



# Lower Columbia River Estuary Plan

Comprehensive Conservation and Management Plan  
2011 Update

Estuary Partnership 2011 Board of Directors Chair

*Steve Harvey*

Estuary Partnership Executive Director

*Debrah Marriott*

Front and Back Cover Photos

*Jim Douglas*

December 2011

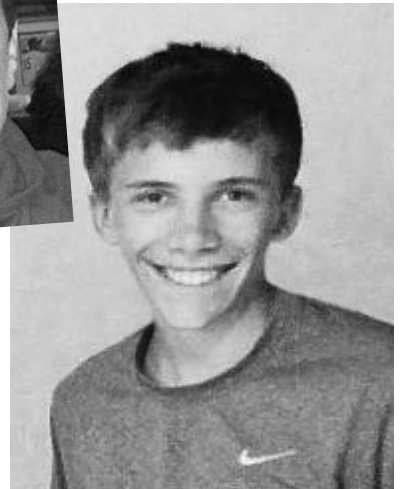
The Lower Columbia Estuary Partnership is a  
National Estuary Program administered by the  
U.S. Environmental Protection Agency and supported by the  
States of Oregon and Washington and the U.S. Congress.

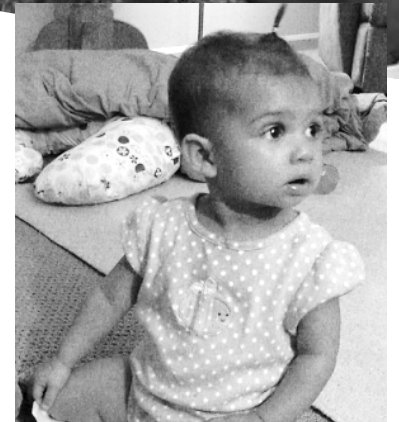
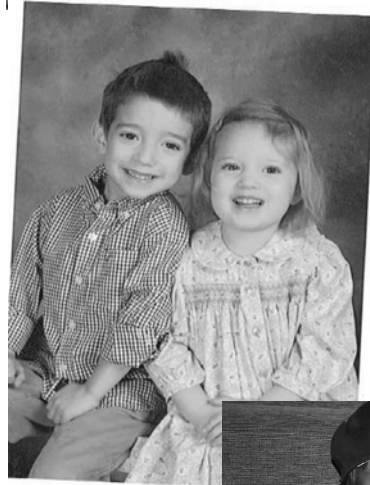
Eventually all things merge into one,  
and a river runs through it.

*Norman Maclean*



For the seventh generation of  
our children's children.





The Mission of the Lower Columbia Estuary Partnership  
is to preserve and enhance the water quality of the estuary  
to support its biological and human communities.

The Guiding Principle of the Estuary Partnership  
is that the health of the river will not significantly improve  
if new problems continually emerge even as old ones are solved.

# Table of Contents

<b>Introduction</b> .....	1
Estuary Partnership Mission.....	1
Geographic Area.....	1
Comprehensive Conservation and Management Plan.....	2
<b>Progress Since 1999</b> .....	4
<b>About the Actions</b> .....	6
<b>2011 Updated Actions</b> .....	7
<i>Shared Actions</i>	
<b>Habitat Restoration - Environmental Significance</b> .....	9
Actions.....	10
<b>Land Use Practices - Environmental Significance</b> .....	16
Actions.....	17
<b>Water Quality and Contaminant Reduction - Environmental Significance</b> .....	20
Actions.....	21
<i>Estuary Partnership Actions</i>	
<b>Education and Stewardship -Environmental Significance</b> .....	25
Actions.....	26
<b>Regional Coordination and Synchronicity -Environmental Significance</b> .....	29
Actions.....	30
<b>Actions &amp; Measures At-a-Glance</b> .....	32
<b>Comprehensive Conservation and Management Plan Implementation</b> .....	35
Tracking Action Implementation.....	35
Financial Planning and Funding.....	35
The NEP Workhorse: Regional Impact.....	36
Volunteers.....	36
Jobs.....	37
Conclusion.....	37
<b>Appendices</b> .....	38
Organization Chart.....	38
2011 Board of Directors.....	39
2011 Estuary Partnership Staff.....	40





# 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.<sup>1</sup> 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 citizens 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:

1. Create a governing structure that is inclusive, with stakeholders guiding decision-making.
2. Collect and assess scientific information about the conditions of the water body.
3. Develop a Comprehensive Conservation and Management Plan (Management Plan) that summarizes the ecosystem conditions and problems and identifies actions to address those problems.
4. 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 now operates as a nonprofit corporation 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 40 technical experts from the public and private sectors who guide Estuary Partnership habitat restoration and toxic reduction activities. The Estuary Partnership works with a large body of educators to guide us in our 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 preserve and enhance the water quality of the estuary to support its biological and human communities. Our primary goals are to foster stewardship, provide objective scientific information, 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, and educational activities. Our on-the-ground approach is to restore habitat while advancing science, to improve river conditions as we learn more, and to expand the knowledge and experiences of the next generation of decision makers.

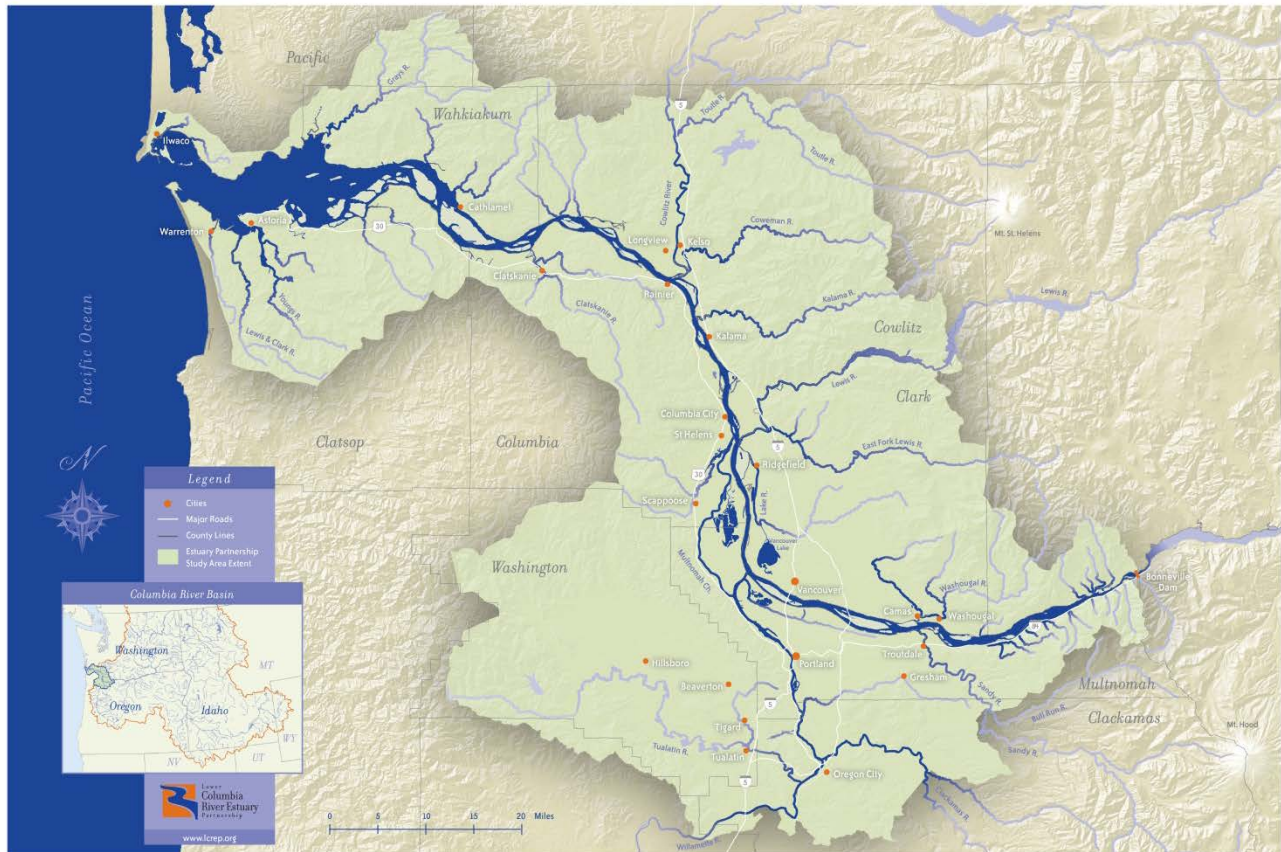
## Geographic Area

The Estuary Partnership focuses on the tidally influenced 146 miles of the Columbia River from Bonneville Dam to the Pacific Ocean in Oregon and Washington.

---

<sup>1</sup> *The National Estuary Program is regulated by Section 320 of the Clean Water Act.*

# Lower Columbia River and Estuary Lower Columbia Estuary Partnership Study Area



## Comprehensive Conservation and Management Plan

The Estuary Partnership Management Plan was 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.<sup>2</sup> 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 citizens. 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 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.

<sup>2</sup> The Management Plan is available at [www.estuarypartnership.org](http://www.estuarypartnership.org), (formerly [www.lcrep.org](http://www.lcrep.org)) along with a description of how it was developed.

It serves 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 for years 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 committing 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. We worked with the Northwest Power and Conservation Council and NOAA to align their fish and wildlife planning and recovery efforts to ensure consistency, and we produced 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) in the plan three times. In 2001, we aligned restoration goals with the 2000 Biological Opinion. In 2009, we set a new target for habitat restoration when the region reached the first goal of 16,000 acres.

In 2011, the Board of Directors initiated a more substantive update of the actions to incorporate the nearly twelve years of experience implementing the Management Plan, to recognize the work of our partners, and to incorporate emerging science. We have met some intermediate goals, partners have advanced their activities in several areas, and we have learned a great deal more about the lower Columbia River system. As a region, we have had sixteen years developing the Lower Columbia Estuary Partnership National Estuary Program—establishing a program office, building capacity, developing partnerships, identifying niches—and getting on-the-ground improvements.

The overall goals and focus of the 1999 plan have not changed, and we are far from finished restoring adequate habitat for species survival or removing pollutants. The original plan identified appropriate needs that are still relevant. The science and knowledge we have gained in the past decade do not change the objectives or direction of the original plan. Since 2000, many regional plans have been developed that support and build on the objectives of the Management Plan. Among them are the Northwest Power and Conservation Council sub basin plans, NOAA's estuary recovery plan module, EPA's strategic plan, Washington and Oregon's salmon recovery plans, and the Federal Columbia River Hydropower System Biological Opinions of 2000 and 2008. 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 nonnative species, reducing predation, and managing uncertainty. With so much regional planning in the last decade, the Board of Directors did not want to engage in another planning effort, opting to focus on the actions in Chapter 5 of the 1999 Management Plan.

This update of the actions recognizes the integrity of previous research and planning and seeks to streamline the actions. The objectives in this effort were to:

1. Integrate EPA climate change adaptations, marine spatial planning, the West Coast Governors' Oceans Action Agenda, and other recent state and federal efforts.
2. Increase emphasis on non-regulatory approaches, which are a hallmark of the NEP.
3. Streamline the set of actions so that we can track implementation more easily and increase accountability.
4. Update measures and give more specific targets.
5. Assess original actions for relevancy, clarity, and the Estuary Partnership's role, and build on sixteen years of Estuary Partnership work.
6. Ensure that the actions remain broad enough to address the ecosystem as a whole; this will allow us to adapt specific activities as we make progress or expand our knowledge.
7. Integrate updates from 2000 and 2010.

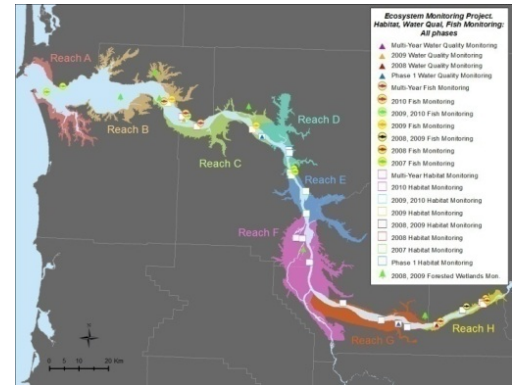
The result is a set of 17 actions that give concise direction for the region and provide specific targets. The goals of the original Management Plan and this update continue to require extensive collaboration and synergy. The river needs it, and our children deserve nothing less.

## Progress Since 1999

Here's a look at our efforts since 1999 implementing the Management Plan. The work happens with hundreds of local, state, federal, regional and tribal partners, contractors, teachers, citizens and technical experts.

### Habitat Restoration

- Acquired, protected or restored 16,614 acres of lower Columbia River habitat with 100 partners.
  - 3,325 acres restored in 58 projects funded by the Estuary Partnership, including reconnecting 754 acres of historic floodplain to tidal influence and opening 58.4 miles of stream habitat.
- Map and track more than 158 projects by restoration partners.
- Worked with over 100 scientists to develop and refine the first regional restoration criteria focused on critical functions and habitat types to ensure ecologically significant restoration.
- Implement key actions in the Federal Columbia River Power System biological opinion and the NOAA, Oregon and Washington Recovery Plans for ESA-listed salmon and steelhead.
- Developing a monitoring strategy with NOAA Fisheries, Army Corps of Engineers, Lower Columbia Fish Recovery Board, Washington and Oregon Departments of Fish & Wildlife and Bonneville Power Administration.
- Developed NOAA Lower Columbia River Estuary Recovery Module.
- Developed Sub-basin Fish and Wildlife Plan for the Northwest Power and Conservation Council.



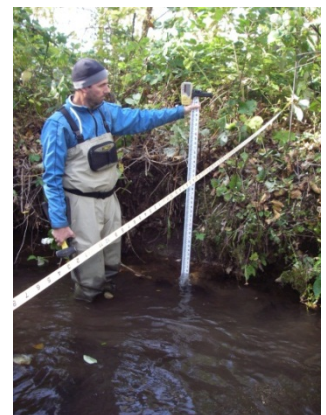
### Water Quality and Toxics Reduction

- Conducting a pilot pharmaceutical take back project in two Oregon counties.
- Monitored and evaluated legacy and emerging contaminants in sediment, water and fish tissue in juvenile salmonid in the lower river and estuary for three years.
- Characterized ecological conditions at a suite of 40 reference sites to assess for effectiveness of restoration efforts.
- Compiled data on toxic contaminants in the lower river into a central database.
- Continuing comprehensive monitoring of habitat conditions; salmon use, diet, and condition; food web and water quality at sites key for juvenile salmon rearing and refuge.
- Work with EPA to implement the Columbia River Basin Toxics Reduction Action Plan.



### Science

- Completed a GIS based strategic prioritization to identify habitat restoration sites based on the highest value at the ecosystem scale.
- Developing the Columbia River Estuary Ecosystem Classification comprised of six data layers, providing the basis for scientifically sound monitoring.
- Collected and characterized digital video of habitat conditions for more than 605 miles of shoreline.
- Collected almost 19,000 acres of bathymetry data and mapped 300,000 acres of floodplain land cover and altered wetlands to improve restoration efforts.
- Assisted two communities to meet federal stormwater requirements.
- Developed and maintain a website to showcase local water-quality friendly development practices.
- Developing a sediment management and dredge placement plan and funded a feasibility study of an upland disposal site for dredge material for lower river ports.



## Education and Stewardship

- Engaged students region wide in 145,895 applied science and hands on outdoor learning experiences.
  - 103,489 in classroom lessons.
  - 18,195 in service learning projects.
  - 5,471 in schoolyard stormwater redesign projects.
  - 155 in summer camps.
  - Took 14,000 adults and students on the water for river classes.
- Provided education programs for 1,540 teachers.
  - Developed over 50 curricula specific to the lower Columbia watershed designed to meet state education benchmarks.
  - Provided 24 professional development workshops to 331 teachers.
- Engaged 10,450 volunteers in science education and volunteer projects.
  - Planted 33,132 native trees and shrubs at 26 sites.
  - 6,420 citizens monitoring water quality.
- Created the Lower Columbia River Water Trail with interactive database for river users. 63 volunteers did clean up at Hump Island and Reed Island.
- Participated in development of "No Oregon Child Left Inside," the State's Environmental Literacy Plan.



## Regional Coordination

- Developed and implementing 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 on an interactive mapping website, including our restoration inventory, reports from 2004-2006 contaminants monitoring, a "Toxics Monitoring Interactive Map" showing contaminant data from over 400 sites and data from the Bi-State Water Quality Studies and Ecosystem Monitoring Project.
- Secured introduction of the Columbia River Restoration Act of 2010 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 monthly forum to share information.
- Coordinated regional restoration project development meetings to reduce overlap and ensure efficiencies.
- Hosted annual Science to Policy Summits to facilitate discussions among policy makers, implementers, and scientists about restoration, contaminants, accountability and climate change and define actions for the Estuary Partnership.
- Hosted forums, technical conferences and scientific workshops; twelve to date.
- Hosted workshops as needed to coordinate land cover, bathymetry, research and monitoring efforts and define data gaps in the estuary with NOAA Fisheries Science Center, Pacific Northwest National Labs, Lower Columbia Fish Recovery Board, Army Corps of Engineers and Bonneville Power Administration.
- Developed and published a broad selection of scientific reports: for example, Habitat Restoration Program 2000-2009, State of the Estuary Report(s) in 2005 and 2010, the Lower Columbia River and Estuary Ecosystem Monitoring: Water Quality and Salmon Sampling Report.



## About the 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 all 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.

The actions fall into two categories:

- ◆ **Shared actions** either fall under the purview of one or more specific entities or are implemented by several partners. Generally, the lead entity tracks the targets and reports to others.
- ◆ **Estuary Partnership actions** are solely the responsibility of the Estuary Partnership, which implements them and tracks the targets.

Within those categories, 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 primarily responsible for implementing the action.
- ◆ The Estuary Partnership’s role, as noted above, varies with each action:



**Track:** The Estuary Partnership tracks progress in implementing the action 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.

## 2011 Updated Actions

---

### Shared 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.

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

**ACTION 3:** Monitor status and trends of ecosystem conditions.

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

**ACTION 5:** Avoid the introduction 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 carbon 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.

### Estuary Partnership Actions

#### 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 diversity, and climate change to a range of users.

**ACTION 14:** Create and implement education and volunteer opportunities for citizens 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.

## *Shared Actions*



## 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 we feel the effects of habitat loss and degradation in the lower Columbia through Endangered Species Act listings, the decline of the local salmon fishing industry, and the economic challenges of dealing with contaminated materials in the environment. ◆

An ecosystem's stability and health come from its complexity. In an estuary, fresh river water mixes with salt water from the Pacific 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 kept the Columbia from inundating riparian areas in the estuary, restricted juvenile salmon's access to important rearing habitats, and radically changed the landscape. 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.

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. Personal income from the commercial salmon fishing industry has dropped dramatically and managing contaminated sediment makes it costly to maintain shipping channels and port facilities in the Columbia River. Restoring riparian areas provides spawning and rearing habitat that is critical to the recovery of ESA-listed salmon and other threatened and endangered species. Healthy riparian zones reduce sediment intrusion and runoff from construction, development, forestry, ranching, agriculture, farming, and road building. Healthy riparian areas shade streams, helping to maintain low water temperature. 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 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 call for more habitat and better habitat function. They envision regional approaches through use 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 bring together data to improve the level of restoration and will coordinate with its partners on how to more strategically prioritize restoration. In some instances, the Estuary Partnership may 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. As a National Estuary Program, the Estuary Partnership will help focus attention on water quality and habitat functions. 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.

**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.

**How:**

- Research and map habitat types including those important to threatened and endangered species and other populations at risk. Habitat types may include: tidal wetlands, riparian habitats, habitat corridors, deep water and near shore environments, and ecologically significant “critical” areas such as nursery grounds, spawning grounds, cold water refugia, and areas of high species diversity.
- Identify factors that limit proper functioning of habitat, including presence of toxic and conventional pollutants.
- Identify and prioritize habitat types to be protected and restored including habitat migration zone pathways.
- Develop appropriate criteria for habitat restoration and protections.
- 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.
- Identify habitat attributes lost to development and assess the potential impacts of proposed development.

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

**Targets**

1. Update a map of habitat types every five years.
2. Identify priority habitats for salmon by 2012.
3. Develop criteria and tools to identify other priority species, their priority habitats, and a schedule to map those habitats by 2018.
4. Map areas predicted to be inundated by sea level rise by 2014.

**Lead Entity:** The Estuary Partnership.

**The Estuary Partnership Role:**



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

**How:**

- Prioritize publicly owned lands.
- Preserve and restore the structural complexity and biodiversity of vegetation in tidal wetlands, swamps, and marshes.
- Support land acquisition programs (fee simple purchases, conservation easements, development rights) to manage important wetland habitats, tidal wetlands, environmentally sensitive lands, and coastal land that is damaged or prone to damage.
- Use appropriate site-specific techniques including dike removal, tide gate repair, culvert repair, to restore habitat and floodplain.
- Identify techniques for cost-effective re-vegetation of native species, including dredge material islands.
- 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).
- Restore habitat diversity to lessen the risks associated with climate change.
- Enhance or create beach area and/or shallow water habitat through the beneficial addition of sediment to shorelines.
- 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 cumulative impacts and habitat attributes lost to development and assess the potential impacts of proposed development.
- Explore ecosystem service markets and options for the lower Columbia River and estuary.

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

**Targets**

1. Permanently enhance, protect, create, or reclaim 19,000 acres of wetland habitat including at least 3,000 acres of tidally influenced habitat and 3,000 acres of upland habitat by 2014.
2. Permanently enhance, protect, create, or reclaim 25,000 acres of wetland habitat including at least 6,000 acres of tidally influenced habitat and 6,000 acres of upland habitat by 2025.

**Lead Entity:** Multiple private entities, public and natural resource and environmental agencies of federal, state and local government.

**The Estuary Partnership Role:** Implement on-the-ground projects, secure resources for the region, support partners on-the-ground work, coordinate with appropriate federal, state, and local governments, conservation entities, soil and water conservation districts, councils of governments, private landowners and others and track regional progress.



**ACTION 3:** Monitor status and trends of ecosystem conditions.

**How:**

- ◆ Use environmental indicators to measure and track ecosystem conditions.
- ◆ Collect baseline data for identified indicators and track over time.
- ◆ Establish and sustain a unified ecosystem monitoring program.
- ◆ Integrate ecosystem monitoring into contaminant monitoring.
- ◆ Adaptively manage to respond to emerging data, findings, and trends.
- ◆ Develop criteria (including indicator species and best assessment tools) for evaluating the effectiveness of habitat protection, restoration, and mitigation projects.
- ◆ Monitor habitat protection, restoration, and mitigation projects for effectiveness and ensure they are adequately maintained for long-term viability. Ensure adequate long-term maintenance of habitat projects.

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

**Targets**

1. Assess at least 20 projects representing a broad geography, restoration method, and type of habitat in the habitat effectiveness monitoring program by 2025.
2. Sample and analyze a full suite of indicators at five fixed sites and five rotating sites by 2015 as part of the ecosystem monitoring program. (Statistical sampling method based on Estuary Partnership Ecosystem classification (2011).)

**Lead Entity:** The Estuary Partnership.

**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 climate change impacts into planning for minimum flows, flow levels, and flow timing.
- ◆ Provide best possible natural spring freshet flow regime given forecasted climate change 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 climate change impacts.
  - Review water withdrawal applications and recommend appropriate conditions or limitations on permits to protect flows. Incorporate climate change 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.
- ◆ Assess impacts of Columbia River Treaty Review.

**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 2025.

**Lead Entity:** Multiple agencies of federal and state government, including US Entity, BPA, Army Corps of Engineers, and Water Resource Agencies.

**The Estuary Partnership Role:** Track and report activity.



**ACTION 5:** Avoid the introduction of non-native invasive species.

**How:**

- ◆ Periodically inventory existing populations of non-indigenous 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. Inventory invasive species and update periodically by 2020.
2. No new introductions by 2020.
3. Make State lists of banned plants and invasive species accessible to a range of issuers and users, e.g. nurseries, etc. by 2013 and every five years update banned list.
4. Fund Oregon and Washington inspection programs by 2012.

**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 the 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 climate change impacts 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 in the face of climate change.
- Create 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. Inventory and map in-water structures that affect flow as part of the shoreline inventory every five years.
2. Develop dredge material placement criteria by 2014.
3. Complete a regional sediment management plan to guide placement of dredge material and flow management by 2020.

**Lead Entity:** Multiple agencies of federal and state government, including U.S. 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. During the next century, projected increases in the region's human population will further tax these resources. 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 – that have a single source of entry into the water body. Today, most pollution enters the Columbia River from thousands of scattered, non-point sources, such as cars, farms, and lawns. As progress was made 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 incidence of shellfish disease increase, along with stream temperature. 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.

### **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.

- Conserving land reduces runoff allowing more natural infiltration.
- 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 also 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.



**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 storm events expected as a result of climate change (e.g. designation based on 200-year storm versus the 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.
- ◆ Refine shoreland protection programs pursuant to the Columbia River Treaty Review.

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

**Targets**

1. Reduce by 10% the percentage of armored or structured shoreline by 2025.
2. Reduce by 30% non-water dependent structures in the floodplain and floodway by 2025.
3. Map and make publicly available a 200-year floodplain map by 2018.
4. Update the Estuary Partnership shoreline inventory every five 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 from the impacts of climate change (e.g. 50-year storms instead of the 25-year storms currently standard).
- ◆ Promote practices through various means (e.g. print materials, websites or 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, street side 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. Focus on planting large, evergreen, long living trees.
- ◆ Use farming practices that keep livestock out of streams, minimize chemical application, and reduce erosion.
- ◆ 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 by 10% the number of communities using 50-year storm standard by 2018.
2. Reduce the incidence and severity of combined sewer overflows from urban areas by 2015.
3. Increase on-site retention by 35% by 2025.

**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 and reduces carbon emissions.

**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, stormwater management facilities, before development occurs. Incorporate consideration of climate change impacts 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, and fish and wildlife survival interrelate.
- ◆ Measure vehicle miles driven in the metro area every five years.
- ◆ 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).

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

**Targets**

1. Maintain impervious surface at no more than 12% to 15% of each county by 2025.
2. Increase by 10% mass transit, carpooling, walking and bicycle commuting in the metro area by 2020.
3. Reduce by 30% the ratio of converted land to population growth by 2030.

**Lead Entity:** Multiple agencies of state and local government.

**The Estuary Partnership Role:** Coordinate and assist extension offices, local governments, soil and water conservation districts and watershed councils; 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 (1) water quality standards, (2) sediment standards for pesticides, semi-volatile organics, dioxins/furans, metals, and cyanide, and (3) reference levels for dioxin/furan, PCB, and DDE burdens in fish tissue.

Another recently identified contaminant is flame retardants – PBDEs. These are widespread in the lower river, especially in urban and industrial areas. PBDEs are known to reduce the number of osprey 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 twelve 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.

Flame retardants, pharmaceuticals, and ingredients in personal care products now are being found throughout the system. In 2007, for example, endocrine-disrupting compounds that block or mimic hormones and harm fish and wildlife were detected at 22 of 23 sites. These compounds can cause male fish to essentially morph into female fish within a life cycle. They also affect a fish’s ability to avoid predators and resist disease. All of these effects inhibit recovery of the 13 salmon species in the lower Columbia River that are listed as threatened and endangered under the ESA.

### **Taking Action**

Actions 10 through 12 call 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 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 citizens 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 the fate 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 2014 and every ten years thereafter.
2. Identify a regional list of priority contaminants targeted for reduction by 2015.
3. Regularly monitor and analyze the full suite of priority contaminants at a minimum of 30 sites by 2018 and report on impact on ecosystem and human health.
4. Identify trends in contaminants and impacts of reduction actions by 2025 to adaptively manage.

**Lead Entity:** 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 TMDL development.
  - Develop and implement total maximum daily loads (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, 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 not meeting water quality standards by 2030.
2. Reduce discharges by 25% from nonpoint sources by 2025.
3. Put in place trading opportunities among dischargers by 2021.

**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 lawn mowers and minimize the use of petroleum-powered engines with incentives for innovative approaches (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 2025.
2. Render hazardous waste sites harmless by 2050.
3. Reduce sales of products containing contaminants (fertilizers, pesticides, personal care products) by 2030.
4. Institute a region wide pharmaceutical take back with law enforcement and hospice providers by 2018. Expand the program 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 2025.
7. Map derelict vessels and by 2015 remove 50% of the derelict vessels by 2022.
8. Remove chlorine from wastewater treatment and industrial processes by 2025.
9. All vessels use pump out facilities by 2021.

**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.



# *Estuary Partnership Actions*



## 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 citizens 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 citizens, 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. Most adults concerned about the environment attribute their commitment to two things: (1) the hours they spent outdoors during childhood or adolescence, and (2) an adult who taught respect for nature. 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. They have a much shorter "roaming" distance from home than they did a generation ago, and children between the ages of two and eleven spend an average of 28 to 32 hours a week in front of a TV, computer, or cell phone screen. 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 actually experiencing the river 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 citizens. 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 citizens 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 connection to the river. Sharing information among peers helps demonstrate the economic and the 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 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, how to be safe, 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 citizens isn't telling them what we want them to know. It's giving them the information they need to connect.

**ACTION 13:** Provide information about the lower Columbia River and estuary that focuses on water quality, endangered species, habitat loss and restoration, biological diversity, and climate change to a range of users.

**How:**

- Using Estuary Partnership environmental indicators, report regularly to the public 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.
- Develop educational materials that convey river issues and conditions (including targeting individual consumers), along with how daily actions affect the carbon footprint and river conditions, 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 and runoff generated by their homes or building footprint, 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 the green technology and the pollution prevention hierarchy of prevent, reduce, re-use and recycle.
- Develop 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 2017 and every ten years thereafter.
3. Publish a status of habitat restoration efforts in the region by 2019.
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 annually.
2. Host or co-host a regional scientific workshop at least every two 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 citizens 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.
- Work with existing educational programs to build capacity and fill gaps.
- 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 climate change, oceans, macroinvertebrates, stormwater, water quality, geology, history, demography, 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.

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

**Targets**

1. Provide a minimum of 35,000 hours of river education programs to at least 5,000 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. Host a teacher workshop at least once a year.
4. Update curriculum at least once a year.

**Lead Entity:** The Estuary Partnership.

***The Estuary Partnership Role:***



**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, businesses, refuges, camping, and Estuary Partnership activities such as habitat restoration projects and river education.
- ◆ Assess adequacies of existing sites and trails, and identify additional sites and trails where the environmental or cultural impacts are neutral or positive.
- ◆ Engage citizens in siting, restoration, and development of access points.
- ◆ Provide assistance to enhance responsible public access to the river.
- ◆ Provide opportunities for children and adults to participate in on-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.
- ◆ Maintain Water Trail website.

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

**Targets**

1. Update the Water Trail website at least twice annually.
2. Produce a series of water trail maps by 2013.
3. Conduct at least one cleanup or maintenance of a Water trail site annually as part of the volunteer program.
4. Conduct at least five community paddles led 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 citizens. 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 citizens. 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 2004 to 2009, the major investment in the Columbia mainstem was Northwest Power and Conservation Council and Bonneville Power Administration funds. Of the \$877 million invested, only 6.7 percent was spent in the lower river, primarily on salmon recovery. The states of Oregon and Washington have stepped up their efforts to protect waterways, habitat, and fish and wildlife within state boundaries, but the mainstem remains an orphan.

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 be able to achieve the next level of results we need.

### **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 EPA and USGS with Columbia Basin toxic contaminants reduction work.
- Implement key actions for the federal Action Agencies 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 diversity, and climate change.
- Build collaborations to promote compliance with existing laws and regulations to protect/conserves/manage natural resources and protect species.
- 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 governments.
2. Convene a regional executive committee at the Governors' requests to coordinate efforts on species and water quality by 2015.
3. Provide expertise to a minimum of two other organizations annually concerned with lower river resources such as Vancouver Lake Partnership, West Hayden Island Technical Advisory Committee, Lower Columbia Solutions Group, EPA Columbia River Toxics Reduction Working Group.

**Lead Entity:** 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.
- 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 six-year strategy to implement activities in the Management Plan.
2. Develop a six-year funding strategy to support the six-year implementation strategy.
3. Update the status of implementation strategy activities annually.
4. Maintain or grow state and federal NEP funding.
5. Maintain diversified funding.
6. The Columbia River Restoration Act is enacted by 2015 and reauthorized regularly.
7. Make annual federal appropriations requests.

**Lead Entity:** Estuary Partnership.

**The Estuary Partnership Role:**



# Actions & Measures At-a-Glance

	Measures	1	2	3	4	5	6	7	8	9
	<b>Shared Actions</b>									
	<b>Habitat Restoration</b>									
	<b>Inventory habitat types and attributes and prioritize those that need protection and conservation. Identify 1 habitats and environmentally sensitive lands that should not be altered</b>	Update map of habitat types every five years	Identify priority habitats for Salmon by 2012	Develop tools to identify other priority species by 2018	Map by 2014 predicted areas of inundated by sea level rise					
	<b>Protect, conserve, and enhance priority habitats, 2 particularly wetlands, on the mainstem of the lower Columbia River and in the estuary.</b>	Protect 19,000 of wetland habitat by 2014	Protect 25,000 acres of habitat by 2025							
	<b>3 Monitor status and trends of ecosystem conditions.</b>	Include 20 projects in effectiveness monitoring by 2025	Analyze a full suite of indicators by 2015							
	<b>4 Establish and maintain Columbia River flows to meet ecological needs.</b>	Increase water to meet minimum flows by 2025								
	<b>5 Avoid the introduction of non-native invasive species.</b>	Inventory invasive species and update by 2020	Incur no new introductions by 2020	Make state lists of banned species accessible by 2013; update every five years	Fund state inspection programs by 2012					
	<b>6 Manage human-caused changes in the river morphology and sediment distribution within the river channel and estuary to protect native and desired species.</b>	Map in-water structures every five years	Develop dredge placement criteria by 2014	Complete sediment management plan by 2020						



	Measures	1	2	3	4	5	6	7	8	9
	<b>Land Use Practices</b>									
	<b>7 Develop floodplain management and shoreland protection programs.</b>	Reduce armored shoreline by 10% by 2025	Reduce non-water dependent structures by 30% by 2025	Map 200-year floodplain by 2018	Update shoreline inventory every five years					
	<b>8 Reduce and improve the water quality of stormwater runoff and other non-point source pollution.</b>	Increase number of communities using 50 year floodplain by 10% by 2018	Reduce CSOs in urban areas by 2015	Increase on-site retention of runoff by 35% by 2025						
	<b>9 Ensure that development is ecologically sensitive and reduces carbon emissions.</b>	Maintain impervious surface in each county between 12% and 15% by 2025	Increase use of mass transit, bicycling or walking by 10% by 2020	Reduce ratio of converted land to population growth by 30% by 2030						
	<b>Water Quality and Contaminant Reduction</b>									
	<b>10 Expand and sustain regional monitoring of toxic and conventional pollutants.</b>	Update monitoring strategy by 2014 and every ten years	Identify list of priority contaminants by 2015	Monitor and analyze full suite of contaminants by 2018 at 30 sites	Identify trends by 2025 and adaptively manage					
	<b>11 Reduce conventional pollutants.</b>	Decrease number of streams not meeting water quality by 50% by 2030	Reduce discharged from non-point sources by 25% by 2025	Put trading opportunities in place by 2021						
	<b>12 Cleanup, reduce or eliminate toxic contaminants, particularly contaminants of regional concern.</b>	Clean up five hot spots by 2025	Render hazardous waste sites harmless by 2050	Reduce sales of products with contaminants reduce by 2030	Institute region wide pharmaceutical take back program by 2018, expand by 2030	Hold pesticide and fertilizer collection in multiple locations annually	Remove marine debris at 40 sites by 2025	Map derelict vessels by 2015, remove 50% by 2022	Remove chlorine from processes by 2025	All vessels use pumpout facilities by 2021

	Measures	1	2	3	4	5	6	7	8	9
	<b>Estuary Partnership Actions</b>									
	<b>Education and Stewardship</b>									
	Provide information about the lower Columbia river and estuary that focuses on water quality, endangered species, habitat loss and restoration, biological diversity, and climate change to a range of users.	Issue a State of Estuary Report every five years	Publish technical analysis on toxics by 2017 and every ten years	Publish status of habitat restoration efforts by 2019	Distribute consumer info regularly	Host Science to Policy summits annually	Host or co-host regional scientific workshops every two years	Update technical information on website annually		
	13									
	Create and implement education and volunteer opportunities for all citizens of all ages to engage in activities that promote stewardship of the lower Columbia River.	Provide 35,000 hours of educational instruction to 5,000 K-12 students annually	Organize ten volunteer projects annually	Host one teacher workshop per year	Update curriculum once a year					
	14									
	15 Identify and improve public access to the river.	Update Water Trail website twice annually	Produce map series by 2013	Host cleanup/maintenance at one site	Host five community paddles annually					
	15									
	<b>Regional Coordination and Synchronicity</b>									
	Facilitate and assist federal, tribal, state and local government agencies protection of the lower Columbia River and estuary.	Implement restoration projects in five counties annually	Convene executive committee to coordinate efforts by 2015	Provide expertise to at least two groups annually						
	16									
	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.	Define six year implementation strategy	Develop six year funding plan	Update status of implementation annually	Maintain or grow state and federal NEP funding	Maintain diversified funding	Gain passage of Restoration Act by 2015	Make annual appropriations requests		
	17									

# 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 the strategic directions for activities. Every six years, the Board adopts an implementation strategy to guide day-to-day Estuary Partnership activity. This allows regular review of the progress implementing the Management Plan and incorporates emerging needs of the region.

The Estuary Partnership maintains a running status of progress implementing activities in the six-year strategy. Progress of each activity is reported in our annual status report.

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 and State NEP funding we receive. As an NEP, we also report to Congress and EPA annually on Estuary Partnership activities. We report in detail the habitat acres restored and protected directly by the Estuary Partnership and by regional partners. We also report annually on how we leveraged EPA NEP funds. These two are required as part of the Government Performance and Reporting Act. We report to the States' legislatures every two years. We report to our State NEP funders as stipulated in our contracts.

The Estuary Partnership also reports every five years on a set of six indicators. This is our 'State of the Lower River and Estuary' report. We track five measures: pollutant levels, land cover trends, citizen 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 is responsible for implementing Actions 13-17 and tracking and evaluating progress toward meeting the targets.

For Shared Actions, Actions 1-14, implementing and tracking progress varies. In identifying targets, we tried to use targets that were currently being measured by an existing entity. 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.

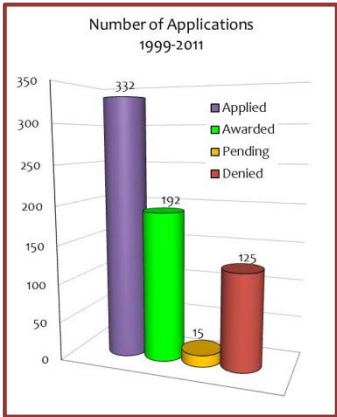
The Estuary Partnership develops a financial plan that supports the six-year implementation strategy. It sets funding goals that direct research, applications and requests. This allows us to be strategic as we apply for funds and our success rate has been about 2:1, above the 10% -25% range that is often the case with grant writing.

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 50% of the match required to secure the NEP funding.

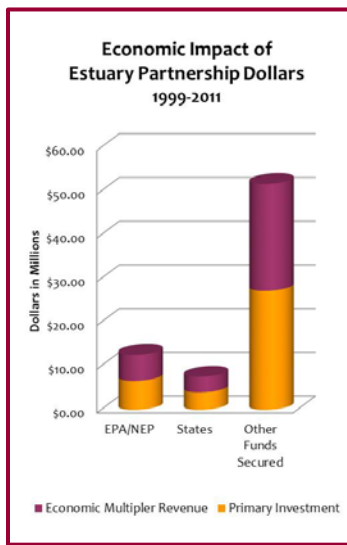
The Estuary Partnership started with just EPA and states NEP funds. In 2000, we accepted our first private donation -- \$91.15 from students at Peterson Elementary School in Scappoose. They collected bottles and cans, researched causes and chose to invest their funds in the Estuary Partnership school programs. Since then, we have added corporate donors growing from one in 2000 to over 50, several dozen foundations and hundreds of individuals. We have also expanded our public funding sources as well.

We continue to expand and diversify sources of funding. Over 50% of our education programs are supported by competitive grants and unrestricted contributions. Diversifying our funding allows us to focus our restoration, monitoring, and toxic reduction work on the entire ecosystem, including habitat for threatened and endangered species.

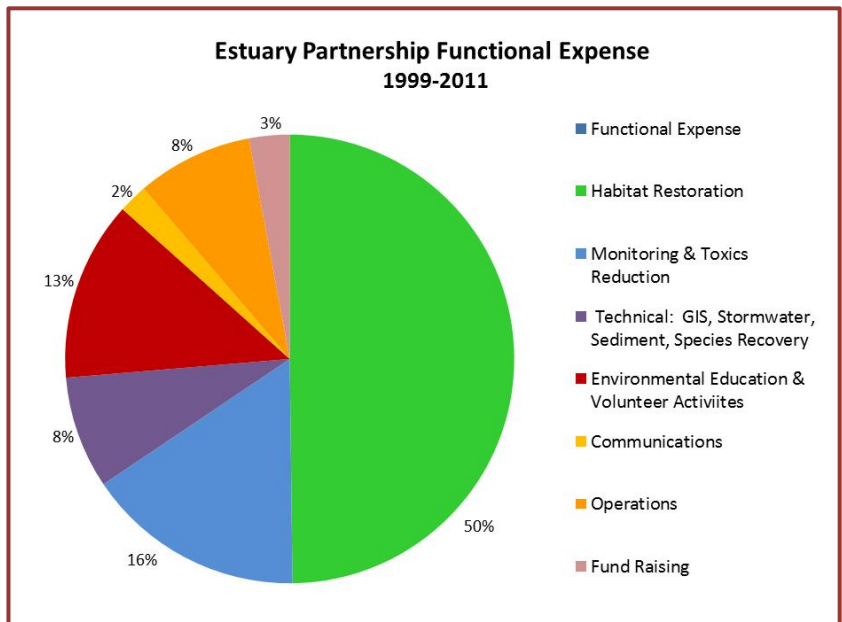


### The NEP Workhorse: Regional Impact

NEPs are measured annually in part by their ability to leverage funds well beyond the required 1:1 match. The Estuary Partnership leverages the state funds and federal NEP funds to bring in competitive funds that give an average total return on the federal NEP funds of 15:1. Adding a regional multiplier of 1.9 brought nearly \$34.1 million additional dollars to cycle through the region as a result of the Estuary Partnership leverage.



Seventy-four percent of the funds we have leveraged for the region since 1999 went to local entities to implement habitat restoration

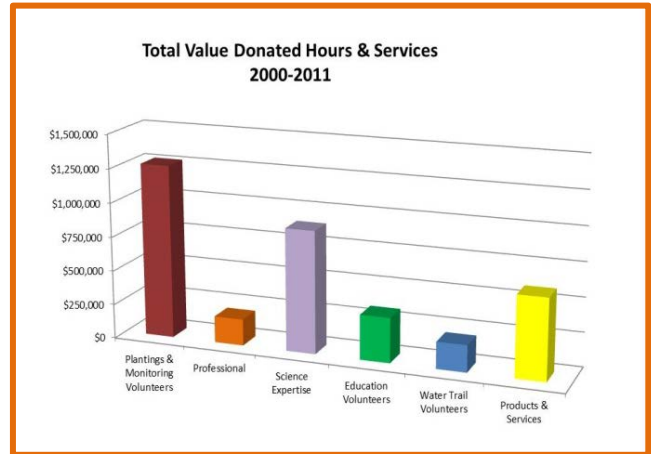
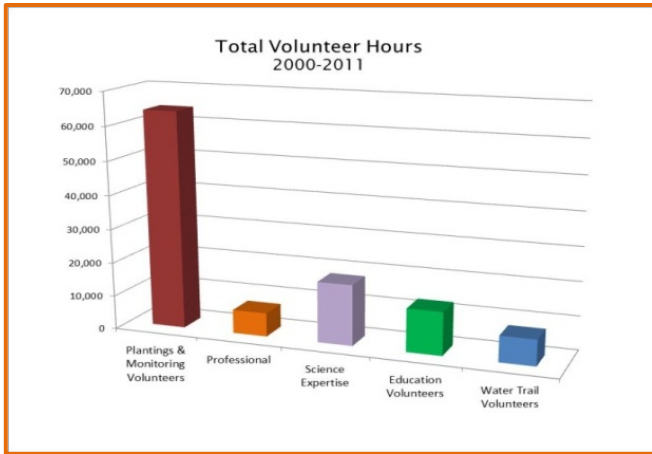


or monitoring projects. These are often funds that can be accessed and managed more cost effectively through a regional entity like the Estuary Partnership.

Thirteen percent went to our K-12 applied science programs to help teachers meet benchmarks and volunteer projects including riparian tree plantings. Twelve percent supported core programs (sediment management planning, stormwater management assistance, information exchange networks, technical workshops and publications and regional forums), communications and organization operations, including three percent for fund-raising.

### Volunteers

Since our volunteer programs began in 2000, 40,485 volunteers have donated 107,334 hours to Estuary Partnership activities such as riparian plantings, habitat enhancement, water quality monitoring, invasive species removal, and water trail maintenance. Volunteers have also provided professional expertise guiding our science projects and governing the organization. The value of those hours has added \$3,350,617 to our efforts.

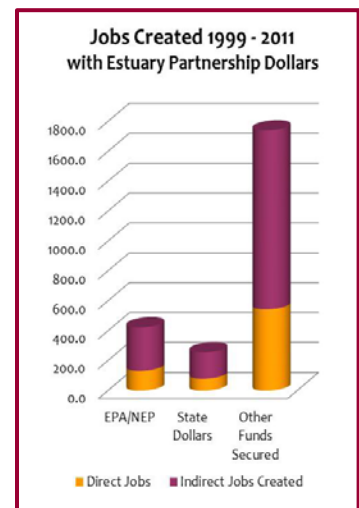


## Jobs

Research from 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.<sup>3</sup>

The investment in the Lower Columbia Estuary Partnership has created 757 direct jobs and 1,665 indirect jobs, a total of 2,421 local jobs since 2000.

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, hospice workers, soil & water district employees, fence installers, pesticide applicators, skilled and unskilled labor for tree planting, road crews, field technicians, boat crew 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. Through this first decade of implementation, collaboration has proven even more essential. Working together is the only way we can be efficient, represent the values of all the region's citizens, and preserve and enhance the ecosystems of the lower river and estuary. Our collective progress to date demonstrates the impact of that collaboration. The challenges ahead are more difficult though: current economic issues affect investments; habitat restoration projects are more expensive and complex; and the work to clean up and reduce contaminants requires a long-term commitment.

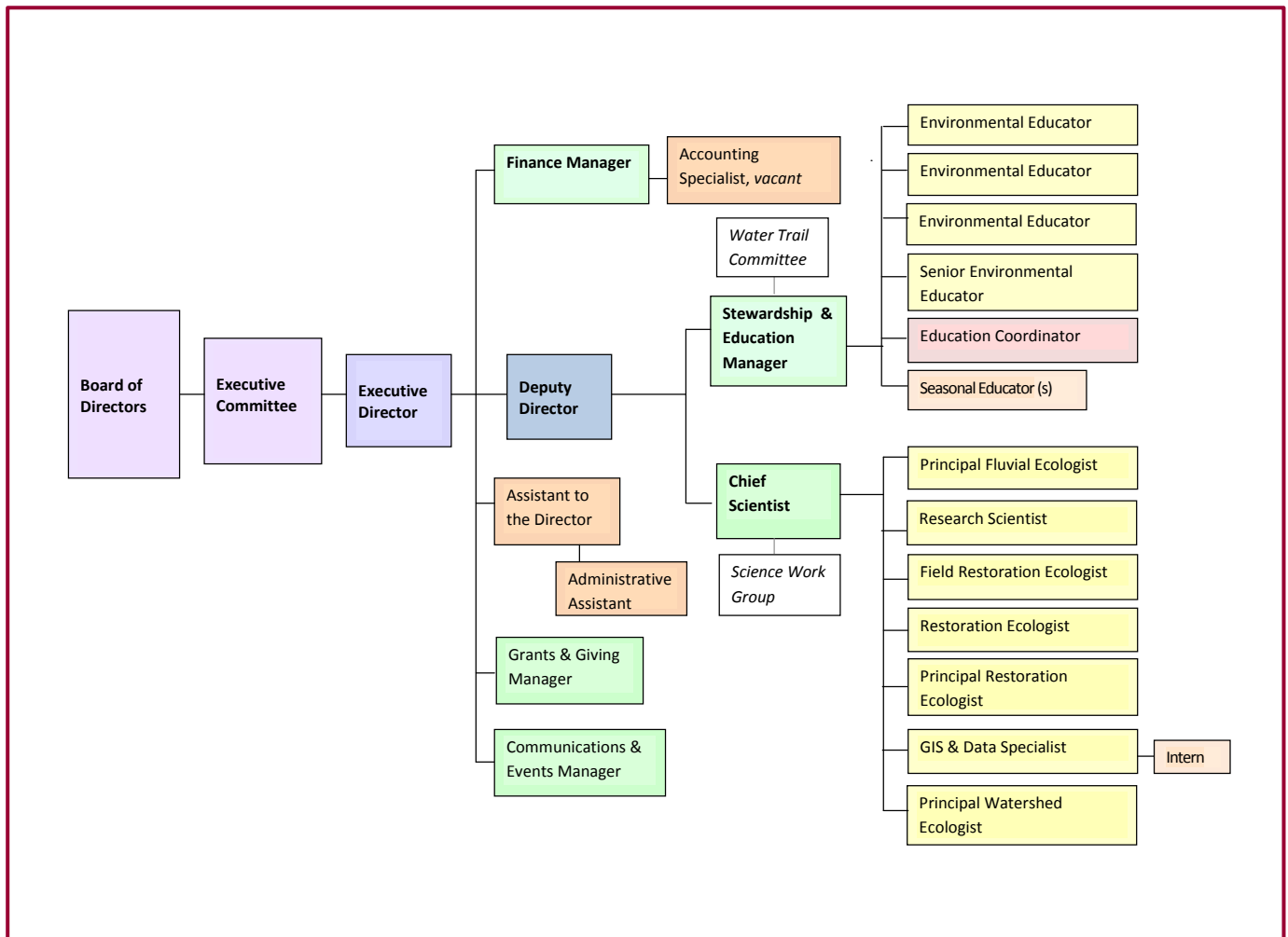
Every one of the 28 National Estuary Programs, including the Estuary Partnership, has made great progress with environmental improvements distinctive to their estuary and its problems through locally driven, scientifically based partnerships. With collaboration, the possibilities are limited only by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

The Estuary Partnership is more than a group of employees, more than a Board of Directors. We are teachers, students, scientists, volunteers, public and private professionals, engineers, paddlers, parents, boaters, hydrologists, road crews, farmers, river boat pilots, fishers, biologists, fence installers, landowners and foresters who share a commitment of providing a thriving lower Columbia River for our children's children.

<sup>3</sup> University of Oregon, "Economic and Employment Impacts of Forest and Watershed Restoration in Oregon", Spring 2010.

# Appendices

## 2011 Organization Chart



## 2011 Board of Directors

Tom Byler  
*Oregon Watershed Enhancement Board*

Kevin Gray  
*Clark County Environmental Services*

Steve Harvey  
*Cowlitz-Wahkiakum Council of Governments*

Susan Holveck  
*Beaverton School District  
Dept. of Teaching & Learning*

Bill Hutchison, Esq.  
*Lane Powell Attorneys & Counselors*

David Judd  
*Citizen, Parks & Recreation*

Paul Lumley  
*Columbia River Inter-Tribal Fish Commission*

Margaret Magruder  
*Agricultural Community*

Dean Marriott  
*City of Portland  
Bureau of Environmental Services*

Iloba Odum  
*Washington Department of Ecology*

Dick Pedersen  
*Oregon Department of Environmental Quality*

Donna Quinn  
*Cannery Pier Hotel*

Jeff Smith  
*Smith Root, Inc.*

Kathryn Van Natta  
*Northwest Pulp and Paper*

Reed Waite  
*Citizen, Water Trails & Recreation*

*Office of Oregon Governor  
Kitzhaber*

*Office of Washington Governor  
Gregoire*

**Officers:**  
Steve Harvey  
*Chair*

David Judd  
*Vice Chair*

Debrah Marriott  
*Secretary*

**Ex Officio:**

Yvonne Vallette  
Mary Lou Soscia  
*US Environmental Protection Agency*

Patty Dornbusch  
*National Marine Fisheries Service*

Kevin Brice  
*US Army Corps of Engineers*

Greg Fuhrer  
*US Geological Survey*

Debrah Marriott  
*Lower Columbia Estuary Partnership*

**Honorary Board Members**

The Honorable Brad Witt  
*Oregon House of Representatives*

The Honorable Sharon Wylie  
*Washington State House of Representatives*

The Honorable Jackie Dingfelder  
*Oregon State Senate*

## 2011 Estuary Partnership Staff

### **Executive Team**

Debrah Marriott  
*Executive Director*

Chris Hathaway  
*Deputy Director*

Pam Andrews  
*Assistant to the Director*

Tom Argent  
*Finance Manager*

Maggie Coddling Jones  
*Grants & Giving Manager*

Laura O'Keefe  
*Communications & Events Manager*

### **Stewardship Team**

Jennie Klein  
*Stewardship Programs Manager*

Josh Holcomb  
*Education Coordinator*

McKenzie Miller  
*Senior Environmental Educator*

Annie Kleffner  
*Environmental Educator*

Katie Jacobson  
*Environmental Educator*

Samantha Johnson  
*Environmental Educator*

### **Science Team**

Catherine Corbett  
*Chief Scientist*

Bill Bennett  
*Restoration Ecologist*

Marshall Johnson  
*Principal Watershed Ecologist*

Chris Collins  
*Principal Restoration Ecologist*

Evan Haas  
*Restoration Ecologist*

Jina Sagar  
*Research Scientist*

Keith Marcoe  
*GIS and Data Management Specialist*

Paul Kolp  
*Principal Fluvial Ecologist*







811 SW Naito Parkway, Suite 410 ♦ Portland, Oregon 97204  
503.226.1565 ♦ 503.226.1580 Fax ♦ [www.estuarypartnership.org](http://www.estuarypartnership.org) ([www.lcrep.org](http://www.lcrep.org))