaboration, help maintain the flow of information, and coordinate protection and restoration efforts. ♦

More than 160 agencies of various local, state, federal, and tribal governments have jurisdiction in the lower Columbia River and estuary, and a wide range of laws govern the river. Hundreds of private entities, such as land trusts and watershed councils, actively advance conservation in the area. Socially and economically, the lower river and estuary serve multiple needs, from electric power, shipping, irrigation, and commercial fishing to recreational and aesthetic opportunities for community members. In addition, the region is home to more than 2.5 million people and hundreds, if not thousands, of fish and wildlife species.

The lower river's environmental problems are similarly large and complex, involving habitat loss and degradation, pollution, altered food webs, invasive species, and disruption of important natural processes. These problems developed over a very long time, as the result of hundreds of causes, sources, and activities. Together we have made progress. The Estuary Partnership has established an infrastructure and partnerships, restored habitat, educated students, and engaged community members. The states and the federal government completed recovery plans and initiated toxics reduction plans. Many other organizations have gathered information or implemented restoration projects. But the lower river and estuary still face many of the same problems that led to creation of the Estuary Partnership in the first place: the lower river is nationally significant, but it also is contaminated and degraded and receives little attention.

Despite being officially designated as one of ten large aquatic ecosystems and 28 estuaries of national significance, the lower river lags behind the rest of the Columbia Basin in attention, investment, and restoration efforts. From 2011 to 2022, according to data from the Northwest Power and Conservation Council, just over 4% of total funds invested by BPA and the Council in the Columbia Basin were dedicated to projects in the Columbia estuary[21]. Their annual investments, totaling nearly $150 million over the twelve-year period, are not insubstantial, but the overall lack of investment in the estuary compared to other areas in the basin cannot be overstated. The states of Oregon and Washington have stepped up their efforts to protect waterways, habitat, fish and wildlife within state boundaries, but the mainstem remains an orphan. While we celebrate the authorization of the Columbia River Basin Restoration Program, the estuary is not uniquely recognized and must continue to compete for funding.

It is crucial that we reverse this lack of focus on the lower Columbia River and estuary, for our economic vitality, public health, and fish and wildlife health. What is needed is an advocate for the lower Columbia River and estuary, a coordinator who can provide a framework for ecosystem protection and accountability in the region. An entity that can increase the level of stewardship, maintain the integrity of data and information, and foster long-term collaboration. The problems in the lower Columbia River and estuary cannot be solved by one or two agencies, or by the disjointed efforts of different organizations. Only through collaboration will we be able to achieve the next level of results we need.

[21] https://www.nwcouncil.org/reports/2023-3/

Taking Action

Actions 16 and 17 direct the Estuary Partnership in its role as a regional entity. The actions describe how the Estuary Partnership can support local, state, federal, and tribal governments as they protect the lower Columbia River. The actions call for the Estuary Partnership to foster establishment of common goals, establish regional dialogue, coordinate protection and restoration efforts, and enhance the region's ability to improve the ecosystem of the lower Columbia River and estuary.

Regional Coordination and Synchronicity - Actions

Action 16: Facilitate and assist federal, tribal, state, and local governments protection of the lower Columbia River and estuary.

How:

- Foster consensus for regional goals for protection of the lower Columbia River and estuary.
- Provide science to support protection.
- Work with Congress to secure sustained resources to improve ecosystem conditions.
- Assist federal, state, tribal, and other partners with Columbia Basin toxic contaminants reduction work.
- Implement key actions for the federal Action Agencies (Army Corps of Engineers, BPA, and the Bureau of Reclamation) as identified in the Biological Opinion for the federal hydro system.
- Work with National Marine Fisheries Service, the Army Corps of Engineers and other appropriate agencies to identify actions and implement components necessary for species recovery. Identify and convene appropriate parties to set priorities and develop specific actions for priorities such as species recovery.
- Assist the states to plan and implement aspects of state natural resource and water quality laws such as species recovery, marine spatial planning, regional sediment management, contaminant monitoring, toxic reduction, TMDLs, water quality improvement, and the West Coast Governors Agreement on Ocean Health Action Plan.
- Host meetings, workshops, or forums with Oregon and Washington agencies to coordinate environmental programs that affect the lower river and estuary.
- Provide technical assistance to local governments on water quality, endangered species, habitat loss and restoration, biological variety, and the effects of recurring extreme weather events on the estuary, including the identification and assessment of vulnerabilities in the estuary and the development and implementation of adaptation strategies.
- Build collaborations to promote compliance with existing laws and regulations to protect, conserve, and manage natural resources and protect species.
- Encourage agencies and stakeholders to participate in meaningful engagement with communities, Tribes, and partners in decision-making that may affect them.
- Create opportunities for data sharing and information exchange among federal, state, and local governments to improve implementation of and compliance with environmental and land use laws.

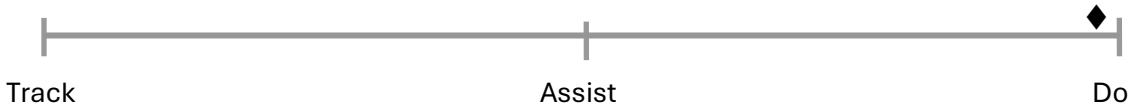
Priority Issue(s) Directly Addressed: Biological Integrity, Habitat Loss and Modification, Conventional Pollutants, Toxics Pollutants, Institutional Constraints.

Targets

1. Implement projects annually in at least five counties that advance habitat restoration or water quality goals of the states and federal government.
2. Provide expertise to a minimum of two other organizations annually concerned with lower river resources such as Vancouver Lake Partnership, Oregon Abandoned and Derelict Vessels Workgroup, Lower Columbia Solutions Group, EPA Columbia River Toxics Reduction Working Group, and others.

Lead Entity: The Estuary Partnership.

The Estuary Partnership Role:



ACTION 17: Create and maintain a regional entity (Lower Columbia Estuary Partnership) to advocate for the lower Columbia River and estuary and unify and coordinate Management Plan implementation.

How:

- Maintain a governing structure for the Estuary Partnership that includes a bi-state diverse representation of river users, geography, and needs, including policy-level directors of agencies, community leaders, private sector interests, recreational users, and natural resource users.
- Maintain an independent program office and professional staff responsible for overseeing and implementing the Management Plan.
- Monitor the effectiveness of the implementation of the Management Plan actions.
- Secure resources, expertise, and data to assist partners with implementing Management Plan goals and actions.
- Advocate for the interests of the ecosystem, its habitats, water quality, and species (including human) of the lower river and estuary.
- Maintain scientific integrity in work for region.
- Foster stewardship.
- Build collaborative partnerships to expand implementation of the Management Plan's objectives.
- Improve coordination among governments to share information, identify needs and gaps, and work together on Columbia River issues.
- Develop and implement regional approaches to water quality improvement, habitat protection, and threatened and endangered species recovery.
- Develop and implement collection of social science metrics to provide context around communities in the lower Columbia, with increased attention on high-disparity areas.
- Create opportunities for regional discussion.

Priority Issue(s) Directly Addressed: Institutional Constraints, Public Awareness and Stewardship.

Targets

1. Assess current activity and progress regularly and define a ten-year strategy to implement activities in the Management Plan.
2. Develop a funding strategy to support the implementation strategy.
3. Update the status of implementation strategy activities annually.
4. Maintain or grow state and federal National Estuary Program funding.
5. Maintain diversified funding.
6. The Columbia River Basin Restoration Program is reauthorized regularly.
7. Make annual federal appropriations requests.

Lead Entity: The Estuary Partnership.

The Estuary Partnership Role:

Comprehensive Conservation and Management Plan Implementation

As a 501(C)(3), the Estuary Partnership is governed by a Board of Directors. The Board sets all policy and establishes strategic directions for activities. Beginning in 2025 with the 2025 Update of Actions the Board adopts a 10-year Implementation Strategy to guide day-to-day Estuary Partnership activity. The Implementation Strategy will contain direction from both a programmatic and financial perspective. This allows regular review of progress toward implementing the Management Plan and incorporates emerging needs of the region.

The Estuary Partnership maintains a running status of progress implementing activities in the ten-year strategy. Progress of each activity is reported annually.

Every two years, the Estuary Partnership develops a work plan and two-year budget that specifically addresses the work we will do pursuant to the EPA funding we receive. As a National Estuary Program (NEP), the Estuary Partnership also reports to Congress and EPA annually on its activities. The organization provides detailed reports about the habitat acres restored and protected directly by the Estuary Partnership and by regional partners, as well as how the Estuary Partnership leveraged EPA NEP funds. The Estuary Partnership also reports to its state NEP funders as stipulated in its contracts.

The Estuary Partnership produces an Annual Report each fall and a State of the Estuary Report every five years, both reports are available digitally and in print by request. The Estuary Partnership's 'State of the Lower River and Estuary' report tracks five measures: pollutant levels, land cover trends, community engagement, habitat restoration, and endangered species. The Estuary Partnership is involved with all these efforts, sometimes supporting existing entities and sometimes leading implementation.

Tracking Action Implementation

There are two aspects to tracking implementation of the actions in the Management Plan:

- Tracking implementation of the actions and
- Tracking progress toward meeting targets.

The Estuary Partnership tracks the overall number of actions being implemented.

Tracking progress in meeting targets varies.

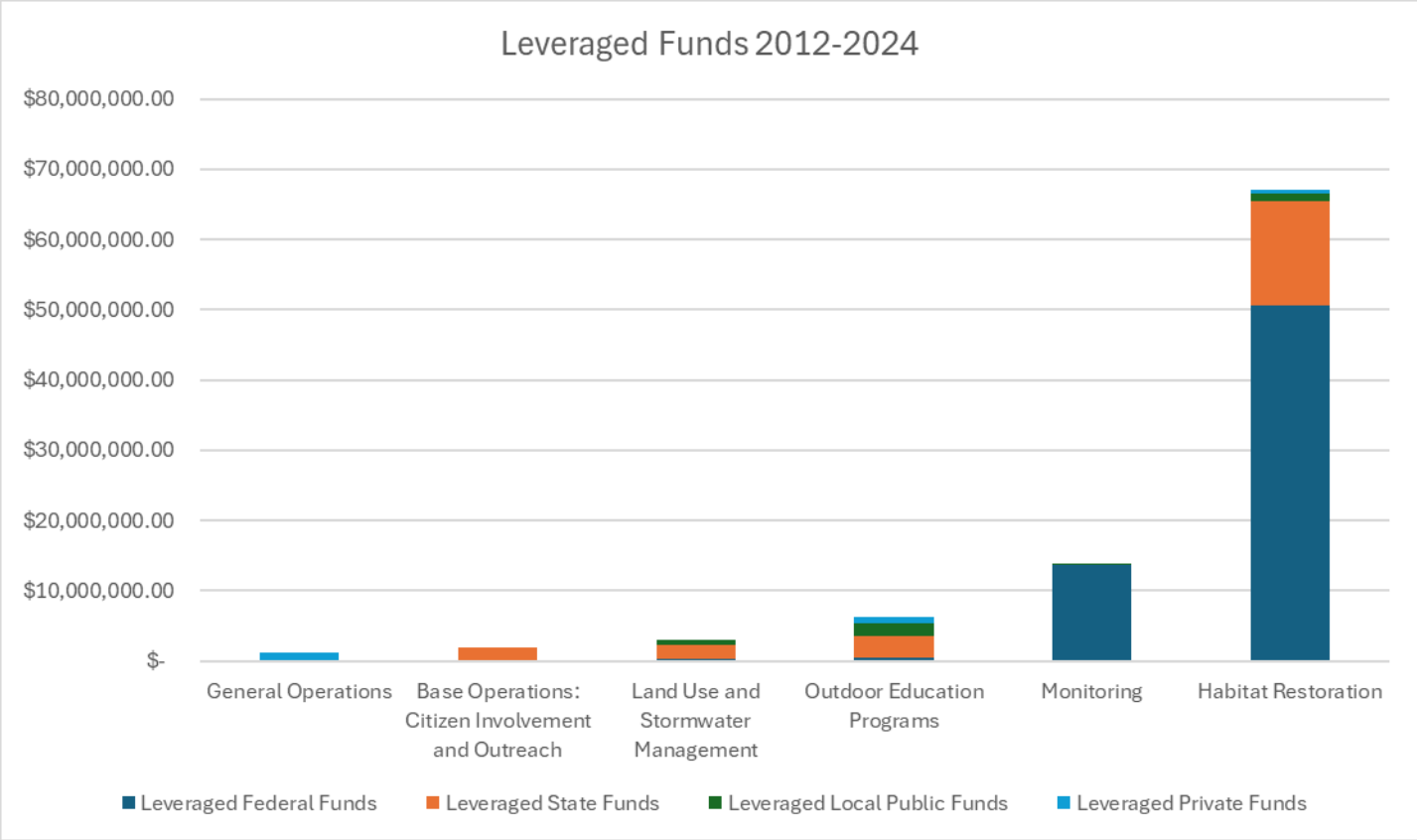
The Estuary Partnership implements projects to address various Actions, but not all Actions, and tracks and evaluates progress toward meeting the targets where that information is available. The Estuary Partnership will track Actions 1, 2, 3 and 10 as part of its NEP responsibilities. For the remainder, the Estuary Partnership will try to collect data or information from various sources.

Financial Planning and Funding

Most of the actions require funding before they can be implemented, in some cases significant funding. This plan does not call for lead entities to add to existing workloads within existing resources. One of the primary charges of NEPs is to leverage additional resources for the region.

Congress has supported the NEP since its authorization in 1987; the Estuary Partnership has been supported by Congress and EPA and the States since it was created in 1995. The Estuary Partnership receives operational funds from EPA as a National Estuary Program. The States of Oregon and Washington combined provide nearly 50 percent of the match required to secure the NEP funding. In addition to funding from EPA and the matching state funds, the Estuary Partnership has a successful grant writing program that has, along with private donations, provided an additional $93 million dollars in funding between July 2012

and July 2024. EPA Base funding provided 8% of the total funding during the time period between 2012 and 2024, with $7.8 million in funding, resulting in a 12:1 match.



During the span of time from 2012-2024, the greatest share of leveraged funds were used in the planning, design, and construction of habitat restoration projects. Habitat restoration projects realized a total exceeding $67 million in leveraged funding, primarily from federal funding sources including NOAA, BPA, and National Fish and Wildlife Foundation. State leveraged funds provided the next largest share of habitat restoration funding with $14.8 million that came from a variety of state agencies on both sides of the Columbia including Washington Department of Ecology and Oregon Watershed Enhancement Board. Monitoring programs were a distant second in terms of overall funding from during the time period, with a total of $13.7 million that came almost entirely from BPA. Following monitoring programs was outdoor education with $6.1 million in funding; land use and stormwater—a growing segment of our work—with $3.1 million in funding; community involvement and outreach with $1.9 million; and finally general operations with $1.2 million in funding over the period.

The Estuary Partnership continues to expand and diversify sources of funding. Diversified funding allows the organization to focus its restoration, monitoring, and toxic reduction work on the entire ecosystem, including habitat for threatened and endangered species.

Volunteers

Since the inception of the volunteer program in 2000, 15,651 volunteers have donated their time to Estuary Partnership activities, completing such work as riparian plantings, habitat enhancement, water quality monitoring, invasive species removal, and water trail maintenance. Volunteers have also provided professional expertise to guide the science projects and governing of the organization. The value of those hours has added $6.4 million to the Estuary Partnership's efforts.

Jobs

Research from the University of Oregon as well as Department of Transportation data indicates every $1,000,000 spent in forestry or watershed restoration creates an average of direct 20 jobs. Each of those jobs creates an additional 2.2 indirect jobs.[22]

The investment in habitat restoration by the Estuary Partnership has resulted in the creation of a total of 2,101 direct jobs since 2000—1,344 of those created since 2012. Additionally, each of those direct jobs has resulted in a total indirect job creation of 4,621 since 2000 and a combined 6,722 direct and indirect jobs created. The majority of our habitat restoration dollars stay local, with the employment of local contractors and subcontractors completing habitat restoration work close to home. These include construction engineers that design sites and construct projects, heavy equipment contractors for bridge and culvert replacement, habitat ecosystem ecologists, hydrologists, large equipment operators, fisheries biologists, chemists, laborers, foresters, agricultural specialists, haulers licensed to transport contaminants to licensed disposal facility, law enforcement officers to accept pharmaceuticals, soil and water district employees, fence installers, pesticide applicators, skilled and unskilled labor for tree planting, road crews, field technicians, boat crews for data collection, and data analysts.

Conclusion

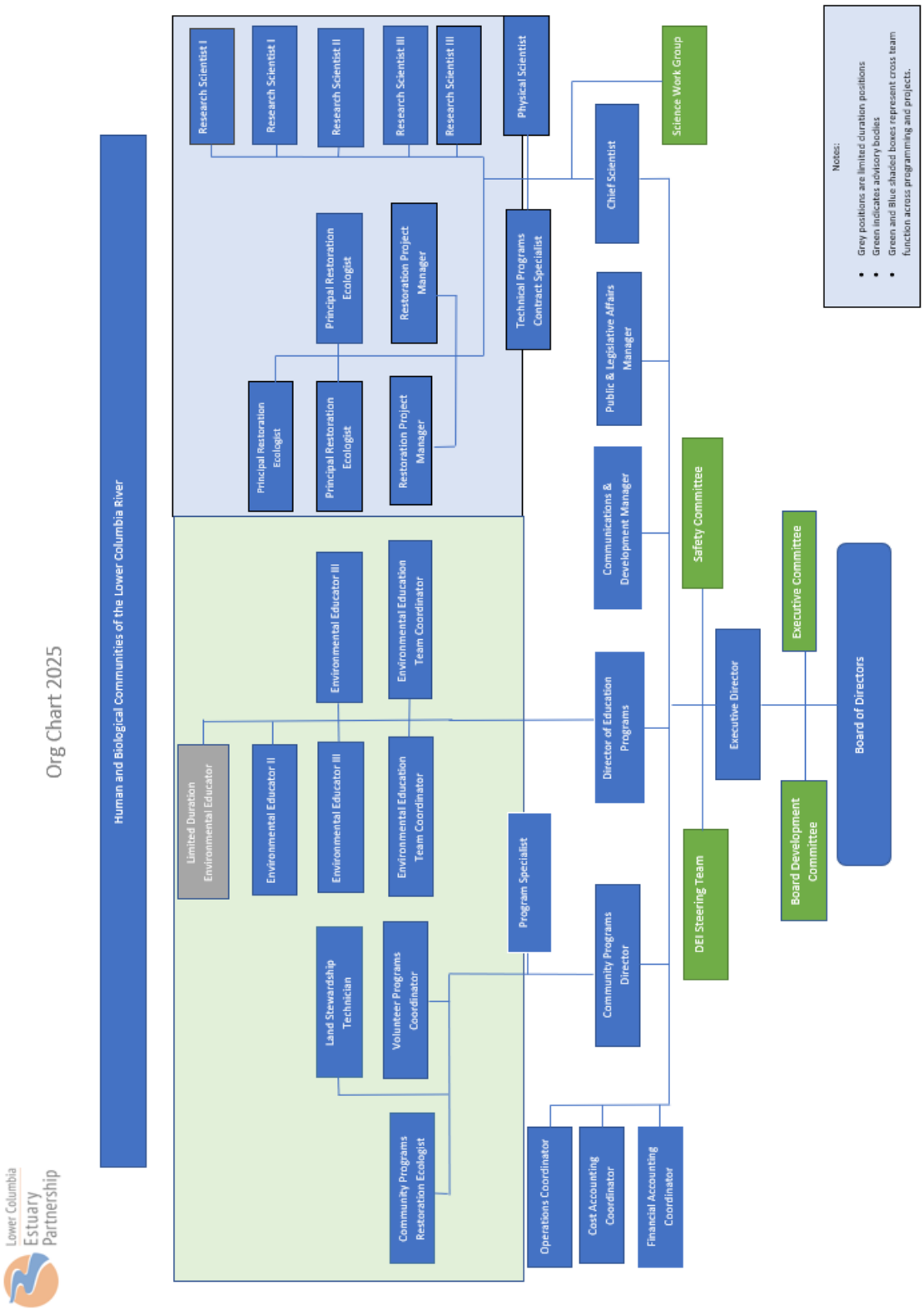
The close of the 1999 Management Plan stated that collaboration and cooperation had served the Estuary Partnership well during the plan's development. This assessment has not changed over the course of three decades of implementation, in fact, collaboration has proven even more essential. Working together is the only way we can be efficient, represent the values of all the region's community members, and restore and care for the ecosystems of the lower Columbia River, for current and future generations of fish, wildlife, and people. Our collective progress to date demonstrates the impact of that collaboration. At the close of the 2011 Update, we noted challenges ahead that include: how current economic issues affect investments, habitat restoration projects that are more expensive and complex, and that the work to clean up and reduce contaminants requires long-term commitment. Those challenges remain and have been further complicated by emerging issues: the deepening impacts of a rapidly changing environment; increasingly complex regulatory environments that stretch the length of planning and constructing large-scale restoration projects; and a lack of funding mechanisms for development of complex projects, which require thorough engagement with communities and long-term partnerships that often evolve at the speed of trust.

Every one of the 28 National Estuary Programs, including the Estuary Partnership, has made great progress with environmental improvements distinctive to their estuary and its problems through locally driven, scientifically based partnerships. With collaboration, the possibilities are limited only by our commitment to be partners.

[22] University of Oregon, "Economic and Employment Impacts of Forest and Watershed Restoration in Oregon", Spring 2010.

Appendices

Organization Chart:



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