Action Agenda

The Puget Sound Action Agenda is a strategy for cleaning up, restoring, and protecting Puget Sound by 2020

PugetSoundPartnership

our sound, our community, our chance

December 1, 2008

To the People of Puget Sound:

Puget Sound is in trouble.

Most of that trouble is caused by the everyday activities of us – the humans who share this beautiful place with millions of other living things.

For the most part, we have not caused the Sound's decline out of malice. The Sound's health has largely been compromised by: how we have covered up the land with houses, buildings and parking lots; how we live and prosper; how we treat our waste; and how we transport ourselves.

In 2007, Governor Gregoire proposed and the Legislature created the Puget Sound Partnership to reverse Puget Sound's decline and restore it to health by 2020. We were to do this restorative work by coordinating the many existing cleanup efforts, holding all levels of government agencies accountable for their part of that work, and at the same time, maintaining the prosperity of the region.

Seven signers of this letter are the members of the Leadership Council appointed by the Governor and charged by the Legislature with overseeing this effort. The eighth signer, David Dicks, is the Executive Director of the Puget Sound Partnership.

Today we are releasing an Action Agenda outlining the immediate and long-term actions necessary to restore and protect Puget Sound. Thousands of people – from scientists to citizens, from Blaine to Olympia to Hoodsport to Port Angeles – helped us understand the problems and put forward solutions.

The Action Agenda carefully outlines how to solve the problems that threaten Puget Sound – which include pollutants in stormwater that washes off our city streets, suburban, and rural areas into the Sound, to the more than 21 species that have been listed as threatened or endangered, to massive fish kills in Hood Canal, to continued discharges of toxic substances into the Sound, to loss of habitat for living things throughout the region – whether on land or in fresh and marine waters.

Our environment, our health, and our economy are all threatened by the current trends in Puget Sound's environmental decline. Add to this well over a million more people by 2020 and the effects of climate change, and we find ourselves facing a challenge unmatched in the region.

We are aware that cleaning up our mess – restoring our place – will require new resources. And we know these are hard economic times for the people of Puget Sound. But not taking the steps outlined in the Action Agenda will ultimately place a much higher burden on all of us – both economically, in health costs from exposure to toxic substances, and environmentally, in the loss of the stunning and vibrant life of Puget Sound, the economic engine for our state.

But perhaps the most significant loss would be that of the Puget Sound experience, which so enriches our lives. Many of us were drawn here – and stay here – because of the incredible beauty and natural diversity of our home – our Puget Sound.

It's unthinkable – indeed, unconscionable – that we would not take the necessary steps to make our home prosperous and safe for ourselves and every other living thing whose very existence depends on us.

We call on all citizens of our region to understand what's going on in Puget Sound and pledge to take the steps, individually and collectively, to protect, restore, and maintain our shared place.

A healthy Puget Sound is fundamental to our way of life and a legacy that we all want to pass on to our children.

Now is our chance to make and keep Puget Sound a healthy and prosperous place for all of us.

Sincerely,
Puget Sound Partnership Leadership Council

Bill Ruckelshaus *Chair*	Billy Frank, Jr.	Dan O'Neal	Bill Wilkerson
Martha Kongsgaard *Vice Chair*	Diana Gale	Steve Sakuma	David Dicks *Executive Director*

Puget Sound Action Agenda

Protecting and Restoring the Puget Sound Ecosystem by 2020

Puget Sound Partnership

December 1, 2008

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The Partnership extends its sincere appreciation to the countless organizations, agencies, and individuals who contributed to the production of the Action Agenda during the past 18 months. Their dedication to a shared vision for protecting and restoring the entire Puget Sound ecosystem will help make our mission a success.

Working together, we can achieve the region's desire to pass on a legacy of a clean and healthy Puget Sound to future generations.

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Overview of the Puget Sound Action Agenda

> *"[It is our task] to ensure that the Puget Sound forever will be a thriving natural system, with clean marine and freshwaters, healthy and abundant native species, natural shorelines and places for public enjoyment, and a vibrant economy that prospers in productive harmony with a healthy Sound."*
>
> *--- Governor Christine Gregoire*

When the Puget Sound Partnership was created in 2007, the Legislature gave us three basic charges:

- Define a 2020 Action Agenda that identifies work needed to protect and restore Puget Sound, based on science and with clear and measurable goals for recovery;
- Determine accountability for achieving results including performance, effectiveness, and the efficient use of money spent on Puget Sound; and
- Promote public awareness and communication to build support for a long-term strategy.

The 2020 Action Agenda represents a new way of approaching the management of the Puget Sound. It takes an ecosystem approach from the crest of the Cascades and Olympics to the waters of the Strait of Juan de Fuca and Hood Canal. Building on the Puget Sound region's award-winning work to recover species and clean up polluted waters, the Action Agenda integrates scientific assessment with community priorities, and establishes a unified set of actions that are needed to protect and restore Puget Sound. The Action Agenda also serves as a statement of common purpose across the Sound and forms the basis for cooperation and collaboration among implementing partners.

The Puget Sound Action Agenda is designed to be adaptable and is intended to be changed over time. The Legislature set a December 1, 2008 deadline for the creation of the Action Agenda, and included a regular schedule for updated work plans. In creating the Action Agenda, the Partnership collaborated with hundreds of affected parties, used the experience and expertise of existing regional agencies, and involved local communities and scientists in crafting regional solutions. Local and regional partners implored us to seek practical solutions and to build on existing programs that are working whenever possible. Scientific information about the health of Puget Sound, the threats to the ecosystem, and future challenges and risks has been incorporated throughout the process. Across Puget Sound, federal and state agencies, tribes, city and county governments and other agencies, businesses, environmental organizations, watershed groups, landowners, and individual citizens have stated their support for the Action Agenda and their willingness to implement their role in restoring Puget Sound.

Continued collaboration with the many governments and interests in Puget Sound will be essential in implementing solutions and sustaining actions that support a healthy ecosystem while moving forward with a vibrant economy. The Action Agenda was completed during a time of severe financial strain for our country, state, and citizens. Local governments are already pressed to find ways to provide basic services. The current economic climate underscores the need for the Puget Sound effort to be more efficient with human and financial resources and to set priorities. Our time and energy must be focused on what matters and makes a difference. We hope the Action Agenda provides the roadmap for doing that.

How was the Action Agenda developed?

The Puget Sound Action Agenda was developed in a fundamentally different way from traditional "top-down" planning approaches, using transparent public forums and soliciting extensive citizen and scientific input. During 2008, the Partnership took the four basic questions framing the Action Agenda to scientists, elected officials, businesses, volunteers, and local communities. Public workshops, expert topic forums, and implementer-focused action area meetings were used to discuss the health of Puget Sound, future threats, what is being done, and what people think is needed. More than 1,600 people attended public workshops, 75 presentations were given to business and community organizations, and 11,182 public comments were received in writing or on-line with ideas and comments on the Partnership's work.

- Workshops were held in the seven action areas of Puget Sound to discuss the important features of the action area, local stresses and threats, and top priorities for action. The workshops were focused primarily on gathering input from the organizations and individuals who are responsible for implementing much of the work to protect and restore Puget Sound. Results of the workshops are primarily reflected in the action area profiles.
- Topic forums of regional experts were convened to analyze six issues that reflect ecosystem health: land use and habitat; species and biodiversity; water quality; freshwater quantity; human health; and human well-being. Findings on conditions, management approaches, and recommendations are described in the topic forum papers. The work of the topic forums helped in developing Questions 2 and 3 of the Action Agenda.
- Scientific input was overseen by the Science Panel and included development of desired outcomes and indicators to measure ecosystem health, peer-review of the scientific elements of the topic forum papers, and the preparation of a Biennial Science Work Plan that will help refine elements of the Action Agenda as the region moves forward.

Review of the Action Agenda: The Partnership reviewed the near-term action ideas with the Ecosystem Coordination Board (ECB) in October and November 2008, and ECB members provided helpful refinements and ideas about prioritization. A two-week public review of the draft Action Agenda was conducted in November. More than 1,000 individual comments came from public agencies, associations and community groups, water groups, business and environmental interests, and individual citizens. The comments fall into several broad categories identified below:

- A wide range of agencies and groups expressed their appreciation and support for the Puget Sound Action Agenda, including affirmation of the actions identified.
- Specific aspects of the Action Agenda that need refinement were identified, including: indicators of ecosystem health; ecosystem targets and benchmarks; better links between goals, indicators, and actions; more detail on the overall accountability, costs, and the funding strategy; and the need to prioritize actions and identify a work plan for moving forward. This information is better described in the final Action Agenda, including next steps to improve each of these areas.
- There were suggestions that the Partnership summarize the areas of focus in the Action Agenda and elaborate on which of areas should be emphasized. A section was added to the Introduction to address this need.

- Numerous technical corrections and clarifications were submitted, as well as refinements to actions and strategies. References, a glossary, and table of contents were requested. Many clarifications were made as time permitted, including a key references section, glossary, and table of contents.
- Other comments and ideas were submitted about specific issues to consider. The Partnership received many helpful comments on a variety of subjects ranging from additional funding ideas, water conservation techniques, specific implementation considerations, and others. Many of these ideas need more consideration than time allowed and we have cataloged them for future discussion.

A comment-response summary and the comment letters are included in the Action Agenda Appendices.

Inside the Action Agenda

The Action Agenda is structured around four basic questions:

1. What is a healthy Puget Sound?
2. What is the status of Puget Sound and what are the biggest threats to it?
3. What actions should be taken that will move us from where we are today to a healthy Puget Sound by 2020?
4. Where should we start?

Question 1: What is a healthy Puget Sound?

A healthy Puget Sound includes a thriving natural world, high quality of life for people, and a vibrant economy. Puget Sound residents overwhelmingly agree that a healthy environment is a legacy that must be passed on to our children and grandchildren, but defining the elements of a healthy system is very difficult. Several goals for a healthy Puget Sound have been set out by the Legislature, and the Partnership has been working with regional scientists to link these goals to specific measures of ecosystem health. The development of a clear set of measurable indicators and benchmarks for the health of Puget Sound is a new effort that will enable us to assess whether progress is being made, adjust our actions, and report back to the public.

Question 2: What is the status of Puget Sound and what are the biggest threats to it?

Although many types of human activities threaten the health of the Puget Sound ecosystem, there is considerable agreement among regional scientists and community leaders that the alteration and loss of habitat and the ongoing input of pollution are the top two immediate and pervasive threats facing Puget Sound. Habitat alteration has occurred throughout the estuaries, rivers, forests, and beaches of Puget Sound, and thousands of pounds of additional pollution enters the waterways on a daily basis. The entire region faces challenges from a growing human population and a changing climate that will exacerbate the many existing pressures on Puget Sound.

Question 3: What actions should be taken that will move us from where we are today to a healthy Puget Sound by 2020?

The Partnership has developed an Action Agenda at both the scale of the Puget Sound ecosystem, and in local action areas designated by the Legislature. Question 3 includes Soundwide actions as well as local fixes that address the unique conditions of the individual action areas.

The Partnership synthesized existing information about Puget Sound and used additional information developed and received during the development of the Action Agenda to create five strategic priorities to achieve progress at the Soundwide scale. These five priorities, along with associated actions, address the major threats to ecosystem health and embrace a new approach to managing and sustaining the Puget Sound ecosystem. This comprehensive, consolidated set of necessary actions is a significant step forward. As the Action Agenda is implemented and we evaluate our progress, the strategies and actions will be adjusted to help achieve the 2020 goals.

Our strategic priorities are to:

Priority A: **Protect** the intact ecosystem processes, structures, and functions that sustain Puget Sound. Avoiding problems before they occur is the best and most cost-effective approach to ecosystem health.

Priority B: **Restore** the ecosystem processes, structures, and functions that sustain Puget Sound. Protecting what we have left is not sufficient, and significant effort at an unprecedented scale is needed to undo past damage.

Priority C: **Prevent water pollution at its source.** Many of our efforts have focused on cleaning up degraded waters and sediments, but insufficient resources have been devoted to stopping pollutants before they reach our rivers, beaches, and species.

Priority D: **Work together** as a coordinated system to ensure that activities and funding are focused on the most urgent and important problems facing the region. Many of the programs and laws now used to regulate or support activities in Puget Sound were established on a piecemeal basis to address individual problems. Strategies that will help to address problems more effectively at an ecosystem scale include improved coordination of land use planning, water supply, ecosystem protection, transportation, and species recovery plans. The Action Agenda calls for the reform of environmental regulatory programs as well as improvements to the capacity of local partners to implement actions and compliance efforts across Puget Sound.

Priority E: **Build an implementation, monitoring, and accountability management system.** This includes:

- Using a **performance management system** with adaptive management and clear pathways for decision making, coordinated monitoring, accountability for action, and coordinated data management;
- Providing **sufficient, stable funding** focused on priority actions;

- Implementing a **focused scientific program** with priorities for research, and developing appropriate measures to improve understanding of the ecosystem and the effectiveness of our actions; and
- Increasing and sustaining **coordinated efforts for communication, outreach, and education.**

Highlights of the Action Agenda include:

Account for anticipated growth and climate change. Our region is growing fast and changing. We can help accommodate this growth through: projects, regulations, and incentives to better protect intact areas; focusing growth in urban areas; conserving freshwater resources; and protecting working farms and forests. Actions to adapt to and mitigate for climate change are included.

Engage the private sector in finding practical solutions. Through creativity and ingenuity, the private sector will be a partner in implementing the Action Agenda. Many businesses are already taking stewardship actions. Incentives for actions, new ways of approaching mitigation requirements, and technological innovation are included.

Implement the regional salmon recovery plans as an integral part of Puget Sound restoration. The salmon recovery plans are a cornerstone of the efforts to improve the health of the Puget Sound ecosystem. The data, planning, and community commitment that have gone into the recovery plans overlap with and complement Puget Sound recovery efforts. The Puget Sound Partnership is responsible for implementing the regional salmon recovery plans for Chinook and summer chum salmon that have been approved by the National Oceanic and Atmospheric Administration (NOAA). Salmon recovery plans have been prepared by local groups in all 14 watershed areas of Puget Sound and include detailed actions for protecting and improving habitat, restoring river deltas and estuaries, re-vegetating stream corridors, removing barriers, conserving instream flows, and upgrading hatchery operations. Benefits of implementation extend to many other species, including orca whales, and enhance human well-being.

Recover the Puget Sound orca whale population. The viability of J, K, and L pods is tied to overall Puget Sound ecosystem health including our culture and economy. Actions that will address the threats of lack of prey, abate pollution, and reduce disturbance are in the Action Agenda. These include implementation of the killer whale recovery plan, implementation of the salmon recovery plan, and pollution reduction strategies. The Washington State Legislature has also recently passed a new law protecting local killer whales from vessel disturbances

Control and manage stormwater runoff in an integrated way with protection of vegetated land cover and reduction of pollutants before they reach water. Many Puget Sound citizens and science groups have emphasized stormwater runoff as a major threat to ecosystem health. The Action Agenda includes large-scale regional approaches that call for: the creation of consistent protection and restoration standards for the region; reducing pollutant inputs at the source; prioritizing and retrofitting existing stormwater management facilities (particularly in areas that were urbanized long ago); and ramping up low impact develop techniques in urbanizing areas.

Use a watershed approach for protection and restoration efforts. The Action Agenda builds on a watershed approach that is already underway and calls for: completing watershed assessments to identify priority areas for protection and restoration; conducting mitigation efforts in context of watersheds rather than isolated sites; investigating regulatory compliance at the watershed scale; and better integrating the efforts of existing watershed groups. This approach will also help manage stormwater runoff and be more effective at solving problems than just working within specific local jurisdictions.

Take immediate actions in areas of Puget Sound that are imperiled, particularly the low dissolved oxygen situations in Hood Canal and South Sound. The reduction of pollutant loads, substantial improvement to wastewater and on-site sewage treatment systems, and other actions will be directed toward some of the most urgent problems in the Sound, such as the low oxygen conditions in Hood Canal and other identified areas.

Leverage Puget Sound efforts with other state and regional initiatives. There is significant opportunity to advance the Action Agenda and emerging state priorities to reduce greenhouse gases and create other ecological and economic benefits. For example, promoting compact, high-density, transit-oriented urban development while discouraging sprawl and conversion of forest and agricultural land is a cornerstone of the Governor's climate change recommendations. These same land use policies will greatly benefit the Puget Sound ecosystem. Cleanup, restoration, and redevelopment of urban bays can also help promote transit-friendly cities that minimize greenhouse gas emissions. The new updates to the Shoreline Master Program are an important opportunity for integrating planning and restoration actions under a new ecosystem approach. Transportation-related actions such as reducing the number of vehicles on roads will reduce pollutant loading, as well as greenhouse gas emissions and long-term road repair and maintenance efforts. Focusing on these types of leveraged actions will optimize regional and statewide efforts, enabling us to solve multiple problems with a coordinated approach.

Question 4: Where should we start?

The challenges facing Puget Sound are large and the list of things to do is very long. While the Puget Sound Action Agenda will be improved and adjusted for many years to come, the implementation of the set of near-term priority actions will move the region toward long-term ecosystem health. Near-term actions and priorities have been selected based on scientific and community input, ecosystem management principles, and the recognition that many important plans have already been prepared and are poised for implementation. Every unit of government, business, volunteer organization, and individual landowner has a role to play in protecting and restoring the health of Puget Sound.

Funding strategy

The initial cost for implementing the Action Agenda in the 2009-2011 biennium is estimated at $601 million. This includes $199 million in new funding, $222 million in ongoing capital expenditures, and continuation of $178 million in ongoing operating expenses. This estimate is primarily focused at the state level and includes state agency costs as well as the pass through of state dollars to assist local governments implement programs and projects identified in the Action Agenda.

The Action Agenda proposes three approaches to long-term financing of the Action Agenda: leveraging existing funding to better align with the Action Agenda priorities, raising new revenue at the state, regional,

and federal level; and using creative approaches to engage the private sector through financial incentives and ecosystem market-based mechanisms centered on protection and restoration of Puget Sound. We are also seeking authorization to create a regional improvement district.

Profiles of the Puget Sound Action Areas

The legislation that created the Puget Sound Partnership also established seven geographic "action areas" in Puget Sound to address problems specific to those areas. Puget Sound is a vast and diverse region, and each action area has unique ecological conditions and communities of people. The profiles describe the different features of each action area, the major local ecosystem threats, and the local priority actions that mirror the regional priorities and address local conditions and issues. The action area profiles were completed with the cooperation of and input from people who live in each area, and who will be implementing many of the actions to restore the health of Puget Sound. Work is expected to continue in 2009 to refine local strategies and priorities, and integrate local actions into an overall ecosystem approach.

Conclusion

Fundamentally people care passionately about Puget Sound and want to ensure it is passed on to future generations. We hope the Action Agenda will enable us to convert this aspiration into reality.

QUESTION 1: What is a healthy Puget Sound (and how do we know if we are moving toward one)?

The natural beauty and biological richness of Puget Sound make it a national treasure and one of the most spectacular places on earth. Snowcapped mountains and marine waters, extraordinary wildlife, lush forests, and dynamic rivers and beaches draw millions of admirers each year. The orcas and salmon that inhabit the waters of Puget Sound are irreplaceable symbols of regional identity, as well as important signals of ecosystem health. Puget Sound provides us with drinking water, seafood, timber, unparalleled opportunities for outdoor recreation, and a buffer from Pacific storms. Puget Sound is also an economic engine. Ocean-related industries generate more than $3.8 billion in annual wages to the Puget Sound economy and thousands of business establishments use Puget Sound counties as their base of operations. Abundant natural resources and deep water ports create opportunities for thousands of family wage jobs. The quality of life in Puget Sound has also attracted creative and innovative people from around the country and the world. These people write computer code, draft building plans, find cures to diseases, brew coffee, sell virtually anything online, and design and build composite airplanes.

Recognizing the extraordinary cultural and economic value of Puget Sound to the region, Governor Gregoire created and charged the Partnership with developing an Action Agenda to achieve a healthy Puget Sound ecosystem. The Legislature, in full agreement with the Governor, established six goals for the Partnership to achieve by 2020:

> *(a) A healthy human population supported by a healthy Puget Sound that is not threatened by changes in the ecosystem;*
>
> *(b) A quality of human life that is sustained by a functioning Puget Sound ecosystem;*
>
> *(c) Healthy and sustaining populations of native species in Puget Sound, including a robust food web;*
>
> *(d) A healthy Puget Sound where freshwater, estuary, nearshore, marine, and upland habitats are protected, restored, and sustained;*
>
> *(e) An ecosystem that is supported by ground water levels as well as river and stream flow levels sufficient to sustain people, fish, and wildlife, and the natural functions of the environment;*
>
> *(f) Fresh and marine waters and sediments of a sufficient quality so that the waters in the region are safe for drinking, swimming, shellfish harvest and consumption, and other human uses and enjoyment, and are not harmful to the native marine mammals, fish, birds, and shellfish of the region.*

The Legislature directed the Partnership to establish "measurable outcomes for each goal…specifically describing what will be achieved, how it will be quantified, and how progress toward outcomes will be measured." During 2008, the Partnership worked with NOAA/National Marine Fisheries Service and a broad group of regional scientists to refine what these goals mean by identifying a set of desired outcomes, a provisional set of measurable indicators for each goal, and targets and benchmarks that will help us determine whether progress is being attained.

What does a healthy ecosystem look like?

Puget Sound's vast stands of timber, abundant fish and game, and sheltered bays have supported local tribes for centuries and drew settlers to the area. Though we do not expect Puget Sound to return to the exact conditions experienced by native populations, we still want to derive many of the same benefits from a healthy Puget Sound in the 21st century. To do this, we need to define specific outcomes for our ecosystem goals.

Outcomes are qualitative statements of what a healthy ecosystem should look like. Outcomes have been developed to help translate broad goals into measurable characteristics of ecosystem health. For Puget Sound, a healthy ecosystem would have the following desired outcomes:

> **Human health** is supported by clean air and water, and marine waters and freshwaters that are safe to come in contact with. In a healthy ecosystem the fish and shellfish are plentiful and safe to eat, air is healthy to breathe, freshwater is clean for drinking, and water and beaches are clean for swimming and fishing.
>
> **Human well-being** means that people are able to use and enjoy the lands and waters of the Puget Sound. A healthy ecosystem provides aesthetic values, opportunities for recreation, and access for the enjoyment of Puget Sound. Tribal cultures depend on the ability to exercise treaty rights to fish, gather plants, and hunt for subsistence, cultural, spiritual, ceremonial, and medicinal needs. The economic health of tribal communities depends on their ability to earn a livelihood from the harvest of fish and shellfish. Human well-being is also tied to economic prosperity. A healthy ecosystem supports thriving natural resource and marine industrial uses such as agriculture, aquaculture, fisheries, forestry, and tourism.
>
> **Species** are "viable" in a healthy ecosystem, meaning they are abundant, diverse, and likely to persist into the future. Harvest that is consistent with ecosystem conditions and is balanced with the needs of competing species is more likely to be sustainable. When ecosystems are healthy, non-native species do not impact the viability of native species or impair the complex functions of Puget Sound food webs.
>
> **Marine, nearshore, freshwater, and terrestrial habitats** in Puget Sound are varied and dynamic. The constant shifting of water, tides, river systems, soil movement, and climate form and sustain the many types of habitat that nourish diverse species and food webs. Human stewardship can help habitat flourish, or disrupt the processes that help to build it. A healthy ecosystem retains plentiful and productive habitat that is linked together to support the rich diversity of species and food webs in Puget Sound.
>
> **Clean and abundant water** is essential for all other goals affecting ecosystem health. Freshwater supports human health, use, and enjoyment. Instream flows directly support individual species and food webs, and the habitats on which they depend. Human well-being also depends on the control of flood hazards to avoid harm to people, homes, businesses, and transportation.

Water quality in a healthy ecosystem should sustain the many species of plants, animals, and people that reside there, while not causing harm to the function of the ecosystem. This means pollution does not reach harmful levels in marine waters, sediments, or fresh waters.

A healthy ecosystem also has three important properties: It must be **resilient** to changes that are caused by humans or natural events. It must have **redundancy** – meaning species and habitats are not limited to a single location that puts them at risk of catastrophic loss. It must have a **representative** sample of the species and habitats that historically lived there. A healthy ecosystem does not necessarily need to exist as it once did, but these three characteristics will increase the chances that it will persist into the future. In a healthy ecosystem there are opportunities for growth and prosperity for people, while the other ecosystem benefits we enjoy can be sustained.

How will we measure progress toward the goals for Puget Sound?

As a region, we currently count and monitor many things in Puget Sound, including salmon, birds, water temperature, bacteria near shellfish beds, toxic contamination in fish and marine mammals, streamflow, and the loss or gain of habitat. However, these separate measures are often not linked together in a way that tells us about the ecosystem as a whole. It is possible to organize all of these measurements and focus them on determining the status of the desired outcomes for Puget Sound. Conducting these measurements systematically will ultimately identify trends that will tell us if we are making progress toward achieving our goals. Linking monitoring to actions and outcomes in the Action Agenda will also help us be accountable for the success or failure of our management actions.

Indicators are physical, biological, or chemical conditions that can be measured to provide data about the status of Puget Sound. Indicators include things such as drinking water quality, acres of shellfish beds that are closed, number of oil spills, or the abundance of particular species, such as salmon. (This is similar to the way the Commerce Department uses GDP as an indicator of overall economic health of the U.S. economy.) Taken together, a set of indicators will help measure progress toward outcomes, goals, and the health of the ecosystem as a whole.

Working together, the Puget Sound Partnership and NOAA/National Marine Fisheries Service convened a broad group of scientists to identify the best available indicators that might be used to track progress toward the outcomes and goals. Initially, more than 300 possible items currently being measured were identified as indicator candidates. But because it would be impossible to measure, analyze, and report on so many things, the group evaluated the candidates, and pared them back to a set of approximately 100 provisional indicators. The Partnership's Science Panel reviewed the provisional indicators and recommended the Leadership Council's adoption with the condition that additional work is still needed to refine the list (Table 1-1).

Indicators need to be linked to numerical **targets** to specify the desired condition in a way that defines success. This includes "how much" is enough – both as a target endpoint and as interim milestones (or benchmarks) toward the target. Targets and benchmarks are useful for setting a course of action and interpreting progress. To track and report progress in the ecosystem, the Partnership will use quantitative targets and benchmarks as well as qualitative trends. Baseline data for accountability will be reported in the 2009 State of the Sound report.

As part of the Action Agenda development, we have started the work to identify quantitative targets and benchmarks. For a subset of the provisional indicators, the Partnership will confirm outcomes and quantitative targets and benchmarks by June 30, 2009 (see example Table 1-2). There is a provisional indicator for each goal, with a target, benchmark, and description of the current condition (baseline). Beginning in early 2009, the Partnership will convene a policy discussion, with scientific input, for each goal to select and develop at targets and benchmarks for at least one indicator to track ecosystem health. The work presented in Table 1-2 will be a starting place. Some indicators may need to be adjusted so we better capture the status of the ecosystem.

Over time, the Partnership will work to develop targets and benchmarks for more of the 100 indicators or others that may be identified in the future. As we build a greater understanding of the importance of a particular indicator, the availability of data, and the links to desired outcomes, appropriate targets and benchmarks can be developed. For indicators without set targets and benchmarks, strategies and actions can be directed at improving trends toward ecosystem health (e.g., increasing amount of publicly accessible shoreline).

Adaptive management will be a critical component for reducing uncertainty around defining a healthy Puget Sound. This will include refining indicators, targets, and benchmarks as we better understand the relationships among ecosystem components. In addition to the near-term work to set targets and benchmarks, the provisional set of indicators will be turned into a “final” list by identifying any new indicators and developing indicator indices. Selection of the final set of indicators will be based on several factors, such as data availability, how well the set captures the full range of ecosystem functions, and the cost of monitoring and analysis. A date for the selection of the final set will be identified with the Phase II indictor work (a near-term action).

Puget Sound residents from many different walks of life clearly recognize the value of clean water, recreational opportunities, fisheries and food production, and spiritual values associated with a healthy ecosystem. Question 2 of the Action Agenda looks at the present condition of Puget Sound and the biggest threats facing the ecosystem in the future. By determining what a healthy Puget Sound should look like, our ability to assess where we are today and measure what progress we are making in the future will be more effective in ensuring a legacy of a healthy Sound for future generations.

Table 1-1: Ecosystem recovery goals, desired outcomes and provisional indicators

GOAL	DESIRED OUTCOME	PROVISIONAL INDICATOR
1. A healthy human population supported by a healthy Puget Sound that is not threatened by changes in the ecosystem. Short name: A healthy human population	Fish and shellfish are safe for people to eat	Marine fish consumption advisory
		Acres and trends in shellfish commercial growing area closures
		Shellfish closures and biotoxin levels for paralytic shellfish poison (PSP)
		Shellfish closures and biotoxin levels for domoic acid
		Shellfish consumption advisory
		Freshwater fish consumption advisory
	Air is healthy for people to breathe	Washington Air Quality Advisory (WAQA) index
		Air quality – particulates
	Freshwaters are clean for drinking	Drinking water quality in public water systems
		Groundwater quality for drinking water
	Marine and freshwaters are clean for contact	Percent of swimming beaches that meet safe swimming standards at all times during the summer
2. A quality of human life that is sustained by a functioning Puget Sound ecosystem. Short name: Human well-being	Aesthetic values, opportunities for recreation, and access for the enjoyment of Puget Sound are continued and preserved	Puget Sound recreational shellfish harvests
		Puget Sound recreational finfish harvests
		Puget Sound non-harvest recreational activity
		Puget Sound publicly accessible or owned shoreline
	Upland and marine resources are adequate to sustain the treaty rights, as well as the cultural, spiritual, subsistence, ceremonial, medicinal needs, and economic endeavors of the tribal communities of Puget Sound.	Puget Sound commercial Indian finfish and shellfish harvest
	The Puget Sound ecosystem supports thriving natural resource and marine industry uses such as agriculture, aquaculture, fisheries, forestry, and tourism.	Puget Sound commercial finfish and shellfish harvest, wild and aquaculture
		Scenic and sightseeing water transportation
		Marinas
		Puget Sound timber harvest
		Puget Sound land in farms
	The Puget Sound's economic prosperity is supported by and compatible with the protection and restoration of the ecosystem.	
	Explanatory variables related to human well-being	Total population
		Developable land
3. Healthy and sustaining populations of native species in Puget Sound, including a robust food web	Viable marine, nearshore, freshwater, and terrestrial biological communities exist into the future and biodiversity is maintained	Species Listed under Federal Endangered Species Act (ESA)
		Species of Concern on State list
		Species on Conservation Concern
		Marine benthic infaunal community structure
		Terrestrial breeding bird count
		Marine bird mortality

GOAL	DESIRED OUTCOME	PROVISIONAL INDICATOR
Short name: Healthy and sustaining species and food webs		Fish and invertebrates at marine reserves
		Marine species at risk
	Populations of marine, nearshore, and freshwater species are viable into the future and biodiversity is maintained	Bald eagle
		Pinto abalone
		Groundfish
		Herring
		Marine birds – breeding and non-breeding
		Southern resident orca whale population trends
		Salmon and steelhead
		Taylor's checkerspot butterfly
		Peregrine falcon nesting surveys
		Pacific hake & other midwater fish status and trends
		Marine/shore birds – food web interactions
		Black oystercatcher abundance at nesting colonies
		Harbor seal
		Gray whale
		Harbor porpoise/Dall's porpoise
		Waterfowl breeding surveys
		Band-tailed pigeon mineral site counts
		Mountain goat
		Deer population
	Non-native species do not significantly reduce native species' viability or impair food web function	Non-native invasive species threat in all habitats
		Non-native nearshore species
	Biological harvests are balanced, viable, and ecosystem-based	Dungeness crab
		Marine associated waterfowl harvest
		Game species
		Marine bottomfish
		Harvest of wild salmonid populations
		Exploitation rates of wild salmonid populations
4. A healthy Puget Sound where freshwater, estuary, nearshore, marine, and upland habitats are protected, restored, and	Marine/nearshore habitats sustain diverse species and food webs and are formed by natural processes and human stewardship so that ecosystem functions are sustained	Eelgrass
		Marine parameters
		Marine shoreline geomorphology
		Kelp and other seaweeds
		Saltmarshes
		Intertidal biotic community status and trends
		Shoreline armoring of marine/nearshore habitats

GOAL	DESIRED OUTCOME	PROVISIONAL INDICATOR
sustained Short name: Protected, restored, and sustainable habitats	Freshwater habitats sustain diverse species and food webs and are formed by natural processes and human stewardship so that ecosystem functions are sustained	Physical habitat and freshwater parameters
		Maximum temperature in freshwater
		Channel armoring in freshwater habitats
		Floodplain connectivity in freshwater habitats
		Change in wetland acreage
		Number of artificial fish barriers
		Fish passage barrier improvements
	Terrestrial habitats sustain diverse species and food webs, sustain marine and freshwater habitats, and are formed by natural processes and human stewardship so that ecosystem functions are sustained	Old growth forest change
		Transportation pressure
		Road densities
		Land cover status and trends
	Non-native species do not significantly impair habitat quality, quantity, or the processes that form and maintain habitats	Non-native invasive aquatic marine species
5. An ecosystem that is supported by ground water levels as well as river and streamflow levels sufficient to sustain people, fish, and wildlife, and the natural functions of the environment. Short name: Water for people, fish, and wildlife	Freshwater quantity is sufficient to support freshwater and terrestrial food webs and human uses and enjoyment	Snow pack
		Glacier mass balance
		Annual maximum daily flow
		Annual mean flow
		Flow flashiness – TQmean
		Annual 7-day low flow
		Violations in agreed upon instream flows
	Freshwater delivery to shorelines and estuaries supports estuarine, nearshore and marine food webs and the habitats upon which they depend	Stream flows to Puget Sound marine/nearshore habitat
	Flooding hazards do not harm people, residences, and transportation	Frequency of flood events
6. Freshwaters and marine waters and sediments of a sufficient quality so that the waters in the region are safe for drinking, swimming, shellfish harvest and consumption, and other human uses and	Loadings of toxics, nutrients, and pathogens do not exceed levels consistent with healthy ecosystem functions	Oil spills
		Toxics in biosolids from wastewater treatment plants
		Nutrient and pathogen loadings in rivers to Puget Sound
	Toxics in marine waters and sediments, and in mammals, fish, birds, shellfish, and plants in these waters, do not harm the persistence of these species	Chemical contamination in Puget Sound sediments
		Toxics in marine benthic fish
		Toxics in marine pelagic fish
		Liver disease in English sole
		Sediment quality triad index
	Pathogens, nutrients, and ocean influences do not harm the mammals, fish, birds, shellfish,	Fecal pollution index for commercial shellfish beds
		Marine water quality (multiple parameters)

GOAL	DESIRED OUTCOME	PROVISIONAL INDICATOR
enjoyment, and are not harmful to the native marine mammals, fish, birds, and shellfish of the region. Short name: Water quality	and plants that depend on the marine waters of Puget Sound	Fecal pollution index for commercial shellfish beds
		Marine water quality (multiple parameters)
		Nutrients in marine waters
		Sensitivity to eutrophication in marine/nearshore habitats
	Pathogens, nutrients, toxic contamination, sedimentation, elevated temperatures, and other water quality concerns do not harm fish, invertebrates, and wildlife that depend on the freshwaters of Puget Sound	Water quality parameters in streams aggregated by Water Quality Index (WQI)
		Toxics in freshwater fish

Table 1-2: Example subset of provisional indicators for which Partnership is developing current condition, benchmark, and target measures

Provisional Indicator	**Legislative Goals**	**Indicator Description**	**Unit of measure**	**Current condition**		**Benchmark** – *interim milestone*		***Target*** – *desired condition for 2020 (unless other date noted)*	***Next steps***
				Measure	**Date**	**Measure**	**Date**		
Shellfish growing area closures	Water quality Human health Human well-being	Commercial and recreational shellfish growing area closed to direct harvest due to water pollution	Acres	30,000	1-Jul-07	28,000	30-Jun-11	20,000	Policy discussions and decisions to affirm this benchmark and target
TBD – indicator of human prosperity	Human well-being	TBD	TBD	TBD	TBD	TBD	TBD	TBD	Policy discussions and decisions to identify prosperity indicator for benchmark/target and to specify benchmark and target for this indicator
Land cover – low elevation forest cover	Habitat Human well-being	Forest cover in Puget Sound lowlands (below 1,000 feet elevation)	Percent	TBD	2006	TBD	TBD	TBD	Clarify baseline condition; establish data collection and analysis approach for benchmark date and 2020; policy discussions and decisions to specify benchmark and target
Land cover – impervious area	Habitat Water quality Water quantity Human well-being	Impervious surface area in Puget Sound lowlands (below 1,000 feet elevation)	Percent	7.3	2001	TBD	TBD	TBD	Update baseline condition with 2006 data, which will be available in January 2009; policy discussions and decisions to specify benchmark and target

Provisional Indicator	Legislative Goals	Indicator Description	Unit of measure	Current condition		Benchmark – *interim milestone*		***Target*** *– desired condition for 2020 (unless other date noted)*	***Next steps***
				Measure	**Date**	**Measure**	**Date**		
Salmon and steelhead status and trends	Species/food web Habitat Water quality Human well-being	Regions with 2 to 4 viable populations of Chinook salmon	Regions	0	2004	--	--	5 (by 2055)	Continue developing Chinook recovery adaptive management and monitoring program so that it provides sufficient information to evaluate population viability and information about trends in the primary factors limiting the status of populations and the ESU; policy discussions and decisions about benchmarks and targets
		Populations providing ecological functions consistent with viability	Populations	TBD	TBD	--	--	TBD (by 2055)	
		Populations with improving status	Populations	TBD	TBD	TBD	2012	--	
		Watersheds providing ecological functions consistent with viability	Watersheds	TBD	TBD	--	--	TBD (by 2055)	
		Factors limiting viability that are decreasing	Factors	TBD	TBD	TBD	2012	--	

Provisional Indicator	Legislative Goals	Indicator Description	Unit of measure	Current condition		Benchmark – *interim milestone*		***Target*** *– desired condition for 2020 (unless other date noted)*	***Next steps***
				Measure	**Date**	**Measure**	**Date**		
Eelgrass status and trends	Habitat Species/food web	Area and/or depth of eelgrass of eelgrass beds Eelgrass monitoring sites with increasing and decreasing area	TBD Ratio of sites – increasing: decreasing	TBD 1	TBD 2000	-- >1	-- 2015	TBD --	Policy discussions and decisions to affirm benchmark and specify target, including discussion of whether to base target on historic condition. Note: in-depth analysis required to estimate historic condition
Instream flows	Water quantity Species/food web Habitat	TBD – Stream flows within ranges that support ecological functions	TBD	TBD	TBD	TBD	TBD	TBD	Policy discussion and decision to select indicator; describe baseline condition; policy discussions and decisions to specify benchmark and target
Toxics in biota	Water quality Species/food web	TBD – levels of bioaccumulative chemicals in Pacific herring, Harbor seals, and mussels	TBD	TBD	TBD	TBD	TBD	TBD	Policy discussion and decision to select indicator; describe baseline condition; policy discussions and decisions to specify benchmark and target

QUESTION 2: What is the status of Puget Sound and what are the biggest threats to it?

In a scant 150 years, the human population of Puget Sound has grown from 50,000 to 4 million people. During that time, we have been very busy – creating: the second-largest port on the West Coast; global enterprises such as Boeing, Microsoft, and Starbucks; lively ecotourism businesses; world-renowned seafood products; and a timber industry that is still a national and international leader. Some of our industries, such as timber and shellfish production, are directly dependent on the ecosystem. Others rely on Puget Sound for shipping and an attractive quality of life to draw prospective workers and their families. More than 135,000 major businesses in the region employ over 2.2 million people. Puget Sound drives more than $20 billion dollars in economic activity in Washington.

Puget Sound remains a desirable place to live and work. But there are ominous signs that the ecosystem has been pushed to its limits: 21 species are listed as threatened or endangered, more than 1,000 rivers and lakes are listed as impaired, and there are "dead zones" in Hood Canal and South Sound. A more detailed summary discussion of threats and drivers affecting ecosystem function in the Puget Sound region can be found in the Appendices.

In creating our productive society and economy we: eliminated three-quarters of the saltwater marsh habitat through dikes and drainage; lost 90 percent of estuarine and riverine wetlands; and armored one-third of the Puget Sound shoreline. We removed 66 percent to 84 percent of the old-growth forest in the basin in the past 50 years. We spilled at least 230,000 gallons of oil and hazardous waste (just since 1985), constructed 10 major dams and thousands of small diversions and stream blockages, re-plumbed the Cedar River system, straightened and diked hundreds of small and large rivers, filled wetlands, and introduced almost 100 invasive marine plant and animal species – sometimes intentionally. From 1991 to 2001, impervious surfaces increased by an additional 10.4 percent, leading to further changes in streamflow runoff and expanding a major pathway for a host of other pollutants to enter our rivers, soil, and food supply.

What do these separate, incremental changes tell us about the overall health of Puget Sound? There is broad agreement that the natural resilience of upland, freshwater, and marine systems in Puget Sound has been seriously strained but not irreparably damaged; thus there are opportunities for ecosystem recovery. Identifying the most imperiled and intact parts of the ecosystem, and the primary factors causing problems are key to achieving a healthy system. New approaches are helping to answer the question about the condition of Puget Sound and identify the key threats to ecosystem recovery. In addition to the first steps toward development of a comprehensive set of measurable indicators, described in Question 1, the Partnership and regional scientists have been working together during the past 18 months on three related efforts: a) a "threats/drivers" analysis led by NOAA as part of an ongoing Integrated Ecosystem Assessment of Puget Sound; b) a series of topic forums that assembled the best current information about the Sound; and c) a process to gather and synthesize data at the local level in each of the seven action areas.

Although many types of human activities threaten the health of the Puget Sound ecosystem, there is considerable agreement among regional scientists and community leaders that the alteration and loss of habitat and the ongoing input of pollution are the most immediate and pervasive threats to the ecosystem.

The types and magnitude of threats vary in different places, but the entire region faces challenges from a growing human population and a changing climate that will exacerbate the many existing pressures to Puget Sound.

How healthy is Puget Sound?

Sorting through the many available studies and statistics to figure out what they add up to in terms of a healthy or impaired ecosystem is a complex and difficult task. One way to describe the status of Puget Sound is to compare existing conditions to the goals and indicators that have been established for ecosystem health:

> **Human health:** Human health is closely tied to the ecosystem through contact with water, consumption of seafood, and air quality. Puget Sound is world renowned for specialized oysters, geoduck, salmon, and other seafood products. Although cleanup efforts have resulted in a number of shellfish beds that have re-opened for harvest, approximately 30,000 acres downgraded since 1980 remain closed. Closures of commercial and recreational shellfish areas due to harmful algal blooms appear to be more widespread and more frequent in recent years. In addition, toxic contaminants, especially PCBs and mercury, occur in high enough levels in Puget Sound fish that the Department of Health has issued advisories limiting the number of meals should people eat of Chinook, rockfish in many areas, and flat fish such as English sole in some urban bays. Outbreaks of illness, or even the perception that Puget Sound seafood is contaminated, can have profound economic ramifications to the Puget Sound region.
>
> **Human well-being:** Most of the residents of Puget Sound feel fortunate to live here, enjoying a lifestyle that is closely connected to scenic landscapes, outdoor recreation in forests, beaches and waterways, local foods, and vibrant communities, including a healthy maritime economy. Developing measurable indicators of human well-being has been particularly challenging but the ability to continue the traditions of fishing, harvesting shellfish, watching birds and whales, and earning a livelihood from working farms and forests in Puget Sound depend on ecosystem health. Nearly 200 square miles of forested area were lost from the Puget Sound basin in a recent 10-year period (1991-2001) – representing a loss of nearly 4 percent of the lowland forests. The loss of these forestlands represents a loss of open space, recreation opportunities, and the ability to earn a livelihood in sustainable forest industries. Similarly, the conversion of agricultural lands to urban land uses shrinks the economic viability of the farm community, reduces the sources of local produce, diminishes habitat for migratory birds and other wildlife, and results in a loss of water filtration and absorption with increasing impervious surfaces. Human well-being has also been impacted by the reduction of salmon fishing. Many rivers in the Puget Sound basin no longer have sufficient Chinook to allow any harvest whatsoever and sport fishing days have been reduced in central Puget Sound by more than 75 percent since 1986. Tribal communities are particularly bereaved by the decline of salmon for tribal cultural tradition and identity, as well as the economic loss to fishing families.
>
> **Species and food webs:** Puget Sound food webs are fraying and several species do not appear to be able to maintain themselves at sustainable levels. Hood Canal and the Strait of Juan de Fuca have a uniquely timed run of chum salmon that return in the summer. But eight out of the 16 historic populations of these summer chum are no longer present in their historic watersheds. A recovery plan for the summer chum was federally approved in 2007. Puget Sound Chinook also

have an approved plan developed by local watershed communities, and are one of the few species in Puget Sound that have numerical targets and benchmarks for recovery. Chinook salmon are generally at less than 10 percent of their historic levels in Puget Sound river systems, with some below one percent. An estimated eight to 15 populations of Chinook have been lost entirely. Studies have also shown that Chinook are the preferred food of orcas. The local southern resident killer whale population, which currently numbers only 84, lost seven members this year. Reduced food availability is one factor thought to be limiting the population; the orcas are also impacted by the noise from vessel traffic that interferes with their ability to hunt, and by toxic contamination. Puget Sound contains some of the most toxic marine mammals in the world. Harbor seals in Puget Sound were found to be seven times more contaminated with the persistent toxic chemicals known as PCBs than those inhabiting the adjacent Strait of Georgia in Canada. Species declines are apparent throughout the marine, freshwater, and terrestrial food webs and habitats of Puget Sound. In addition to the 21 threatened and endangered species, Washington presently lists 157 species of concern.

Land use and habitat: Freshwater, estuary, nearshore, marine and upland habitats are critical in supporting species health and human well-being. Land cover is an important indicator of ecosystem health because of its importance for upland species of birds and animals, retention of water runoff, and the function of large trees in forming habitat along Puget Sound rivers. In a recent 10-year period, almost four percent of the forest cover of Puget Sound's lowlands was converted to other land uses. By 2001, more than seven percent of the land area of Puget Sound below 1,000 feet elevation was covered by roadways, parking lots, rooftops, and other types of impervious surface – an indicator of the extent to which human activities have changed Puget Sound's landscape. Eelgrass beds are essential spawning areas and nurseries for herring, other forage fish, and salmon, and generate food consumed throughout the marine food web. The overall acreage of eelgrass beds in Puget Sound is a key indicator for ecosystem health, along with their spatial distribution throughout the areas where salmon, Dungeness crab, and other species migrate and grow. In 2006, there were approximately 50,000 acres of eelgrass beds in Puget Sound. Although the total acreage has been relatively stable for a few years, these eelgrass beds are concentrated into a few areas and some regions of Puget Sound, such as Hood Canal, have experienced localized losses. Many other Puget Sound habitats have shrunk in size, diminished in quality, fragmented, and the processes that form and sustain them have been disrupted. During the past 50 years, Puget Sound lost at least two-thirds of its remaining old growth forest, more than 90 percent of its native prairies, and 80 percent of its saltwater and freshwater marshes. In addition, one-third of its natural shoreline has been hardened.

Freshwater resources: Freshwater supply is closely tied to snowpack and precipitation. Important provisional indicators of ecosystem health related to water quantity are snowpack and flow patterns, the frequency of achieving regulated minimum flows in watersheds, and the availability of water for human use. Like most states in the West, Washington has a law that allocates water depending on who claimed it first rather than availability, need, or some other socially-based priority. Most watersheds in Puget Sound have rules that establish minimum flow levels, but rules have not been completed in all areas and some minimum levels may need to be reviewed. Several local chapters of the salmon recovery plan specify target flows for recovery. Currently, 11 of 19 Puget Sound rivers are already at levels that impair salmon due to low seasonal flows and over-allocation of out-of-stream uses. Almost every watershed in Puget Sound has local areas where freshwater supplies are not adequate to meet current human demands. The Nooksack,

Snohomish, Lake Washington, Green, White, Puyallup, Dungeness, and Elwha are considered to be "water critical" basins for salmon because of over-allocated water rights and low flow conditions.

Water quality: Pollutants and contaminants enter the water where they can harm aquatic life and pose health and safety problems in seafood, drinking water supplies, and beaches. Pollution-related water quality problems in the freshwaters and marine waters of Puget Sound include contamination by pathogens (especially bacteria and viruses), low dissolved oxygen from delivery of excess nutrients, and contamination by chemicals, some of which persist for long periods and accumulate in Puget Sound sediments, fish, and wildlife. The quality of Puget Sound water bodies has been affected by pollution from human and animal wastes, fertilizers and pesticides, and toxic chemicals that run off pavement during storms and are discharged from industrial facilities. More than 1,000 freshwater lakes and streams are classified as "impaired" and low oxygen conditions are increasingly frequent in Puget Sound marine waters. However, Puget Sound freshwaters and marine waters are not universally contaminated from major pollutant sources. Some of the "legacy toxics" from the 1970s have been cleaned up or sealed off where they remain in contaminated sediments underlying urban bays. Wastewater treatment plants remove or transform many (but not all) contaminants. Many bays and marine water bodies in Puget Sound experience hypoxia – the low oxygen conditions that result in widespread kills of marine life. South Puget Sound and Hood Canal are experiencing hypoxia episodes that are more frequent and of longer duration.

In 2009, the Partnership will produce a new "State of the Sound" report that will comprehensively link the conditions in Puget Sound to the goals and indicators of ecosystem health. The report will build on earlier efforts, and the Action Agenda, to describe status and trends within Puget Sound. It will also begin to describe the magnitude of threats overall, and within and between geographic sub-regions.

What threatens the health of Puget Sound?

The current condition of Puget Sound shows signs that the web of life is fraying and that the many benefits we derive from our ecosystem may be in jeopardy. What is causing these problems? It is not only what humans do as we live, work, and play in Puget Sound, but how we go about it that affects the health of the Sound. Some activities are fairly obvious as harmful to ecosystem health, such as the input of toxic pollution and oil spills, and habitat destruction. Other activities that are considered to be potential "threats" – such as the harvest of timber, fishing, shellfish and finfish aquaculture, water withdrawals from rivers and aquifers, and farming – are highly beneficial to people. These activities depend directly on healthy ecosystem conditions but, if not properly managed, can also damage the ecosystems upon which they depend.

Regional scientists use the terms "threats" to refer to any activities that have altered the ecosystem in the past or present, or are likely to in the future. The Partnership has identified six broad categories of threats: habitat alteration, pollution, surface/groundwater impacts, artificial propagation, harvest, and invasive species, which are described below. Changes to Puget Sound are also driven by large-scale processes – such as weather, volcanoes, earthquakes, ocean circulation patterns, population growth, and climate change and its ancillary impacts – that are likely to amplify the many pressures facing the Sound.

Habitat alteration and land conversion: Habitat alteration consists of activities such as clearing forests, armoring shorelines, diking and draining saltmarshes and freshwater wetlands, dredging, filling, and paving the land. Habitat alteration occurs in Puget Sound marine waters and on the sea floor, along the shoreline, throughout river systems, and in the upland forests, meadows, prairies, and brush. In the nearshore, docks and bulkheads cover beaches that produce the plant life, insects, forage fish, and shellfish that provide food for fish, shorebirds, and marine mammals. Jetties, groins, and rock walls interrupt the flow of sand that builds Puget Sound beaches. Land conversion in Puget Sound continues to eliminate habitat – between 1991 and 1999 Puget Sound lost an additional 2.3 percent of its forest cover, and impervious surfaces in the lowlands increased by 10.4 percent. Although growth management has been successful in some places to direct density into urban areas, many areas of Puget Sound remain vulnerable to the habitat loss and fragmentation that is taking a toll on our native plants and animals.

The alteration of nearshore habitat through the construction of docks and bulkheads provides one striking example of how a localized activity can threaten broad components of the ecosystem. The nearshore environment provides essential habitat for herring. Herring spawn in the shallow zone along Puget Sound shorelines, and are especially vulnerable to the loss of eelgrass. Pacific herring in Puget Sound are a universal source of prey for all species of salmon, as well as seals, sea lions, orcas, hake, halibut, cod, and 14 species of ducks and gulls. Herring also feed loons, herons, puffins, and many other marine bird species. Herring populations have fluctuated dramatically in Puget Sound in recent years and their central position in the Puget Sound food web has the potential for ripple effects throughout Puget Sound species.

Pollution: Pollution continues to enter Puget Sound from many sources, even as we clean up contaminants of the past. Vehicles release toxic substances from oil leaks, brake linings, and tire wear. Airborne emissions appear to be a widespread source of loading for some chemicals of concern in the air and water. Emerging contaminants from medication and personal care products, whose effects we are just beginning to understand, often pass through sewage plants without treatment. The half-million on-site septic systems in Puget Sound – when improperly sited or maintained – can be a significant source of nitrogen loading into rivers and marine waters. Where the systems do not function properly, they are major sources of bacteria and viruses. Fertilizers and animal waste add to this mix. Fecal coliform bacteria are one of the most ubiquitous pollutants in the Puget Sound region. Combined sewer overflow outfalls occasionally discharge mixed stormwater and untreated wastewater to Puget Sound during wet weather. Major oil spills in Puget Sound are relatively infrequent, but still pose a potential catastrophic threat.

Pollution enters Puget Sound's rivers, lakes, and marine waters through a variety of pathways, but surface water runoff appears to be the primary transporter of toxic pollution to Puget Sound, with the most concentrated loads coming from developed lands. In the quintessential example of "what goes around, comes around," toxic substances and harmful pathogens end up back in the water and food supply for humans, resulting in closures and consumption warnings for fish and shellfish. Pollutants also result in closures at recreational beaches and lakes and contaminated sediments that contribute toxic substances to the food web for decades. Many Puget Sound businesses such as shellfish aquaculture, depend directly on environmental quality for their continued existence.

Pollution threatens our ability to achieve all six Puget Sound recovery goals and appears to be a significant, far-reaching threat to the health of Puget Sound.

Surface and groundwater supply and availability: Water falls all too abundantly in Puget Sound at some times of the year, but in July and August, Seattle receives very little rainfall. During the past 50 years, we have already experienced an 18 percent decline in freshwater flow entering Puget Sound, affecting water temperatures, marine water circulation, and oxygen conditions in water bodies. Reduced availability of water and altered runoff patterns from land clearing are direct factors limiting the productivity of salmon and other species. Water consumption and local runoff also affect the water supplies and runoff patterns for neighbors in many Puget Sound communities – land development can increase flooding on neighboring properties during the wet season and surface and groundwater use affects junior water right holders at dry times of the year.

Snowpack sustains most of our rivers, reservoirs, and aquifers. April 1 snowpack in the low- and mid-elevations of the Cascades has a high sensitivity to surface temperatures. Projected warming in the future will substantially diminish springtime snowpack in these watersheds and cause large changes in the timing of stream flows. Where snowpack and streams are rare, infiltration of precipitation is essential for groundwater recharge. Altered weather regimes associated with climate change will likely compound many existing threats to surface and groundwater supply and availability resulting in: an over commitment of water resources; projected increases in domestic, municipal, commercial, and industrial demand; land use practices that alter streamflow patterns; and modification of stream channels through dams, levees, bank armoring, and ditching. We may be famous for our rain, but land development decisions will increasingly reflect the need to consider flow patterns, water scarcity, and tradeoffs among competing activities.

Invasive species enter Puget Sound through the importation of seeds, fruits, plants, and vegetables. Other pathways include ballast water discharges from ships, soil brought in with nursery stock, commercial and recreational boat hulls, and from people releasing exotic pets and plants "into the wild." The threats from invasive species vary across the Puget Sound action areas. Purple loosestrife, *Spartina* species, knotweed, Scotch broom, and other invasive plants are here now and could transform estuaries and river corridors. Alien invaders in the marine waters of Puget Sound include tunicate species that reproduce quickly and coat the surfaces of docks, pilings, boat hulls, and oyster-growing racks and lines. Domesticated animals can transmit potentially fatal pathogens to native species. While a comprehensive inventory of invasive species across Puget Sound has not yet been conducted, the magnitude of the problem is beginning to emerge from regional studies.

Artificial propagation of species is conducted for human use and quality of life benefits. The potential risks to native species, modification of habitat, and aesthetic impacts resulting from aquaculture and hatchery operations vary considerably by site, species, and methods. Hatchery operations to produce salmon have historically had effects such as loss of genetic diversity and genetic fitness, pathogen transfer, overharvest of native species that are co-mingled with hatchery stocks, and habitat impacts from the facilities themselves. Impacts have varied depending on the site, methods of operation, and the production objectives at each facility. Activities to culture many species of plants and animals may contribute pollutants to the environment or facilitate the introduction of non-native species, depending on how they are conducted.

Harvest and poaching of plants and animals similarly may impact the Puget Sound ecosystem, depending on how, when, and where it occurs. Harvest is considered to be a historic factor in the decline of Puget Sound rockfish, Pacific hake, pinto abalone, and Chinook salmon. Past harvest management practices focused on individual species and attempted to maximize the sustainable yield for human harvest rather than considering other species and ecosystem needs. For some threatened species, focused harvest management has been able to stem the decline of the target species, but may not adequately consider cross-species impacts, such as by-catch of other fish, birds, and marine mammals, or the loss of food for predators such as orcas. Harvest of plant species (such as trees) that serve as habitat for fish and wildlife species may adversely affect the species that depend on them or remove the building blocks that form habitat.

What do these threats mean for the future of Puget Sound?

Although all of the activities described above represent existing or potential problems for the overall health of Puget Sound, in the near term, the Partnership has focused on those threats with known and extensive impacts and the greatest level of urgency in developing actions for the future. Based on the scientific evidence gathered in many forums, it is clear that the Action Agenda will need to address the continuing loss and fragmentation of habitat, and the ongoing input of toxic substances to Puget Sound as two of the highest priorities for sustaining Puget Sound into the future.

Population growth and climate change are expected to exacerbate the threats that are already affecting the health of Puget Sound. At least 1 million more people will live here in the next 15 to 20 years. At the same time there is compelling evidence that the region's climate is changing. Temperatures in the Pacific Northwest have risen faster than the global average, and Puget Sound waters are warmer. Most climate change models predict increasing temperatures, diminishing snowpack, earlier runoff, reduced summer flows, rising sea levels, and more acidic ocean waters in Puget Sound in the 21st century.

Further compounding these challenges is the fragmented system now in place to manage natural resources. Previous approaches to Puget Sound recovery have lacked a structure to: link problems across jurisdictions and geographic areas; set priorities; or determine the effectiveness of our actions. The Partnership was largely created to resolve this problem by defining key priorities and setting up a system to manage Puget Sound at an ecosystem scale. Question 3 of the Action Agenda outlines strategies to address the overriding threats to the ecosystem, and ways to fix the current management system so it works more effectively and efficiently. Question 3 also describes the unique conditions, threats, and strategies for action that have been identified for each of the Puget Sound regional action areas.

Assessing status and threats

Developing the Action Agenda: The Partnership has woven together the work of three related efforts to assess the status and threats to the Puget Sound ecosystem:

- At a regional scale, NOAA/National Marine Fisheries Service has coordinated the work of federal, state, tribal, and other local scientists to produce a "Threats/Drivers Analysis" demonstrating the connections between threats and status. This work is part of an ongoing Integrated Ecosystem Assessment of Puget Sound (Appendix to be posted on Partnership Web site).
- A series of topic forums were held in 2008 to summarize our current understanding of the status of and threats to each of the six goals for a healthy Puget Sound: human health, human well-being, species and biodiversity, land use and habitat, freshwater resources, and the quality of water and land. Led by scientific and policy experts in each topic area, workshops were held to allow the larger public to contribute and a summary paper was prepared for each topic. This fact-finding process allowed scientists and policy leaders to work together, and gave the public an open opportunity to provide input to the Partnership in advance of publishing preliminary findings. The topic forum papers were also reviewed by the Partnership's independent Science Panel. (Papers are located in the Appendix.)
- Local implementers working in the field in each of the seven Puget Sound action areas have identified the unique ecosystem features and major constraints facing their region. This information is summarized in the action area profiles, and illustrates the many differences in the diverse Puget Sound ecosystem and the need to combine efforts to achieve overall ecosystem health.

Improving our understanding over time: A more comprehensive picture of the health of all parts of the terrestrial, freshwater and marine ecosystem and the relative importance of threats in causing problems will be developed over time. Three important areas of further work identified for this next biennium will help improve our understanding of where the most urgent problems occur in the system, and which threats are most critical to address in the near term.

- Develop a coordinated regional ecosystem monitoring program that will allow us to track changes in priority ecosystem indicators over time.
- Refine ecosystem indicators so no gaps occur in how we measure changes in ecosystem health. Indicator development work will include models that illuminate cause-and-effect relationships and drivers (see next bullet). Part of this work will involve developing a subset of indicators that can be used to communicate to the public through a report card for ecosystem health
- Use existing information to conduct spatial (mapped) analyses to evaluate current ecosystem status and the primary threats and drivers affecting ecosystem health. Together with models and refined indicators, this work will highlight the location and relative importance of threats and drivers across the entire ecosystem, and help identify the features of Puget Sound that are most at risk.

QUESTION 3: What actions should be taken that will move us from where we are today to a healthy Puget Sound by 2020?

The Puget Sound Partnership's principal task has been to "define a strategic action agenda prioritizing necessary actions, both basin-wide and within specific areas, and creating an approach that addresses all of the complex connections among the land, water, web of species, and human needs." The Partnership was required to involve the public, incorporate science, and develop a system for accountability and the efficient use of funding. Questions 1 and 2 of the Action Agenda define what a healthy ecosystem should look like in 2020 and identify the current and future threats to ecosystem health. These are complex and difficult questions, but the next step – determining what to do about it – is the toughest challenge of all.

During the development of the Action Agenda, the Partnership received more than 1,000 suggestions of what should be done, illustrating the difficulty in prioritizing actions for Puget Sound. Comments addressed myriad issues. Individually or in groups, people want to prevent oil spills, save orcas, restore their local creek, recover salmon, regulate geoduck production and harvest, increase recycling in schools, build green, enforce existing laws, ban disposable water bottles, and establish conservation reserves around Puget Sound. All of these actions are helpful, but long lists of unconnected actions provide little guidance on where to start and what would be the most effective use of limited resources.

Building a comprehensive, consolidated list of actions for Puget Sound is a significant step forward. Although the list of things to do for Puget Sound is daunting, and the actions cannot be tackled everywhere all at once, the Partnership synthesized the input into five strategic priorities for Puget Sound. Together, these five priorities address major threats to ecosystem health and embrace a new approach to managing and sustaining the Puget Sound ecosystem. Priorities A through C are related to specific threats facing the ecosystem. Priorities D and E are the management systems needed to effectively implement the other three priorities. The five priority strategies are:

Priority A: **Protect** the intact ecosystem processes, structures, and functions that sustain Puget Sound. Avoiding problems before they occur is the best and most cost-effective approach to ecosystem health.

Priority B: **Restore** the ecosystem processes, structures, and functions that sustain Puget Sound. Protecting what we have left is not sufficient, and significant effort at an unprecedented scale is needed to undo past damage.

Priority C: **Prevent water pollution at its source.** Many of our efforts have focused on cleaning up degraded waters and sediments, but insufficient resources have been devoted to stopping pollutants before they reach our rivers, beaches, and species.

Priority D: **Work together** as a coordinated system on priority actions. The programs and laws addressing environmental issues were established on a piecemeal basis to address separate problems in an earlier time, and the system does not address Soundwide and local problems on a coordinated basis at an ecosystem scale.

Priority E: **Build an implementation, monitoring, and accountability management system.** This includes: using a **performance management** system with adaptive management, coordinated monitoring, accountability for action, and coordinated data management; providing **sufficient, stable funding** focused on priority actions; implementing a focused **scientific program** with priorities for research, appropriate measures to improve understanding of the ecosystem and the effectiveness of our actions, and clear pathways for informing decision making; and increasing and sustaining coordinated efforts for **communication, outreach, and education**.

Question 3 of the Action Agenda describes what needs to be done, identifies a set of near-term actions, and describes the approach for working together. For each priority, there is a description of the current situation and rationale for taking action, key objectives for attaining desired ecosystem outcomes, and near-term actions to move the region forward. The strategic priorities and their associated actions provide a regional starting place. Prioritization and sequencing of actions, as well as implementation assignments with milestones, is detailed in Question 4.

Many existing laws, policies and programs are critical to Puget Sound protection and recovery, and need to continue. Some but not all of these efforts are mentioned in the Action Agenda. As the Action Agenda is implemented and refined in the future, some programs and policies may need to be modified or even eliminated.

The strategies and actions are primarily aimed at addressing threats, particularly land alternation and water pollution, as well as increased population and climate change. The strategies and actions will be adjusted as the Action Agenda is implemented to help achieve the 2020 goals. As we learn more about the ecosystem and the effectiveness of particular techniques, we can also better link strategies and actions to desired goals and outcomes. Two important efforts will help to continually improve the Action Agenda. The Biennial Science Work Plan, completed in the same timeframe as the Action Agenda, identifies near-term research and assessment that will improve scientific information on ecosystem conditions and strategies. The management system for implementation, described in Priority E, will be used to keep track of the work to recover Puget Sound at the regional and local level, and use adaptive management to improve implementation efforts.

How were the priorities and actions developed?

The Action Agenda priorities and actions have been developed though extensive collaboration between regional experts, scientists, and local community members who will undertake much of the responsibility for implementation. More than 300 inventories of existing programs and priority actions were provided by implementers via an online inventory, at action area workshops, and in written comments. Topic forum papers were prepared to address each Partnership goal, and associated workshops were attended by more than 500 people; the papers generated more than 1,200 pages of comments. Scientific input was obtained from the early results of the scientific assessment of the ecosystem and the topic forums, and findings were peer reviewed by the Science Panel. In all, more than 1,600 people attended workshops to develop the Action Agenda and more than 12,000 comments were received in writing or online.

A key step in the development of the Puget Sound Action Agenda was the development of a set of principles for ecosystem management in Puget Sound that followed from discussion at topic forums and community workshops (see below). The principles, refined by the Ecosystem Coordination Board, Leadership Council, and the Science Panel, were used in the development of strategic priorities and sets of actions.

Using the ecosystem principles, looking across the topic papers as a whole, the Partnership identified Priorities A-D to identify the land alternation and pollution threats. Priority E is the charge assigned to the Partnership. In considering the threats, the ecosystem principles, and the input from the topic forums and from the public, the Partnership selected the high-level actions and near-term actions identified in the topic forum papers and action area workshops, as well as by the Leadership Council. The Partnership also considered some of the many plans that already exist.

Guiding principles for ecosystem management in Puget Sound

Input from the topic forums and action area meetings in 2008 led to the development of the following principles for ecosystem management. The principles, refined by the Leadership Council, Science Panel, and Ecosystem Coordination Board, were used to develop the strategic priorities and actions.

a. Address threats and choose opportunities with the highest potential magnitude of impact.
b. Address threats with the highest level of urgency. (How imminent is the threat; will it result in an irreversible loss; how resilient are the resources that are affected?)
c. Use strategies that have a reasonable certainty of effectiveness and reflect a balanced precautionary and adaptive approach.
    - Actions should have a realistic expectation that they will be effective in addressing the identified threat.
    - Actions and decisions about the use of resources should err on the side of caution to avoid irreversible ecological consequences.
    - Actions should be designed so they can be measured, monitored, and adapted.
d. Use scientific input – about the importance, urgency, and reversibility of threats; opportunities for management impact; effectiveness of actions; and monitoring and adaptation – in designing, implementing, and evaluating strategies.
e. Use strategies that are cost effective in making efficient use of funding, personnel, and resources with realistic expectations of achieving results.
f. Address the processes that form and sustain ecosystems and increase ecosystem resiliency rather than focus narrowly on fixing individual sites. Consider the Salish Sea ecosystem perspective.
g. Attempt to address threats at their origin instead of reacting after the damage has been done. Anticipate and prevent problems before they occur, and plan for extreme events. (With more people coming to the region and a changing climate, a proactive strategy is increasingly important.)
h. Consider the linkages and interactions among strategies.
    - Address multiple threats and their interactions with strategies that work together. We cannot afford to look at problems or develop solutions in isolation.
    - Watch out for unintended consequences. Evaluate strategies so actions to address one problem do not cause harm to other ecosystem processes, functions, and structure, as well as social and economic considerations.
    - Integrate salmon recovery actions with ecosystem management actions.
i. Account for the variations in ecosystem conditions and processes in different geographic areas of Puget Sound. Some parts of Puget Sound are fairly intact while others are severely degraded, and rebuilding strategies need flexibility to encompass regional differences. Ensure that no region or economic sector bears the entire brunt of the responsibility for implementing solutions.

Priority A: Protect intact ecosystem processes, structures, and functions

Current situation: As described in Question 2 of the Action Agenda, Puget Sound has been dramatically altered during the past 150 years. One-third of the shoreline has been armored, large areas of forestland and farmland have been paved or otherwise converted to other uses, and river systems have been altered by dams and levees. These actions were undertaken to produce other benefits, but they cumulatively damage and destroy the underlying ecological processes that enable Puget Sound to be healthy and productive. Human population growth and a changing climate in Puget Sound will exacerbate the threats to ecosystem health. To maintain or restore the structure and function of the Puget Sound ecosystem, it is imperative to identify and retain the important features of the ecosystem that still function well.

The region lacks a comprehensive, integrated marine and upland habitat protection strategy to preserve sites and areas with the highest ecological value. Habitat protection until now has been scattered, opportunistic, and disconnected from the physical processes that build and sustain habitat features. Current environmental protection measures in Puget Sound fail to protect ecosystem processes and structure because the measures were intended to protect individual pieces of the system, typically at the site scale, rather than the larger scale of the Puget Sound ecosystem. Since the 1970s, federal, state, and local governments employed numerous protective regulations, land use planning tools, acquisition of property, incentive programs, and education/stewardship programs designed to protect the environment and to manage for and minimize the adverse consequences of human population growth and associated land cover change. Despite these efforts, many activities continue to alter and degrade habitat across the lands and waters of the Puget Sound region, placing our ecosystem at increased risk from existing and future development.

Rationale for action: Protecting high quality ecological areas is less expensive and more effective than trying to repair or recreate damaged areas. Protection of land cover is critical for making improvements in water quality, and the survival of important species will depend on our ability to preserve critical and connected habitats along Puget Sound beaches, rivers systems, and uplands. Essential to our ability to protect resources will be encouraging density in urban areas, protecting rural working lands, and avoiding sprawl. It is important to look at remaining habitat at a larger scale, determining what areas are the most ecologically intact and/or provide the greatest level of ecosystem services, and make these our highest priority for protection. An array of tools such as purchasing property and conservation easements, incentive programs, regulations and other planning tools are already available. What is needed is a strategy to match these actions with the areas that are the most important and most vulnerable.

The Action Agenda identifies a comprehensive protection strategy for Puget Sound ecosystems that reflects five primary objectives:

- ***A.1*** *Focus growth away from ecologically important and sensitive areas by encouraging dense, compact cities, vital rural communities, and protected areas that support the ecosystem Soundwide.*
- ***A.2*** *Permanently protect the intact areas of the Puget Sound ecosystem that still function well.*
- ***A.3*** *Protect and conserve freshwater resources to increase and sustain water availability for instream and human uses.*

A.4 *Support long-term protection and stewardship of working farms, forests, and shellfish farms to help maintain ecosystem function, sustain quality of life, and improve the viability of rural communities.*

A.5 *Prevent and rapidly respond to the introduction of invasive species.*

A.1 Focus growth away from ecologically important and sensitive areas by encouraging dense, compact cities, vital rural communities, and protected areas that support the ecosystem Soundwide.

Attractive cities with appealing neighborhoods, open and vegetated spaces, quality schools, efficient transportation systems, and cultural amenities provide a high quality of life that encourages people to live in cities. This also protects the ecosystem. Growth strategies need to encourage density, retain rural communities with working and viable resources lands, and use planning tools to keep shorelines and vegetated areas intact and functional.

A.1.1 *Build on and coordinate existing efforts to create and implement a Soundwide vision for accommodating population and economic growth while protecting the Puget Sound ecosystem.*

- A.1.1.1 Coordinate and convene existing regional planning groups and collaborative growth process for cities, counties, regional planning groups, and other stakeholders to create a consistent vision for Puget Sound urban and working resources lands and avoid duplication of effort.
- A.1.1.2 Periodically review and update the regional vision.
- A.1.1.3 Implement existing growth plans such as Vision 2040 and others, and coordinate implementation across the Sound.
- A.1.1.4 Implement scale appropriate and cost-effective ecosystem protection and restoration actions in urban areas that enhance human well-being and provide ecosystem benefits.

A.1.2 *Prepare and consistently use regional ecosystem protection standards with a decision-making framework to guide protection and restoration decisions in marine, freshwater and upland terrestrial areas.* This system of recommended standards should be designed to apply anywhere in Puget Sound, bring consistency to protection decision-making across the region, and build on existing decision-making tools as much as possible.

- A.1.2.1 The protection decision-making framework will include a description of the conditions where protection (through impact avoidance) is absolutely necessary to prevent disruption of ecosystem processes in the marine, freshwater and upland terrestrial areas.
- A.1.2.2 Upon completion, the habitat protection decision-making framework will help guide the watershed assessments described in A.1.3, local protection and restoration priorities, and the Action Agenda.
- A.1.2.3 Incorporate results into state and local regulatory programs and other policies. This will need to include reconciliation with the current regulatory programs. See Section D.4.

A.1.3 *Use Action Agenda-based watershed assessments to define areas that should be protected and those that are best suited for growth using low impact development (LID) technologies, and to prioritize restoration opportunities including stormwater retrofits.* This information will be used to set priorities for local protection and restoration work. The assessments will build on and expand existing efforts to more comprehensively identify important ecosystem processes in each area.

A.1.3.1 Update and map ecosystem forming processes, structures, and functions that are intact or degraded. This will include key upland, freshwater and marine habitat areas. Use the regional ecosystem protection decision-making framework once it is available. Build on existing knowledge including, but not limited to, watershed or river plans, salmon recovery plans, State Biodiversity Conservation Strategy water quality plans, Shoreline Master Programs and GMA Comprehensive Plans, Future Land Use maps, FEMA mapping, State Invasive Species Plans, and Buildable Lands Inventories. Incorporate new information from the Nearshore General Investigation Study and Climate Change strategies. The work should be performed in a collaborative method, including local governments, interest groups, and citizens.

A.1.3.2 In the near-term, perform high-level, Action Agenda-based watershed assessment studies in each Water Resource Inventory Area (and/or appropriate sub-basins) and associated nearshore areas to enable the protection and restoration of the highest priority areas of the ecosystem at a local scale. Over the long-term, create and map the Puget Sound's interconnected ecosystem framework in terms of habitat-forming processes, structures and functions, the food web, and species biodiversity to guide decision-making about population and economic growth. Begin with coarse-scale assessment maps that identify key areas for restoration, protection, and development. Subsequent assessment efforts should "drill down" to more precisely indicate the high-priority areas for protection: ecologically important areas that are minimally altered and can be effectively restored; unique, rare, or otherwise intrinsically valuable resources; areas where climate change is projected to eliminate or change key habitats; areas where more intensive development can occur without major additional adverse effects on water quality, water flow, or habitat; and areas where development pressures are most likely to conflict with or confound future mitigation and/or restoration efforts.

A.1.4 *Develop regional and associated local protection and restoration strategies and priorities using the results of the assessment and the decision-making framework.* Focus on protection and restoration in the broad context of the ecosystem and strategic needs. Use and build on existing decision-support tools as much as possible. Examples include, but are not limited to, The Nature Conservancy Ecoregional Planning Model and the Puget Sound Nearshore Estuary and Restoration Program.

A.1.4.1 These strategies identify near- and long-term strategies and targets to: protect and restore local ecosystem processes, structures, and functions; refine current local and regional strategies for acquisition and restoration; reduce water pollution; consider the implications of climate change; and direct growth and accommodate economic development.

A.1.4.2 Incorporate the findings into federal, state and local plans, policies, and regulations and permits, including strategies to protect natural resource industries as appropriate.

A.1 Near-term Actions

1. Convene a regional planning forum to create a coordinated vision for guiding growth at an ecosystem scale. This should build on existing efforts and include the Puget Sound Regional Council, existing collaborative process such as the Cascade and Olympic Agendas and Quality Growth Alliance, Skagit Alternatives Futures projects, and other growth-related processes for agriculture, transportation, and other interests that need to be identified.
2. Prepare a set of criteria to guide decisions for acquiring and protecting high-value, high-risk habitat. Convene a working team of scientists and experts from various disciplines to produce a protection decision-making framework. Work collaboratively with the Science Panel and implementers.
3. Initiate or complete Action Agenda-based watershed assessment and related maps for each of the watersheds within the Puget Sound basin to identify sites and functions that are the most urgent and important for protection. Build on existing work such as the salmon recovery plan and other assessments including climate change information and utilize local knowledge and input. Start with watersheds in counties next in line to complete Shoreline Management Plan updates. This work will include identifying the appropriate watershed scale assessment. The process will include collaboration with local governments and local groups.
4. Support legislation that seeks to continue to direct development growth away from rural and working resource lands and into cities.

A.2 Permanently protect the intact areas of the Puget Sound ecosystem that still function well.

Permanent protection of intact habitat can translate to dedicated networks of open spaces, preserves, wildlife corridors, functional working resource lands, and nearshore, floodplain and estuarine environments. This is a keystone piece of the Puget Sound protection strategy.

Tools to protect key ecosystem processes include regulatory programs, acquisition programs, the outright purchase of property, partial acquisition of development rights or conservation easements, and conservation leasing. Special designations such as Wilderness, Wild and Scenic Rivers, and Outstanding Water Resources can be used to ensure protection happens. Acquiring development rights from highly productive working resource lands, such as farms and forests, is an effective way to protect ecosystem processes/structures while ensuring long-term productivity of working landscapes and rural communities. Government agencies, not-for-profit organizations, and others can assist with permanent protection efforts. Because these protection efforts are so important, assessing the effectiveness of regulatory and other protection methods is needed.

A.2.1 *Permanently protect lands at immediate risk of conversion and waters that support intact ecosystem processes through the acquisition of full or partial property interests.*

A.2.1.1 Acquire specific lands at risk of conversion or impacts from other human activities. For the near term, complete priority acquisition projects identified through established processes (e.g., salmon recovery and others) and/or other

sub-regional acquisition strategies developed using ecosystem recovery principles. Over the long term, acquire property identified through the Action Agenda-based watershed assessments and protection prioritization process (see A.1). For working farms and forests, use tools that keep land in production. Incorporate climate change projections into acquisition considerations.

A.2.1.2 Establish a revolving fund to rapidly protect lands at immediate risk of conversion.

A.2.1.3 Implement a strategic network of Marine Managed Areas and Aquatic Reserves that contributes to conserving the biological diversity and ecosystem health in the marine areas of Puget Sound.

A.2.1.4 Use special river designations where appropriate and needed for conservation.

A.2.2 *Update and implement regulatory programs related to growth and shoreline protection to increase levels of protection while increasing density in urban areas.*

A.2.2.1 Assist local governments in completing and implementing the Growth Management Act, Critical Areas Ordinances, and Shoreline Master Program Updates on schedule and as written.

A.2.2.2 Ensure that Shoreline Master Program and Critical Area Ordinance updates are synchronized to confirm they are consistent.

A.2.2.3 Provide model planning policies to local governments to improve the effectiveness of the local Growth Management Act and Shoreline Management Act programs. Priority should be given to local governments that lack technical expertise, planning staff, and funding.

A.2.2.4 Amend the Shoreline Management Act and associated rules to be more protective of nearshore environments.

A.2.2.5 Work with FEMA and local governments to prevent further residential, commercial, and industrial development in floodplains. Evaluate the feasibility of assisting vulnerable communities in relocating away from floodplains.

A.2.2.6 Limit density in rural areas and GMA-designated natural resource lands and create appropriate rural growth, using tools including voluntary incentives, model ordinances, or legislation for the purposes of maintaining functioning ecosystem processes and forest cover as well as economically viable working farms and forestlands.

A.2.2.7 Resolve legislative and other barriers that currently limit density and infill development in cities and within urban growth areas, such as annexation issues, legacy/non-conforming lots, urban neighborhood compatibility and infrastructure readiness, revenue sharing, and transportation concurrency.

A.2.2.8 Use development incentives to increase and improve redevelopment within urban growth areas, including those for stormwater management upgrades and restoration. Example incentives could include: flexible design standards such as setbacks, building height restrictions, parking lot and road design; use of transfer of development rights; and property tax incentives such as the Public Benefit Rating System program.

A.2 Near-term Actions

1. Protect high-value habitat and land at immediate risk of conversion as identified through existing processes such as the salmon recovery plans and others.
2. Advocate for proposed Wilderness designations: a) support Alpine Lakes Wilderness addition and b) Pratt River Wild and Scenic Designation.
3. Convene a task force to develop a funding mechanism to rapidly acquire properties with high ecological value and imminent risk of conversion. This work must augment and integrate with existing rapid acquisition programs.
4. Work with the Marine Managed Areas Work Group chaired by Washington State Department of Fish and Wildlife (DFW) to develop recommendations to improve the effectiveness of Marine Protected Areas (MPAs) by December 2009. Incorporate recommendations for MPAs in Puget Sound into the Action Agenda and take a lead role in implementation. In consultation with the tribes and other stakeholders, complete the management plans for the Cherry Point Aquatic Reserve and develop management plans for the following nominated reserves: Nisqually Estuary, Protection Island, and Smith Island in the Strait of Juan de Fuca. Implement recommendations. Coordinate the Cherry Point Management Plan with Whatcom County Cherry Point Management Area policies. Implement existing MPA plans in coordination with the Action Agenda.
5. Provide funding and technical assistance to local jurisdictions to update local shoreline management programs by current deadlines, with all updates complete by 2013. Work with local governments to ensure consistency with the Action Agenda priorities.
6. Provide local governments with guidance on how to achieve and measure no-net-loss of ecological function as required by the Shoreline Management Act and the Shoreline Master Program guidelines. This guidance should also refer to the multi-agency Aquatic Habitat Guidelines program, and the Puget Sound Nearshore Partnership. Produce and make available a template for monitoring no-net-loss and guidance on avoidance and minimization of impacts.
7. Change Shoreline Management Act statutes and regulations to require a shoreline conditional use permit for: bulkheads and docks associated with all residential development; all new and replacement shoreline hardening; all seawall/bulkhead/revetment repair projects; and new docks and piers. Require soft armoring techniques be used where new armoring or retrofits are unavoidable. No-net-loss of shoreline function should be required and new shoreline hardening should be prohibited in areas with feeder bluffs. New over water structures or shoreline hardening in the vicinity of forage fish-spawning areas and eel grass beds should also be restricted. Changes will need to address special situations such as emergency repairs. Assist local governments as needed to ensure that any regulatory adjustments are reflected in local Shoreline Master Programs.
8. Provide funding and technical assistance to local governments that have not yet completed their Critical Area Ordinance updates.
9. Support and implement recommendations from the Washington State Department of Community, Trade, and Economic Development TDR Policy Advisory Committee. Prioritize state funds for cities with TDR programs, and provide funds for counties and cities to implement TDR programs or to complete Environmental Impact Statement/State Environmental Policy Act (SEPA) analyses within TDR-receiving neighborhoods.

A.3 Protect and conserve freshwater resources to increase and sustain water availability for instream and human uses.

Surface water flows and groundwater resources in most watersheds of Puget Sound have been compromised as a result of dams, other modifications, loss and change of vegetative cover, water withdrawals for municipal, domestic, commercial, industrial, and agricultural water supplies, and in some cases, over allocation of water rights. Climate change will compound these problems by reducing snowpack and groundwater infiltration, increasing stormwater runoff, raising stream temperatures, and concentrating pollutants in water bodies. As a result, Puget Sound aquatic habitats are degraded, native species have declined, and there is an uncertain future water supply for human consumption. Low flows are identified as priority issues for salmon in 14 of the 19 Puget Sound Water Resource Inventory Areas.

Puget Sound watersheds need a comprehensive approach to protecting year-round, instream flows for people and instream uses. This is particularly important with more people coming to the region and projected increases in water demand. Current approaches to managing stream flows, groundwater, water use, land use, and stormwater management are fragmented and the many programs that address water quantity are not coordinated. A fundamental realignment in policy and regulation is needed at the state level to fix the system, one that ensures the protection of natural hydrologic processes and associated habitats within Puget Sound watersheds. Some of these actions will also help improve water quality.

A.3.1 *Implement and update streamflow protection and enhancement programs.*

- A.3.1.1 Ensure instream flows are protected by rule in each Puget Sound watershed and ensure instream flow rules are based on the most complete and current science pertaining to hydrologic processes.
- A.3.1.2 Develop coordinated, watershed-based water management strategies, accounting for existing ecosystem goals, water management agreements, projected future climate conditions and water availability, and projections of future instream flow demands.
- A.3.1.3 Implement the existing watershed management plans, including those prepared under RCW 90.82, in a manner that is consistent with the Action Agenda and coordinated with other local protection and restoration efforts including salmon recovery.
- A.3.1.4 Develop and implement collaborative, innovative programs to meet instream and out of stream flow needs.

A.3.2 *Reform state water laws to be more protective of instream flows and encourage conservation.*

- A.3.2.1 Revise water laws to encourage conservation and efficiency to better protect instream flows and water availability.
- A.3.2.2 Use demand management strategies (such as pricing structures) to discourage inefficient and unnecessary use of municipal water, particularly in flow-limited areas or low flow periods.
- A.3.2.3 Evaluate and implement solutions to water use issues related to exempt wells.
- A.3.2.4 Improve compliance with existing water laws.

A.3.3 *Expand and promote opportunities to reuse and reclaim water resources.*

A.3.3.1 Establish rules or standards that promote the use and reuse of reclaimed water and are protective of both the health of people and species.

A.3.3.2 Fix current barriers to use and reuse of rainwater, graywater, stormwater, and wastewater.

A.3.3.3 Promote use of water resources as close to the source as possible.

A.3.4 *Implement water conservation programs throughout Puget Sound.*

A.3.4.1 Build on successful public-private models already in place such as the Saving Water Partnership, a consortium of water utilities that fund conservation programs in Seattle and King County.

A.3.4.2 Identify and utilize water conservation technologies.

A.3.5 *Improve our understanding and management of groundwater resources.*

A.3.5.1 Manage groundwater in conjunction with surface water resources to better account for the interaction between the two. This will include monitoring of groundwater resources and use projections.

A.3.5.2 Complete and implement groundwater management plans throughout Puget Sound. Emphasize work in areas without current plans that are at high risk of groundwater pollution and/or current or future demand.

A.3 Near-term Actions

1. Set flow rules in watersheds that currently do not have instream flow rules, with priority given to critical basins or those with known significant problems meeting instream or out-of-stream demands.
2. Update instream flow rules based on current science. Focus this work initially in basins with flow rules that were set before 1986 and for water limited basins.
3. Develop and implement the comprehensive basin flow protection and enhancement programs called for in the recovery plans for Puget Sound Chinook and Hood Canal/Strait of Juan de Fuca summer chum.
4. Implement the recommendations from approved watershed plans prepared under the Watershed Planning Act (RCW 90.82) consistent with the Action Agenda and coordinated with other local restoration and protection efforts.
5. Evaluate and implement solutions to exempt wells issues. Convene a stakeholder group to identify management options and make a recommendation to the Partnership and Department of Ecology.
6. Establish local water masters in each watershed to increase water code compliance and enforcement. Provide funding for water masters to be a local contact to water users, provide a local compliance presence, protect the resource, reduce water use, and protect senior water rights, including instream flows.

7. Support municipal water systems' implementation of Washington Department of Health's Water Use Efficiency Rule, including establishing water conservation goals, metering, and reporting from all municipal suppliers.
8. Develop a treated wastewater reuse rule by December 31, 2010.
9. Adopt state water reuse rules.

A.4 Support long-term protection and stewardship of working farms, forests, and shellfish farms to help maintain ecosystem function, sustain quality of life, and improve the viability of rural communities.

Working lands can contribute to wildlife habitat and migration corridors, aquifer recharge, floodwater retention, and infiltration. Keeping farms and forests in production helps maintain these benefits. There are numerous voluntary incentive and stewardship programs available to rural property owners in Washington. Landowner incentive programs include direct financial incentives (e.g., grants, subsidized loans, cost-shares, leases); indirect financial incentives (e.g., property or sales tax relief); technical assistance (e.g., referrals, education, training, design assistance programs); and recognition and certification of products and operations. Additional financial incentives may be needed to encourage some owners of working lands to continue their operations. Current use and effectiveness of voluntary incentive and stewardship programs vary. These programs should be focused on the highest priority areas in the Puget Sound ecosystem.

A.4.1 *Use, coordinate, expand, and promote financial incentives that allow working lands to stay viable.* These include, but are not limited to, purchase of development rights and conservation easements, transfer of development rights, and property tax incentives such as Open Space Tax Program that can include the Public Benefit Rating System. Additional financial incentives may be needed.

- A.4.1.1 Focus stewardship programs on Action Agenda priorities and use the Action Agenda-based watershed assessment results to define geographic focus areas and problems to address.
- A.4.1.2 Expand rural participation rates in voluntary site stewardship programs.
- A.4.1.3 Where warranted, use financial incentives to enable owners to continue operations and reward them for good land stewardship.

A.4.2 *Support the economic viability of farms and agriculture to reduce land conversion, and work to ensure that farming practices are protective of ecosystem health.*

- A.4.2.1 Expand programs that support the economic viability of farms in Puget Sound consistent with ecosystem protection. This could include: expanding cooperative marketing programs such as Puget Sound Fresh that brings locally-grown food to Puget Sound markets; amending GMA to authorize farm-related business activities to be conducted on designated agricultural lands; and supporting the State Farmland Legacy Program, and related activities and groups working to preserve Puget Sound farmland (e.g., Future of Agriculture Initiative and Skagitonians to Preserve Farmland).
- A.4.2.2 Use incentive programs to encourage farmers and landowners with hobby farms in rural areas to engage in sustainable farming practices.

A.4.2.3 When conducting land use and conservation planning, including Action Agenda-based watershed assessments, engage the farming communities as important stakeholders.

A.4.2.4 Coordinate efforts with ongoing work to promote agriculture such as the Office of Farmland Preservation, the Washington Future of Farming Initiative, and the Ruckelshaus Center.

A.4.3 *Support the economic viability of working forests to reduce forest conversion, and work to ensure that forest practices are protective of watershed health.*

A.4.3.1 Maintain publicly owned and private forest production while achieving the ecosystem goals of the Action Agenda.

A.4.3.2 Support small forest landowners through non-regulatory incentive and technical assistance programs.

A.4.3.3 When conducting land use and conservation planning, including Action Agenda-based watershed assessments, engage large and small forest landowners as important stakeholders.

A.4.4 *Promote working aquatic lands that are protective of ecosystem health to provide abundant shellfish for commercial, subsistence, and recreational harvest consistent with ecosystem protection.*

A.4.4.1 Implement best management practices for shellfish production.

A.4.4.2 Resolve conflicts between aquaculture and upland uses, particularly in South Sound. Continue the work of the Shellfish Aquaculture Regulatory Committee and implement its recommendations.

A.4.4.3 Continue to implement the state Forest Practices Rules, as well as Habitat Conservation Plans (HCPs) and similar agreements between forest landowners and federal or state agencies.

A.4 Near-term Actions

1. Purchase or transfer development rights or use conservation easements for working lands at immediate risk of conversion.
2. Coordinate with the SSB 5248 project by the Ruckelshaus Center that is working to resolve conflicts between agricultural activities and critical areas regulations.
3. Support the Conservation Commission's efforts to protect productive agricultural areas consistent with the Action Agenda priorities.
4. Continue to implement existing forest practice plans and regulations consistent with the Action Agenda, including the state trust lands HCP, state forest practices rules, and Road Maintenance and Abandonment Plans as informed by the Forest and Fish Plan, and others.
5. Continue ongoing work to resolve conflicts between aquaculture and upland uses. Consider and implement the recommendations of the Shellfish Aquaculture Regulatory Committee.
6. Implement components of the Washington Department of Natural Resources Aquatic HCP that protect critical habitat.

A.5 Prevent and rapidly respond to the introduction of invasive species.

Invasive, non-native species are brought to the Puget Sound through: imported fruits, plants, and vegetables; ballast water discharge from ships; imported soil; and commercial/recreational boat hulls. In Puget Sound, invasive species can alter native habitats and compete with native species. This reduces the resiliency of ecosystems, changes local habitats, and introduces diseases. Preventing the introduction of new invasive species is more effective than trying to reduce and remove them later.

A.5.1 *Implement key recommendations for the Puget Sound region that will prevent the introduction of new invasive species as identified in the Invasive Species Council "Invaders at the Gate" Strategic Plan.*

A.5.2 *Reduce potential risks from ballast water discharges.*

A.5.3 *Develop and implement a Soundwide early detection and rapid response system to address invasive species risks.* This could include innovative agency fund-sharing mechanisms.

A.5.4 *Continue to implement targeted and strategic efforts to contain, control, and eradicate existing infestations of invasive species that impair ecosystem processes.*

A.5 Near-term Actions

1. Advocate for national or West Coast regional ballast water discharge standards.
2. Implement state ballast water requirements until a national or West Coast standard is established.
3. Develop a Puget Sound baseline and database of invasive species to guide control efforts.
4. Enhance and target existing capacity to rapidly respond to immediate invasive species risks.

Integrating scientific information to improve strategies over time: Two important areas of study identified in the Biennial Science Work Plan will help refine protection strategies.

- A system-wide study to evaluate the current status and primary threats and drivers to indicators across the systems. This work will synthesize information on the status of ecosystem indicators and the relative magnitudes of drivers and pressures throughout the region, helping to identify priority intact areas for protection.
- A study to demonstrate the effects of policy actions (such as protection strategies) and ecosystem change on human uses and ecosystem services. This study will use indicator data on human uses, climate conditions, and other socioeconomic factors to determine how much protection and restoration actions result in ecosystem changes, and how those changes affect benefits humans reap from ecosystems.

Priority B: Restore ecosystem processes, structures, and functions

Current situation: In the course of building homes, businesses, roads, and infrastructure, the lands and waters of Puget Sound have been drastically modified. Levees, dams, and toxic deposits are obvious and have site-specific impacts. But less obvious are the cumulative changes from human land use activities, such as bulkheads, docks, permanent removal of vegetation, and loss of native habitat in marine and upland areas. These activities have damaged the underlying processes that form beaches, keep rivers, estuaries and forests healthy, and support species. Historically, the actions that led to ecosystem degradation were intended to improve the quality of life for Puget Sound residents, but with closed shellfish beds, flooding, species decline, and other impacts it is clear that ecosystem rebuilding efforts are needed.

Rationale for action: Protecting the habitats and functions that are left is critical, but will not be enough to restore the health of the ecosystem. To achieve the goals of the Action Agenda, the condition of Puget Sound must be improved from its present state. Restoration strategies once focused on what was called the "low hanging fruit," referring to specific projects on individual sites. These projects were ready to go, relatively easy to fund, construct, and report on, but they do not necessarily focus on restoring key ecosystem processes. Scientists now emphasize the importance of restoration strategies that consider project sequence, function, and scale. Will the restoration work be obliterated by something that is occurring upstream or the effects of climate change? Will it connect habitat patches into a functional network or just fix an isolated site? And will restoration work address urgent, large-scale problems such as estuary loss at the mouths of our rivers, or the nutrient loading that depletes oxygen in the waters of Hood Canal or South Sound? Finally, will restoration add up to improvement in the quality of life for people by reducing flooding, providing clean water, making shellfish edible, and producing fish and wildlife in the creeks, woodlands, beaches, and marshes throughout Puget Sound?

A restoration strategy for Puget Sound has three major elements. First is the need to undertake ecosystem rebuilding at a large scale in a variety of habitats throughout Puget Sound. In the same way that protection actions must set priorities for the remaining valuable habitat in Puget Sound, restoration activities must focus on improving underlying functions of the ecosystem, and work efficiently on projects that are likely to have large-scale and long-lasting returns. Second, restoration work has significant potential to help revitalize human communities by removing toxic waste, rebuilding shorelines, clearing the way to restore vibrant waterfronts, and providing near-term engineering and construction jobs. Finally, we must ensure that stewardship is implemented to break the cycle of degrade-restore-degrade that carries substantial economic costs and risk to human health and well-being.

The Action Agenda identifies a comprehensive restoration strategy for Puget Sound ecosystems that reflects three primary objectives:

- ***B.1*** *Implement and maintain priority ecosystem restoration projects for marine, marine nearshore, estuary, freshwater, riparian, and upland areas.*
- ***B.2*** *Revitalize waterfront communities while enhancing marine and freshwater shoreline ecosystem processes.*
- ***B.3*** *Support and implement stewardship incentive programs to increase the ability of private landowners to undertake and maintain restoration projects that improve ecosystem processes.*

B.1 Implement and maintain priority ecosystem restoration projects for marine, marine nearshore, estuary, freshwater riparian, and upland areas.

The continued implementation of ecosystem restoration projects and plans is a cornerstone of the restoration strategy and species recovery for Puget Sound. For example, salmon recovery plans provide a broad suite of high priority restoration projects that have been scientifically reviewed and have substantial community support. Those projects that restore ecosystem processes will result in expanded broader ecosystem benefits, such as improved habitat and water quality, increased scenic values, and improvements to salmon and other species. The restoration projects are highly varied and are tailored to local watershed conditions. Land purchase may also be necessary to facilitate specific restoration projects. Native species should be used in restoration efforts.

Examples of ecosystem restoration projects include, but are not limited to:

- Uplands: Reforestation of waterways, removal of fish passage barriers, rehabilitation of poorly maintained or no-longer-needed logging roads;
- Freshwater riparian: Connection of rivers and floodplains, dike and levee setback, revegetation along streams and rivers, placement of large woody debris, wetland restoration;
- Estuary: Levee setback, tidegate improvements;
- Marine nearshore: Removal of or softening shoreline armoring;
- Marine water: Removal of derelict fishing gear.

B.1.1 *In the near term, prioritize the implementation of restoration projects identified within existing species recovery plans, flood hazard management plans, road decommissioning plans, Shoreline Master Programs, and other documented processes that have scientific review and community support. Consider climate change impacts and necessary adaptations.*

B.1.2 *Over the long term, implement projects identified through the Action Agenda-based watershed assessments, regional protection and restoration strategies, and harmonization of existing efforts identified in Priority A.1.*

B.1.3 *Maintain protected areas through stewardship. Consider innovative methods for conducting maintenance such as endowment, partnerships with conservation organizations, and citizen volunteers.*

B.1 Near-term Actions

1. Implement restoration projects in the salmon recovery three-year work plans and the Estuary and Salmon Restoration Program of the Nearshore Partnership. Consider climate change impacts for projects.
2. Complete large-scale restoration projects at the mouths of major river systems in Puget Sound where there is a high likelihood of re-creating ecosystem function. These large-scale projects often require funding amounts not typically available through current grant programs. Examples of projects that already have substantial analysis and are in progress include:

- Finish restoration of 762 acres of Nisqually Estuary by removing dikes to return the area to tidal influence.
- Restore 675 acres of the Snohomish River Estuary, including funding the 400-acre Smith Island Estuarine Restoration project.
- Restore 450 acres in the Skokomish Estuary.

3. Restore floodplain and river processes where there is a high likelihood of re-creating ecosystem function. Examples include the lower 2.6 miles of the Dungeness River.
4. Remove significant blockages of ecosystem processes and provide access to habitat. Two examples include removal of the Elwha Dam and associated restoration that will open up 70 miles of habitat on the Elwha River, and fish passage at the Howard Hansen Dam that will provide access to over 40 miles of habitat on the Green River.
5. Complete the Puget Sound Nearshore Partnership's General Investigation in a timely way to identify and refine nearshore restoration opportunities and move toward implementation. Climate change impacts to potential sites should be considered. Support the U.S. Army Corps of Engineers General Investigation results to receive authority to implement large-scale ecosystem restoration projects in Puget Sound.
6. Remove derelict fishing gear as proposed by the Northwest Straits Commission and local Marine Resource Committees in sites with known problems for species.

B.2 Revitalize waterfront communities while enhancing marine and freshwater shoreline ecosystem processes.

The transition from a resource-based economy has left some Puget Sound communities with degraded and polluted waterfronts from old industrial activities. Many of Puget Sound's urban centers are located on marine or freshwater shorelines, but few have been able to develop a built environment that complements their shoreline environment. Diverse use of shorelines will continue and restoration and stewardship actions can remove obstacles to waterfront redevelopment and reduce new impacts from waterfront activities.

B.2.1 *Restore urban waterfront areas and communities in a manner that complements functioning shoreline ecosystems and accommodates future climate change and sea level rise impacts.*

B.2.1.1 Improve the coordination of waterfront restoration and cleanup efforts.

B.2.1.2 Prioritize habitat restoration at cleanup sites located near intact ecosystems and where the probability of re-creating ecosystem function is high.

B.2.1.3 Improve access to shorelines for recreation.

B.2.2 *Expand and fund "green port" and clean marina programs to foster environmental stewardship for port and marina development and management.*

B.2 Near-term Actions

1. Fund a one-year demonstration program to develop a coordinated cleanup and restoration plan for the Port Angeles Harbor and waterfront and work plan for project completion. Establish local leadership of the project.
2. Continue Bellingham Bay Pilot Program to clean up Bellingham Bay in a coordinated way.

3. Continue to control pollutant sources and remediate toxics in Duwamish Bay.

B.3 Support and implement stewardship incentive programs to increase the ability of private landowners to undertake and maintain restoration projects that improve ecosystem processes.

Restoration actions vary in scale and take place on both public and private lands. There are currently numerous programs available in Washington that can have positive outcomes for the environment with appropriate incentives, technical assistance, and participation. Examples include: direct financial incentives (grants, subsidized loans, cost-shares); indirect financial incentives (property tax relief); technical assistance (referrals, trainings, design assistance); recognition/certification for products or operations; and conservation leasing.

B.3.1 *Develop, use, coordinate, expand, and promote financial incentives, technical assistance, and outreach that encourage private landowners to undertake and maintain restoration projects.*

B.3.2 *Implement incentives for industrial and commercial landowners.*

B.3 Near-term Actions

1. Implement coordinated incentive and technical assistance programs for private landowners through the Conservation Commission, Conservation Districts, Department of Natural Resources, other state agencies, Washington State University Extension, local governments, non-governmental organizations, and others as appropriate.

Note that a near-term action to streamline restoration permitting is included in Section D.4.

Integrating scientific information to improve strategies over time: Three important areas of study identified in the Biennial Science Work Plan will help refine protection strategies.

- The Action Agenda emphasizes the implementation of salmon recovery projects and identifies the restoration of Puget Sound estuaries as important to the ecosystem. By designing one or more of the future large estuary restoration projects as experimental designs that can be measured, scientists and resource managers would be better poised to answer: whether actions work as planned; the role of nearshore biology, physical processes, and functions in the broader ecosystem context; and what findings can inform similar projects around Puget Sound.
- Ongoing analysis of potential benefits and impacts of alternative approaches for managing stormwater and land use collectively to understand better how to reduce impacts of runoff. This analysis would provide a key scientific basis for integrated land use and water resources planning.
- Adaptive management of nearshore restoration projects. At one or more large river delta locations in Puget Sound and/or at one or more marine shorelines, scientists will work with managers to assure on-the-ground restoration actions are developed in an experimental design context, and to assure outcomes of actions are both predicted and measured.

Priority C: Reduce the sources of water pollution

Current situation: Pollution of the rivers, creeks, bays, and open waters of Puget Sound comes from a variety of sources and travels along many pathways. Spilled oil products and fuel, deposition of air pollution, legacy toxic pollutants, disease-bearing and illness-causing organisms from failing and poorly maintained on-site sewage treatment systems, fertilizers, erosion, and the runoff from roads and parking lots all find their way into the waters of Puget Sound, where they harm fish and wildlife and create direct health risks to people. Polluted waters reduce ecosystem services – pollution results in shellfish closures, beach closures, impacts to recreation, impairments to sources of drinking water, loss of cultural resources, consumption warnings for fish, and low oxygen conditions that kill marine species. Increasing numbers of people, cars, and pavement mean more pollutants enter our waterways in higher concentrations, and at a faster rate. Pollutants also enter waterways directly through point source discharges from commercial and industrial sites.

Although we have done a good job of cleaning up contaminated sites, we have not stopped the onslaught of new contamination from entering our waters. We allow pollutants such as synthetic hormones and persistent bioaccumulative toxics to enter the water, many of which we know very little about or have few standards and testing methods to evaluate. Although progress has occurred at individual locations, other sites have worsened and grappling with the multiple problems of water quality at a regional level has been difficult. Past water quality programs have often emphasized expensive cleanup programs without adequate emphasis on reducing new pollution, including areas where cleanup has occurred. Current water quality management practices in Puget Sound do not reflect an ecosystem approach, are not well coordinated, and do not effectively address the ubiquitous nature of pollutants in our freshwater and marine systems.

Rationale for action: Improving groundwater and surface water quality in Puget Sound will require a regional commitment to reducing the multiple sources of toxic, nutrient, and pathogen pollutants prior to their entry into the system. We must be vigilant about preventing and responding to oil spills. We must also improve the management of stormwater runoff and treatment of wastewater. Implementing the cleanup of contaminated sites still must occur, with priorities and appropriate sequencing. Warning systems for contaminated seafood must be continued to protect human health.

The Action Agenda identifies a coordinated, regional approach to reducing the sources of water pollution in Puget Sound that reflects six primary objectives:

- ***C.1*** *Prevent pollutants from being introduced into the Puget Sound ecosystem to decrease the loadings from toxics, nutrients, and pathogens.*
- ***C.2*** *Use a comprehensive, integrated approach to managing urban stormwater and rural surface water runoff to reduce stormwater volumes and pollutant loadings.*
- ***C.3*** *Prioritize and complete upgrades to wastewater treatment facilities to reduce pollutant loading.*
- ***C.4*** *Establish and maintain locally coordinated, effective on-site sewage system management to reduce pollutant loading to vulnerable surface waters.*
- ***C.5*** *Prioritize and continue to implement toxic cleanup programs for contaminated waterways and sediments.*

C.6 *Continue to monitor swimming beaches as well as conduct shellfish and fish advisory programs to reduce human exposure to health hazards.*

C.1 Prevent pollutants from being introduced into the Puget Sound ecosystem to decrease the loadings from toxics, nutrients, and pathogens.

The most reliable and cost effective way to manage for water quality health is to decrease the loadings of pollutants before they enter Puget Sound's surface and groundwater. Source control tactics include education, pollution prevention, innovative technologies, protection of vegetated areas and wetlands, low impact development, natural infrastructure, cradle to cradle product stewardship, state or national product bans, engineered solutions, as well as incentives and technical assistance.

C.1.1 *Implement a prioritized, comprehensive management initiative to prevent, reduce, and control loadings of toxics going into the Puget Sound ecosystem.*

C.1.1.1 Conduct focused business and citizen outreach aimed at controlling and reducing high-priority chemicals, pharmaceuticals, and personal care products. Include pollutants identified in the regional toxic loading studies that are priority threats to Puget Sound.

C.1.1.2 Participate in the Interstate Chemicals Clearinghouse to reduce chemical hazards and promote safer chemical alternatives. Identify priority pollutants present in commercial products (e.g., pesticides, PBTs) that are unnecessary or have less toxic alternatives and work with legislative bodies and agencies to curtail their use.

C.1.1.3 Advocate for national standards that address new and emerging contaminants, as well as those currently without standards that cause harm in Puget Sound waters. Work with federal agencies to adopt region-specific standards that address both Clean Water Act and Endangered Species concerns.

C.1.1.4 Advocate for chemical substitutions, cradle to cradle management of products with hazardous materials and chemicals, the reduction and reuse of materials, and incentives for research, phase-out of harmful chemicals and products, and development and use of safer chemical alternatives and products.

C.1.1.5 Keep Persistent Bioaccumulative Toxic (PBT) chemicals, metals, and pesticides from reaching Puget Sound waters. This means accelerating the reduction of the loading of PBTs and implementing Ecology's PBT program to reduce, and where feasible, eliminate release of PBTs in the environment.

C.1.1.6 Implement state and local programs to keep hazardous materials out of the waste stream and Puget Sound land and waters. This includes implementing the Washington State's Beyond Waste Plan.

C.1.1.7 Continue to invest in technologies that reduce toxic pollutants and technical assistance to reduce their use.

C.1.1.8 Examine and update guidelines for mixing zones. Work with key stakeholders and include a cost-effectiveness analysis of limiting and/or eliminating mixing zones.

C.1.1.9 Implement pharmaceutical take-back programs.

C.1.1.10 Continue scientific work to better understand the sources of toxics, as well as transport and fate in the Puget Sound ecosystem, to better refine reduction strategies. This includes the toxic loadings assessments.

C.1.2 *Implement targeted air emission and source control programs for land-based vehicles, marine vessels, and air transportation.*

C.1.2.1 Expand Soundwide and local oil spill prevention and interagency spill response programs. Improve tribal capacity to assist with oil spill response. Consider and integrate as appropriate the recommendations of the Oil Spill Advisory Council into the overall pollution reduction strategy.

C.1.2.2 Permanently maintain a year-round rescue tug at Neah Bay in support of enhanced emergency response capabilities.

C.1.2.3 Coordinate with regional transportation efforts to reduce vehicle use. Promote efforts that reduce the number of vehicles on the road to reduce pollutants entering Puget Sound from roads and parking lots and airborne pollutants.

C.1.2.4 Support efforts for cleaner fuel technologies to keep pollutants off roads and reduce carbon emissions.

C.1.2.5 Establish No Discharge Zones for commercial and/or recreational vessels in all or parts of Puget Sound that have nutrient and/or pathogen problems, have high vessel use, and are significant for shellfish production. Establishing No Discharge Zones will require pump-out facilities with maintenance programs prior to implementation of the new rules.

C.1.2.6 Develop, implement, and strengthen or enhance as necessary existing air quality management plans to decrease risks to human health and reduce pollution that harms aquatic life.

C.1.3 *Develop and implement water quality cleanup and management plans to reduce pollutant loads.*

C.1.3.1 In the near term, implement existing Water Quality Management Plans, Shellfish Protection District plans, and other water quality plans.

C.1.3.2 In the long term, implement comprehensive watershed-based and regionally coordinated approaches to controlling and treating pollutants that are integrated with other strategies to protect and restore Puget Sound.

C.1 Near-term Actions

1. Conduct a focused outreach campaign for the public and businesses to reduce pollutants identified in toxic loading and other studies that are priority threats to Puget Sound. This effort will be focused on pharmaceuticals, personal care products, and pollutants in stormwater runoff.
2. Assist the Department of Ecology in implementing its PBT program to reduce and eventually eliminate the use of all chemicals on the PBT list, and other programs to reduce toxins such as metals.
3. Permanently fund a rescue tug at Neah Bay. Advocate for a permanent federal funding mechanism for an emergency response rescue tug at Neah Bay. If federal legislation is not

passed, seek and support one-year funding for fiscal year 2010 and pursue a dedicated state funding option.

4. Obtain delegated authority from the Coast Guard to expand and enhance the scope of authority of the Department of Ecology's vessel and facility inspections, marine incident investigations, and the agency's ability to augment Coast Guard prevention activities and review spill prevention and response plans on behalf of the Coast Guard. Delegated authority will streamline and strengthen spill prevention plans and operations manuals required by both agencies as well as stronger state enforcement.
5. Petition EPA to establish Puget Sound as a No Discharge Zone for commercial and/or recreational vessels to eliminate bacteria, nutrients, and pathogens from being discharged into Puget Sound. Prioritize areas of the Sound that have nutrient and/or pathogen problems, have high vessel use, are significant for shellfish production, and/or that are otherwise especially vulnerable.
6. Implement existing air management plans consistent with the Action Agenda.
7. Implement Shellfish Protection District plans, on-site sewage treatment plans in marine recovery areas, and related projects to restore water quality at tribal, commercial, and recreational shellfish areas that are degraded or threatened.
8. Implement immediate remediation actions to address Hood Canal's low dissolved oxygen concentrations through the Hood Canal Dissolved Oxygen Program.
9. Implement priority strategies and actions to address low dissolved oxygen in South Sound, targeted areas in the Whidbey Basin, and other vulnerable areas. This includes the Ecology-led South Sound Dissolved Oxygen Study.

C.2 Use a comprehensive, integrated approach to managing urban stormwater and rural surface water runoff to reduce stormwater volumes and pollutant loadings.

Surface water and stormwater runoff in urban and rural areas are the primary transporters of toxic, nutrient, and pathogen pollutants to surface and groundwater resources throughout the Puget Sound basin. Comprehensive approaches to reduce stormwater runoff volumes and pollutant loadings differ in urban and rural areas, but include maintaining and restoring natural hydrologic systems of forests and wetlands for infiltration, and managing surface water closer to its source when possible. The region needs to better implement the current programs and regulations now, as well as strengthen efforts moving forward. This work is particularly important as stormwater flows will likely become larger and more frequent with climate change.

C.2.1 *Integrate efforts to manage stormwater discharges with work to protect land cover and reduce pollutants at the watershed scale and across Puget Sound.* This means implementing the land use protection and restoration actions described in Priorities A, B, and D, as well as the loadings reduction strategy in C.1.

C.2.1.1 Integrate stormwater management efforts into integrated watershed planning. This would include actions identified in Sections A and D, as well as Watershed Management Plans and Water Quality Improvement Plans.

C.2.1.2 Investigate, and if appropriate and feasible, establish watershed-scale stormwater permits through Section 208 of the Clean Water Act. Focus permits on the multitude of discharges that occur in logical geographic areas, rather than discharge-specific inputs or jurisdictional boundaries.

C.2.1.3 Establish priorities and resource needs for creating a coordinated water quality monitoring program under National Pollutant Discharge Elimination System (NPDES). This program would need to be coordinated with the overall regional monitoring program identified in E.3.

C.2.2 *Manage stormwater runoff in urban and urbanizing areas to reduce stormwater related impacts.*

C.2.2.1 Implement the municipal stormwater NPDES Phase I and II permits so that the discharges from municipal stormwater systems are reduced. Achieve overall water quality standards. Provide financial and technical assistance to permitted cities and counties.

C.2.2.2 Implement other NPDES permits including those for industrial discharges and the Washington State Department of Transportation.

C.2.2.3 Improve stormwater management in communities not currently covered by NPDES permits by providing financial and technical assistance to local governments to create local comprehensive stormwater control programs. Investigate expansion of NPDES permit coverage to include additional jurisdictions with municipal separated storm sewer systems (MS4). Initiate work in areas with documented stormwater-related problems and intact resources that are threatened by surface runoff.

C.2.2.4 Provide cities and counties with comprehensive guidance and standards regarding LID practices to incorporate into stormwater codes for development and redevelopment. Assist local governments with revisions to regulations so that all jurisdictions in Puget Sound require the use of LID where feasible, as soon as possible.

C.2.2.5 Advance the use of LID approaches to stormwater management. This includes, but is not limited to: a) resolve institutional barriers that limit use of LID for new development and redevelopment and road construction, including an update of stormwater flow control standards; b) implement, assess, and promote successful examples of LID techniques; c) develop incentives for using LID; d) develop focused training for contractors and developers and other stormwater professionals; and e) develop focused training for local government staff on areas best suited for LID and assist them in revising their regulations to allow LID.

C.2.2.6 Evaluate the technical and programmatic solutions for Combined Sewer Overflows (CSOs) in the context of improving water quality in fresh and marine water and preserving and recovering the health of Puget Sound. Continue efforts to eliminate discharge of raw sewage.

C.2.2.7 Prioritize and implement stormwater retrofits in urbanized areas, including roads. In the near term, develop high-level prioritization criteria for the selection of new projects. Over the long term, link retrofit priorities to coordinated watershed restoration and pollution prevention strategies.

C.2.2.8 Improve future, new, and updated NPDES permits by requiring sub-basin planning to better identify specific actions for water bodies, improving collaboration of effort for shared water bodies, incorporating climate change

projections related to stormwater runoff volumes, and meeting other requirements that will need to be identified.

C.2.3 *Manage surface water runoff in rural areas and on working resource lands to reduce pollutant loadings.*

- C.2.3.1 Implement the Forest and Fish agreement, including road maintenance and abandonment plans on public and privately held working forests.
- C.2.3.2 Fund and implement voluntary incentive, stewardship and technical assistance programs for rural unincorporated landowners, hobby farms, working farms, and nurseries.
- C.2.3.3 Implement and ensure compliance with Concentrated Animal Feeding Operations permits.

C.2 Near-term Actions

1. Establish a regional coordinated monitoring program for stormwater, working with the Monitoring Consortium of the Stormwater Work Group (see E.3).
2. Provide financial and technical assistance to cities and counties to implement NPDES Phase I and II permits, as well as Ecology for permit oversight and implementation.
3. Assist cities and counties in incorporating LID requirements for development and redevelopment into all stormwater codes.
4. Develop and implement LID incentives. Work with regional experts to develop and implement incentives and remove barriers to the use of low impact stormwater management techniques on development projects.
5. Convene a group of regulating agencies, implementers with key funding responsibilities, and other stakeholders as appropriate to evaluate the technical and programmatic solutions for CSOs to meet overall program goals of improving water quality in fresh and marine water. The integration of CSO solutions into the larger range of solutions to stormwater and other water quality problems may improve cost effectiveness of both programs in urban areas, notably Seattle and King County. This will require flexibility in implementation, timing, and scope of municipal wastewater NPDES program as applied to CSOs.
6. Retrofit existing stormwater systems by: a) developing high-level criteria that can be used in 2009 to determine the highest priority areas around the Sound for stormwater retrofits; and b) implementing stormwater retrofit projects in the highest priority areas based upon these criteria to bring areas into compliance with current stormwater regulations. Retrofits should include low impact stormwater management techniques to the greatest extent feasible. Monitor effectiveness of the techniques.
7. Continue to implement road maintenance and abandonment programs for federal, state (including trustlands), and private timber lands.
8. Implement private property stewardship, incentive, and technical assistance programs (e.g. Conservation Districts, WSU Extension, Washington Sea Grant, local government programs) that focus on reducing sources of water pollution, from commercial and non-commercial farms and other nonpoint pollution sources, particularly in priority areas.
9. Implement NPDES industrial permits and Washington State Department of Transportation permits, including Ecology for permit oversight and implementation.

C.3 Prioritize and complete upgrades to wastewater treatment facilities to reduce pollutant loading.

Untreated wastewater from municipal, industrial, and government facilities is a source of a broad spectrum of pollutants, including nutrients and pathogens, to Puget Sound. Treated municipal sewage contains a mixture of personal care products, caffeine, endocrine-mimicking chemicals, and other pharmaceuticals. Wastewater treatment removes or transforms many but not all contaminants. Land-based wastewater treatment plants discharge an estimated 400 million gallons per day of treated water into Puget Sound. CSOs sometimes discharge mixed stormwater and untreated wastewater to Puget Sound during wet weather when conveyance or plant capacities are exceeded.

Technical approaches to wastewater treatment vary depending upon the type of waste and age of the facility. Municipal, onsite, and CSO treatment facilities primarily focus on removing pathogens, biochemical oxygen demand, and suspended solids with a primary objective of protecting human health. Industrial facilities typically have systems customized to their waste products and sometimes discharge to municipal systems following pre-treatment. Many wastewater treatment plants are outdated and lack advanced treatment technology.

C.3.1 *Pursue stimulus package funding to implement priority upgrades of municipal and industrial wastewater facilities in urban and urbanizing areas to increase effectiveness of treatment, especially in nutrient sensitive and recoverable shellfish areas of Puget Sound.*

- C.3.1.1 Investigate requiring improved nitrogen removal at treatment plants in targeted areas including those with nutrient loading issues and vulnerable waters.
- C.3.1.2 Update all known and reasonable technology (AKART) standards for new treatment plant upgrades.
- C.3.1.3 Investigate use of incentives to encourage upgrades.

C.3.2 *Improve local government project readiness by providing technical assistance to local governments with wastewater treatment plants in locations where significant nutrient loading originates*. Priority given to projects that reduce pollutant loadings (nutrients, toxics, and pathogens) and that develop alternative water supplies by reclaiming and reusing municipal wastewater.

C.3.3 *Encourage federal, federally regulated, and other government and industrial facilities to reduce nutrient and pathogen loading consistent with the Action Agenda priorities.*

C.3.4 *Continue to investigate and invest in technologies that reduce nutrients, pathogens and emerging chemicals*.

C.3 Near-term Actions

1. Use advanced wastewater treatment where needed in nutrient sensitive and shellfish recoverable areas, such as Hood Canal, South Sound, and the Whidbey Basin.
2. Pursue stimulus package funding to implement priority upgrades of municipal and industrial wastewater facilities, especially in nutrient sensitive and recoverable shellfish areas of Puget Sound.

3. Support federal facilities in reducing nutrients and pathogens, particularly in already impaired areas.

C.4 Establish and maintain locally coordinated, effective on-site sewage system management to reduce pollutant loading to vulnerable surface waters.

Rural communities in Puget Sound lack municipal wastewater treatment facilities and residents typically use on-site wastewater treatment techniques to treat sewage and wastewater. There are an estimated 500,000 on-site sewage systems in the Puget Sound basin, many located adjacent to vulnerable water bodies. Failing on-site sewage systems threaten water quality and public health. Well designed, sited, and constructed on-site sewage systems are effective in removing pathogens and bacteria from wastewater; they are less effective in removing nitrogen and other nutrients, as well as materials from personal care products and pharmaceuticals. This can become a major problem in nutrient sensitive areas.

C.4.1 *Establish, in each Puget Sound county, a coordinated, systematic way to identify, inspect, and repair or replace (as needed) failing or poorly functioning on-site sewage treatment systems. Also address long-term maintenance needs for these systems. This includes individual septic and large on-site septic systems.*

- C.4.1.1 Implement on-site sewage treatment plans in marine areas, especially in designated marine recovery areas per 3SHB 1458 (On-site Sewage Disposal System 2006).
- C.4.1.2 Investigate the contribution of on-site sewage treatment systems to pollutant loadings in freshwater and marine environments.
- C.4.1.3 Establish on-site sewage management utilities to ensure that existing septic systems and large onsite septic systems are well maintained, and increase capacity of local health jurisdictions and the Department of Health to implement on-site sewage management plans. This effort should focus first on South Sound, Hood Canal, and other areas prone to increasing levels of hypoxia and in threatened shellfish areas. Encourage community systems in areas of high residential density and promote nitrogen-reducing technology where feasible.

C.4.2 *Review and, as appropriate, approve new on-site sewage system treatment technologies for use in Washington.*

C.4.3 *Provide innovative cost-share and loan programs and grants for homeowners.*

C.4 Near-term Actions

1. Develop and implement on-site sewage system management plans in each Puget Sound county. Evaluate plans and develop and implement appropriate updates. Assist counties in establishing sustainable funding sources for long-term implementation. Ensure existing large on-site sewage systems are consistent with local on-site sewage management plan objectives and requirements.
2. Revise the current on-site sewage treatment rule no later than June 30, 2011, so standards are established to address new on-site sewage treatment technologies. Review technologies and address operation and maintenance issues.

3. Enhance and target on-site sewage treatment loan programs and grants to ensure programs are targeted to areas with demonstrated loading issues and vulnerable waters. Leverage public and private funds to increase the scope of loan programs.

C.5 Prioritize and continue to implement toxic cleanup programs for contaminated waterways and sediments.

Remediation and cleanup of contaminated waterways and sediments, which exceed state and federal regulatory thresholds, typically involve groundwater, sediment in deltas, estuaries and depositional zones, and freshwater lakes. Remediation is costly and requires extensive coordination among many stakeholders. Most cleanup actions target sediments containing a number of legacy contaminants such as DDT and PCBs that impact water quality and can bioaccumulate in aquatic organisms. There are 115 contaminated marine sediment sites in Puget Sound, many of which are currently undergoing active cleanup. The water quality management strategy for Puget Sound reflects a continued commitment to completing remediation projects in conjunction with expanded source control programs to prevent future contaminants from entering the system.

C.5.1 *Prioritize and sequence Puget Sound cleanup and remediation projects to reduce the loadings to the system, as informed by the Toxics Loading Study, CERCLA inventories and other studies.*

C.5.2 *Accelerate priority cleanup projects.* In the near term, continue to detect and implement current high-priority remediation and cleanup projects. In the long term, implement those projects that meet prioritization and sequencing criteria.

C.5.3 *Where possible at cleanup sites, implement appropriate habitat restoration that restores ecosystem processes.*

C.5.4 *Implement long-term stewardship at cleanup sites. Innovative funding methods may need to be considered.*

C.5 Near-term Actions

1. Continue to implement ongoing, high-priority remediation and cleanup projects.
2. Refine the Department of Ecology near-term prioritization criteria for site cleanups to be consistent with the Action Agenda and incorporate criteria into toxic cleanup grant programs. Criteria should include, but not be limited to, vulnerability of receiving waters, contribution of the site to overall water pollution and public health, and potential for recontamination. Use the criteria to reprioritize projects and continue implementation.

C.6 Continue to monitor swimming beaches as well as conduct shellfish and fish advisory programs to reduce human exposure to health hazards.

People and other species encounter a variety of air, soil, and water-based pollutants throughout Puget Sound. If certain thresholds and other conditions are met, individuals may become ill. The consumption of fish, shellfish, sea plants, and other marine biota represent the most significant exposure risk to human health from toxic contaminants, pathogens, and biotoxins related to Puget Sound. The Washington State Department of Health and Department of Ecology monitoring programs assist in identifying sources of pollutants, conduct water quality monitoring, assess the

safety of beaches for shellfish harvesting, and certify the safety of commercial shellfish operations. The Department of Fish and Wildlife monitors chemical contamination in Puget Sound fish. Monitoring information assists with making decisions about swimming beach closures, shellfish beach closures, and fish advisories.

C.6.1 *Monitor algae blooms and other conditions that can be harmful to human health.*

C.6.2 *Continue to inform the public about conditions and closures including fish advisories, as well as swimming beach and shellfish beach closures.*

C.6 Near-term Actions

1. Continue to fund the swimming beach monitoring program.
2. Continue to fund the shellfish and fish advisory monitoring and advisory programs.

Integrating scientific information to improve strategies over time: An important area of study identified in the Biennial Science Work Plan will help refine pollution strategies.

- Ongoing analysis of potential benefits and impacts of alternative approaches for managing stormwater and land use collectively to better understand how to reduce impacts of runoff. This analysis will provide a key scientific basis for integrated land use and water resources.

Priority D: Work effectively and efficiently together on priority actions

Current situation: The system we use to manage Puget Sound was not designed to protect the ecosystem as a whole. Our inventory of what is currently being done for Puget Sound indicates that immense numbers of people and agencies are working hard all across the region. Despite decades of work to "save" Puget Sound, the region's capacity to work at an ecosystem scale is still low.

- Programs to protect and restore Puget Sound are fragmented, and until the Partnership was created, no single entity had the mission to protect and restore Puget Sound. After reviewing the current "tool box" for Puget Sound, we found that the region currently has separate programs for treating sewage, inspecting outfalls, regulating stormwater, measuring water quality, planning water supply, setting flows, directing land use, protecting habitat, recovering salmon, evaluating shoreline development, cleaning toxic waste, ensuring that shellfish is safe to consume, establishing parks, managing timber harvest, promoting tourism, and a host of other activities that impact Puget Sound. Within each of these programs are layers of standards, regulation, enforcement, technical assistance, and outreach activities. These programs are often managed by separate agencies, boards, and commissions, as well as elected officials. Each of these tools to manage environmental protection and restoration were developed at different times for different purposes, and they generally focus on individual problems.
- Many of the land use and permit decisions made in Puget Sound are narrowly focused and are detached from their full repercussions to land, water, species, and human health and well-being. Most programs do not consider future conditions that may occur with climate change. The decision-making process is frequently adversarial – for example, state agencies and county governments are sued from both sides of an issue, sapping resources and eliminating the incentive to take bold action in addressing habitat loss and pollution problems in an integrated way.
- Consistent approaches to restoring and sustaining Puget Sound have not been integrated across various interests or jurisdictional boundaries for solving problems effectively. The transfer of knowledge and resources to implement actions is uneven, and implementation has not always been efficient, properly sequenced, or monitored and adapted.

Rationale for action: Fundamental changes are needed in how we go about the business of protecting and rebuilding the environmental infrastructure of Puget Sound. We need to be able to prioritize actions and locations for investment, consistently implement plans and programs, and learn from our efforts and adjust actions when needed. Sufficient resources are needed to carry out this work and regulatory and legal barriers need to be addressed to allow implementation to proceed. Our level of investment into the health of the Puget Sound ecosystem is low relative to the benefits we derive from it.

The Action Agenda identifies a comprehensive strategy to ensure we work together as a coordinated system for the Puget Sound region, reflecting five primary objectives:

D.1 *Conduct planning, implementation, and decision-making in an integrated way and with an ecosystem perspective.*

D.2 *Support, develop, and integrate climate change programs, including mitigation and adaptation strategies to improve local and regional readiness for anticipated changes.*

D.3 *Build and sustain long-term capacity of partners to effectively and efficiently implement the Action Agenda.*

D.4 *Reform the environmental regulatory system to protect habitat at an ecosystem scale.*

D.5 *Improve compliance with rules and regulations to increase the likelihood of achieving ecosystem outcomes.*

The Action Agenda funding strategy is explained in more detail in Section E and in the Appendix.

D.1 Conduct planning, implementation and decision-making in an integrated way and from an ecosystem perspective consistent with the Action Agenda.

The Puget Sound Partnership will need to remove barriers and break the pattern of fragmentation that prevents people and institutions from working across boundaries and disciplines to plan and implement the Action Agenda in a coordinated way. The Partnership will build on existing models that begin to do integrated planning.

D.1.1 *Develop methods and conduct future planning for biodiversity and species recovery, water quality, water supply and reuse, air quality, floodplain management, and land use in an integrated way.* This includes coordinating planning efforts among and between federal, state, local, and tribal governments.

D.1.2 *Integrate and coordinate implementation of existing Soundwide and local plans and programs to improve efficiency and effectiveness in addressing Action Agenda priorities.* This will include, but is not limited to: the Washington Biodiversity Conservation Strategy; species recovery plans; nearshore needs assessment; local watershed-based salmon recovery plans; water quality plans; water supply plans; GMA comprehensive plans and programs; Shoreline Master Programs; marine resource plans; harvest management plans for salmonids and other fisheries; shellfish protection district plans; salmon hatchery plans; floodplain management plans; The Nature Conservancy's Ecoregional Assessment; and capital facilities plans for state and local governments, ports, utilities, and special purpose districts.

The coordination and integration should be consistent with the Action Agenda. Over the long term, this work will be integrated with the results from the Action Agenda-based watershed assessments (see Priority A). In the near term, while the watershed assessments are being prepared, high-level coordination to improve consistency and efficiency with the Action Agenda and action area priorities will be continued and expanded.

D.1.3 *Implement existing species recovery and biodiversity plans in a coordinated way while a more integrated planning approach is created*. Coordinate implementation of ecosystem protection, freshwater flows, and water quality as identified in Priorities A, B, and C.

D.1.3.1 Use and augment existing species plans to create actionable work plans for imperiled species without existing or specified plans.

D.1.4 *Set future fishing and hunting harvest rates for species based on ecosystem needs, in addition to tribal treaty rights, economic, and quality of life concerns.*

D.1.5 *Set fishing and hunting harvest rates and communicate results in a way that is transparent with readily available information*.

D.1.6 *Manage hatcheries and other artificial propagation methods in a way that is consistent with the Action Agenda.*

D.1.7 *Consider and support recommendations from the U.S. Commission on Ocean Policy's final report, "An Ocean Blueprint for the 21st Century," as they relate to strategies and actions that will support the recovery and long-term health of Puget Sound.*

D.1 Near-term Actions

1. Coordinate implementation of existing plans and programs that support the Action Agenda, and realign or discontinue plans and programs that conflict with the strategies and actions set forth in the Action Agenda. Develop regional guidance for this coordination, including ways to minimize additional work for time-limited local staff.
2. Develop and implement the required Steelhead Recovery Plan, building on the Chinook Recovery Plan and integrating the Action Agenda priorities. Use Action Agenda ecosystem principles to identify and integrate multiple ecosystem considerations and benefits.
3. Continue the integration of habitat, harvest, and hatchery efforts in the salmon recovery plans and watershed three-year work plans.
4. Implement the southern resident killer whale plan and continue to prioritize and identify actionable recovery measures with assignments and implementation timelines.
5. Implement the 2008 revision to the Pacific Salmon Treaty.
6. Implement the priority hatchery reform recommendations to update state and tribal hatcheries to protect wild salmon stocks, as well as achieve fisheries objectives. This includes implementing recommendations of the Hatchery Scientific Review Group.

D.2 Support, develop, and integrate climate change programs, including mitigation and adaptation strategies to improve local and regional readiness for anticipated changes.

D.2.1 *Integrate the recommendations of the Land Use and Climate Change Advisory Committee with priorities, steps, and initiatives consistent with the Action Agenda.*

D.2.2 *Integrate the recommendations of the West Coast Governor's Agreement and Western Climate Initiative with other state and local climate change initiatives consistent with the Action Agenda*.

D.2.3 *Prepare local climate change mitigation and adaptation strategies.* This should include, but not be limited to, a vulnerability analysis of public infrastructure and utilities, sea level rise analysis, and strategies for enhancing capacity to cope with the impacts of climate change (e.g., structural approaches such as innovative water storage projects). Coordination with the Action Agenda-based watershed assessment results should be included.

D.2.3.1 Update or modify existing plans such as salmon recovery as needed to incorporate local climate change mitigation and adaption needs.

D.2 Near-term Actions

1. Once the recommendations of the Climate Change Study Groups are available, integrate and coordinate them with the Action Agenda. Work with stakeholders to define and implement projects or policies that support both Puget Sound recovery and climate change priorities. Example recommendations could include, but would not be limited to, compact urban development and adding climate change assessment to the SEPA review process.

D.3 Build and sustain long-term capacity of partners to effectively and efficiently implement the Action Agenda.

The Legislature directed the Leadership Council to work closely with existing organizations and all levels of government to ensure that the Action Agenda and its implementation are scientifically sound and efficient, and achieve necessary results to accomplish recovery of Puget Sound to health by 2020. In addition, the Legislature directed that the Leadership Council shall support, engage, and foster collaboration among watershed groups to assist in the recovery of Puget Sound (RCW 90.71.230). The Partnership was authorized to provide assistance to watershed groups in those action areas that are developing and implementing programs included within the Action Agenda, and to improve coordination among the groups to improve and accelerate the implementation of the Action Agenda (RCW 90.71.260).

Much of the implementation of the Action Agenda will be accomplished by cities, counties, tribes, and collaborative groups that have formed and are working across interests and sectors in each action area of Puget Sound. Today, those agencies and local collaborative groups lack the organizational infrastructure and staffing capacity to engage in sustained local and regional efforts to assist in the recovery of Puget Sound. The actions chosen for this strategy are designed to respond to the Legislature's direction, as well as the needs of the local communities to create or strengthen local organizations to enable them to engage in a coordinated, collaborative effort to recover Puget Sound.

D.3.1 *Increase and improve the ability of collaborative groups and processes to implement Action Agenda priorities, address conflicts, and balance competing needs in a manner consistent with Puget Sound recovery.*

D.3.1.1 Continue and enhance the Puget Sound Partnership's role and ability to foster collaboration and convene key stakeholders to resolve conflicts, coordinate actions, and advocate for Action Agenda implementation. This includes continuing to work with the Leadership Council, Ecosystem Coordination Board, and Science Panel, as well as elected officials, community leaders,

government and interest-based caucuses, and tribes on implementation and refining the Action Agenda.

D.3.1.2 Clarify and align the roles and responsibilities of the numerous collaborative planning and implementation groups that were established for salmon recovery, water supply, marine resources, and other issues. This includes clarifying the role of watershed stewards, liaisons, and outreach staff.

D.3.1.3 Provide sustained funding for local staff for the collaborative planning and implementation processes to facilitate implementation of the Action Agenda.

D.3.1.4 Provide adequate funding support for local salmon recovery and other collaborative processes (such as Regional Fishery Enhancement Groups, RCW 90.82 watershed planning groups and others), to implement their existing work plans until the roles and responsibilities are clarified.

D.3.1.5 Improve state and federal agency coordination with local collaborative planning efforts to avoid duplication of effort and improve efficiency.

D.3.1.6 Identify where technical expertise is needed to assist in the creation of strategies and actions to protect and restore ecosystem processes. Create mechanisms to share or loan staff to local groups or agencies. (Examples include loaned staff or executive programs, issue-specific think tanks, or Centers for Excellence).

D.3.2 *Increase the ability of cities, counties, and special districts to provide increased focus on implementation of Action Agenda priorities and improve collaboration.*

D.3.3 *Engage state agencies to increase focus on implementation of Action Agenda priorities and improve collaboration as described in Priority E.2.*

D.3.3.1 Model stewardship behavior through state business practices and at state facilities.

D.3.4 *Provide capacity for Puget Sound tribes to enable implementation of Action Agenda priorities.*

D.3.5 *Engage the federal government to increase implementation of the Action Agenda.*

D.3.5.1 The Puget Sound Federal Caucus, working with the Partnership, should develop a common federal work plan to identify and implement priority actions of the Action Agenda.

D.3.5.2 Increase internal federal coordination and communication to efficiently implement Action Agenda priorities. Examples include: a) coordinating restoration and protection grants and other funding; b) improving government-to-government consultation with Puget Sound tribes on federal agency actions; and c) coordinating restoration-related permits.

D.3.5.3 Coordinate federal actions, federal agency funding, and research with existing collaborative planning, implementation, resource management, recovery, and

science efforts. Examples include, but are not limited to: a) USFWS should continue to collaborate with the Nisqually watershed salmon recovery group to restore the Nisqually estuary; b) USFWS and NOAA Fisheries should implement species recovery plans in collaboration with state, regional and local recovery planning groups; c) EPA should update federal/tribal NPDES permits to better monitor and control discharges and fund technical support to implemented NPDES permit programs; d) EPA should coordinate directly with the Partnership and local implementers on growth and protection solutions; and e) cooperation between the U.S. Coast Guard and state on oil spill preparedness and response.

D.3.5.4 Model stewardship behavior. Examples include, but are not limited to: a) participate in the Federal Green Challenge and other comparable programs to reduce waste and energy and conserve water; b) minimize homeland security-related impacts from operations, maintenance and readiness training activities on ecosystem processes, structures and functions, and on marine mammals; c) maintain, repair, and decommission roads and fish passage barriers on United States Forest Service and other federal lands; and d) identify and implement improvements in federal facility wastewater and stormwater treatment processes that specifically target nutrients and other pollutants of particular concern for Puget Sound.

D.3.5.5 Provide scientific support and data management on Action Agenda priorities in coordination and cooperation with the Partnership and other implementers.

D.3.5.6 Provide adequate federal funding for the Action Agenda. The Partnership will work with the congressional delegation and President to increase funding for implementation of the Action Agenda.

D.3.5.7 Align federal agency budgets with priorities of the Action Agenda as described in Priorities A, B, and C. The Partnership will work with federal agencies and federal caucus to accomplish this need.

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D.3.6 *Expand landowner participation in the voluntary incentive programs described in Priorities A, B, and C, to improve the ability of private landowners to protect and restore ecosystem processes.*

D.3.7 *Grow and use the Foundation for Puget Sound (non-profit entity) to increase education and outreach efforts.*

D.3.8 *Work cooperatively with the Canada's federal and British Columbia provincial governments on management and scientific investigations to increase collaborative problem solving and information sharing.*

D.3.8.1 Continue collaborative work on trans-boundary issues and projects.

D.3.8.2 Continue to co-host the Puget Sound Georgia Basin Ecosystem conference.

D.3 Near-term Actions

1. Integrate the work of the Puget Sound Nearshore Partnership (PSNERP), including the Estuary and Salmon Restoration Program, into the Puget Sound Partnership to improve efficiency, coordination, and to avoid overlap and duplication of efforts, as well as focus sufficient state, federal, tribal, and nonprofit organizational resources on protecting and restoring sites identified as part of the General Investigation.
2. Fund salmon recovery lead entities and other collaborative groups such as Regional Fisheries Enhancement Groups, marine resource committees, and RCW 90.82 watershed planning groups in the near term to continue existing work and address Action Agenda priorities.
3. Fund tribes to participate in the refinement and implementation of the Action Agenda, including salmon recovery plans.
4. Establish a Federal Puget Sound Office. Work with the congressional delegation to pass federal legislation authorizing Puget Sound under the Great Waters Program, including establishing a federal Puget Sound Office to improve coordination of federal agencies and codify ongoing federal authorization for funding.
5. Consider the recommendations of the Partnership's Local Integration Task Force and implement appropriate follow up actions.
6. Support appropriations to federal agencies to implement specific priorities in the Action Agenda, especially those that are actively coordinating with state and local partners to implement Action Agenda priorities.
7. Engage with stakeholders throughout the region to advance shared priorities. This will include continued and expanded outreach to and collaboration with private and nongovernmental interests, including the Puget Sound business caucus, environmental caucus, conservation organizations, agricultural groups, shellfish growers, and private landowners in the implementation of the Action Agenda.
8. Develop a joint federal agency work plan for Puget Sound restoration and protection actions in coordination with the Partnership.
9. Work with federal delegation to support reauthorization of the Coastal Zone Management Act and other federal legislation vital to Puget Sound protection and restoration.

Note that the Partnership work is summarized in Section E.

D.4 Reform the environmental regulatory system to protect habitat at an ecosystem scale.

The regulatory system that exists in Washington is fragmented. Regulations typically focus on specific issues, activities, or sites, rather than the ecosystem as a whole. Regulatory authority has been vested in many different agencies at the federal, state, and local level, which can lead to multiple layers of regulation and reviews, conflicting requirements, and an incoherent approach to protecting the entire spectrum of ecosystem process, structures, and functions. This fragmented system prevents us from adequately considering cumulative impacts on the ecosystem. In addition, existing regulations are not always effectively applied or enforced. Reforming the environmental regulatory system will provide more certainty that important ecosystem-forming processes remain intact, and should result in a more efficient, predictable permitting system for consumers.

D.4.1 *Align federal, state, and local agency regulatory programs in Puget Sound to improve coordination, efficiency, and effectiveness of implementation.* This means identifying overlapping authority and conflicts, and amending, realigning, or eliminating programs, laws, and regulations that are not resulting in desired outcomes.

D.4.1.1 Identify and implement actions to resolve overlapping and conflicting authorities by amending, realigning, or eliminating programs, laws, and regulations.

D.4.1.2 Identify and resolve overlaps and conflicts between environmental requirements and permit conditions. Work with local, state, and federal partner agencies to resolve discrepancies in permit conditions and identify ways to resolve environmental permit overlaps and conflicts.

D.4.1.3 Investigate opportunities to develop and use new Clean Water Act regional general and programmatic permits to promote development in urban areas by improving efficiency for review of development projects.

D.4.1.4 Streamline and coordinate the environmental permit review process to improve the consistency and efficiency of decisions while still allowing sufficient public review of proposed actions. Fund cities and counties to perform non-project, programmatic analyses under the SEPA within existing urban growth areas (UGAs). Exempt project actions performed in areas where programmatic SEPA review has already been conducted from complying with SEPA, except in limited circumstances.

D.4.1.5 Create and implement a streamlined permitting process for habitat restoration projects.

D.4.1.6 Reconcile levee maintenance standards to address the ecosystem needs of providing habitat and protecting public safety and welfare. Collaborate with the Corps and other key stakeholders to develop modifications to standards or their application through the existing variance mechanism.

D.4.2 *Increase the success rate of mitigation projects to achieve, at a minimum, no-net-loss of ecosystem function on a watershed scale.* Nationwide, studies have consistently found that wetland mitigation fails roughly 50 percent of the time because of factors such as poor site selection and lack of compliance. Furthermore, there is dissatisfaction with the permit process itself, leading at times to complex and costly delays. Improving mitigation success rates can be a helpful way to achieve restoration goals. The Partnership participated in the Mitigation That Works Forum, and endorses the group's recommendations to identify practical actions that can be taken to make all aspects of environmental mitigation work better.

D.4.2.1 Reinforce the importance of avoiding and minimizing impacts to resources, particularly those with high ecological value and that are difficult to replace. Develop and implement updated avoidance and minimization guidance consistent with the ecosystem protection decision-making framework described in A.1.2.

D.4.2.2 Establish and implement a watershed-based approach to mitigation. This includes, but is not limited to: a) clarifying policy priorities and expectations for

using the Action Agenda-based watershed assessments described in A.1.3; b) using existing plans as an inventory of potential sites and projects that might be candidates for mitigation; c) maintaining a state-wide wetlands inventory; d) developing guidance on how to make site-scale decisions about off-site mitigation; and e) directing Ecology and the Army Corps of Engineers to identify criteria for which projects/sites or types of projects/sites may be eligible for consideration as mitigation for wetland, stream, shoreline, and nearshore impacts.

D.4.2.3 Support the development and piloting of innovative compensatory mitigation tools including market-based techniques and other approaches. This includes, but is not limited to: a) improving the wetland banking system through training and rule adoption; b) developing guidance on crediting for multi-resource conservation banks; c) developing a pilot in-lieu-fee mitigation program and expanding it if successful; and d) developing clear guidance for mitigation.

D.4.2.4 Improve effectiveness monitoring programs for mitigation sites. This includes, but is not limited to, standardizing monitoring protocols for measuring effectiveness and supporting local governments with training and assistance.

D.4 Near-term Actions

1. Conduct an institutional analysis of local, state, and federal agencies with regulatory authority over upland terrestrial and aquatic habitats, species protection, and water quality. Provide recommendations to implement actions to resolve overlapping and conflicting authorities by amending, realigning, or eliminating programs, laws, and regulations consistent with the Puget Sound ecosystem decision-making framework.
2. Evaluate the effectiveness of the Clark County pilot project related to aquatic habitats of the Office of Regulatory Assistance's iPermit program. Adjust the program as needed. Identify a Puget Sound county and one or more cities in the same watershed in which to further pilot the iPermit program. This will involve standardizing best management practices related to shoreline development and customizing the program to meet local requirements. If successful, implement in one additional county and associated cities by the end of the biennium. The watershed selected for this pilot should be prioritized for Action Agenda-based watershed assessment work referenced in A.1.3 and for initial implementation of the in-lieu-fee program referenced in D.4.2.3.
3. Convene a process for making recommendations to the Partnership about streamlining permitting processes for habitat restoration projects. Include the following regulatory programs in the review process: building construction permits, clearing and grading regulations, Hydraulic Permit Approval (HPA) permits, Ecology's Clean Water Act, Section 402 and Section 401 permits, and Army Corps of Engineers' Clean Water Act Section 404 permits and Section 10 of the Rivers and Harbors Act.
4. Convene a process with Corps, NMFS, USFWS, jurisdictions responsible for levee maintenance, and stakeholders to identify and describe conflicts between levee maintenance standards and healthy habitat. This meeting should result in recommendations to the Corps to develop/review potential modifications to levee maintenance standards or the use of the existing variance mechanism.

5. Support funding and legislation to allow state loans to local governments to conduct environmental reviews under SEPA at the planning or programmatic level.
6. Develop, fund, and implement a pilot in-lieu-fee mitigation program for aquatic habitats in one to three Puget Sound watersheds. The program should be implemented at the watershed scale and involve the restoration of off-site, priority habitat areas as mitigation for multiple development impacts. Participation in the program should be optional and should not compete with existing mitigation banks or other in-lieu-fee programs. It should include provisions for long-term maintenance and monitoring. The program would be pre-capitalized with publicly funded mitigation projects.
7. Resolve issues related to the Hydraulic Project Approval including effectiveness, compliance, and enforcement.

D.5 Improve compliance with rules and regulations to increase the likelihood of achieving ecosystem outcomes.

Business, environmental groups, and most all other stakeholders agree that existing environmental regulations should be fully implemented. Full and equal enforcement of existing regulations throughout the region creates a level playing field for developers and predictable results for other stakeholders. In-the-field compliance inspectors play a valuable role in identifying problems, educating land-owners and contractors about compliance issues, assisting with resolutions of compliance problems before environmental damage occurs, and bringing enforcement actions when necessary to achieve compliance. Current regulations need to be better enforced while the region works to improve and integrate enforcement.

To be more strategic over time, the performance of our regulatory systems will need to be assessed by monitoring and reporting on: (a) the effectiveness of the regulations themselves in achieving the protection sought; (b) the effectiveness of the institutions in implementing the regulations through the permitting process; and (c) the rate of compliance with the permits issued both during the permitted activity, and after the property has been sold to third parties that were not part of the permitting process.

D.5.1 *Integrate environmental regulation and permit field compliance across federal, state, and local jurisdictions to improve efficiency of implementation and effectiveness of achieving environmental outcomes.*

D.5.1.1 An integrated field compliance monitoring program should include land use, shoreline, water quality, water use, hazardous materials, and other environmental permit related activities. Ultimately, field inspectors and/or teams should be located in each watershed and be tasked with assisting landowners, builders, and contractors with understanding regulatory requirements, strategizing optimal environmental protection approaches, and inspection to ensure compliance with a full spectrum of environmental protection regulations.

D.5.2 *Provide financial, technical, and regulatory mechanisms to improve environmental permit compliance inspection and enforcement in a coordinated way.*

D.5.2.1 Increase inspections by cities and counties throughout Puget Sound, when consistent with the integrated compliance program, to ensure environmental regulations are being implemented and enforced.

D.5.2.2 Increase inspections by state agencies throughout Puget Sound, when consistent with the integrated compliance program, to ensure environmental regulations are being implemented and enforced.

D.5.2.3 Where needed, strengthen enforcement authority of existing regulations (e.g., Hydraulic Permit Approval program).

D.5.3 *Improve customer service when working with private landowners and businesses to improve effectiveness and compliance.* Public agencies need to provide excellent and transparent customer service to landowners, home owners and businesses so people understand why certain requirements are in place. This need ranges from elected officials to the permit counter and inspectors.

D.5.3.1 Train state and local government staff with regulatory responsibilities in customer service.

D.5.4 *Provide training to architects, engineers, landscape and design professionals, land developers, and contractors working in marine and freshwater nearshore areas, as well as permit staff, on desired environmental outcomes, best management practices, and rules.*

D.5.4.1 Support the development of new programs or expand existing programs of the Association of General Contractors, Master Builders Association and other groups or professional associations in training their members to achieve the desired environmental outcomes for Puget Sound.

D.5 Near-term Actions

1. Convene a process with federal, state, and local jurisdictions and tribes to develop an ideal compliance assistance and inspection program that would leverage existing fragmented inspection programs into an integrated program without co-opting the regulatory and enforcement authority of any jurisdiction. Such a program may involve compliance assistance agents who identify problems in the field, provide compliance assistance, and if necessary, report violations to compliance inspectors at the agencies with jurisdiction for enforcement action.
2. Provide additional state compliance inspectors to ensure that businesses producing hazardous waste are complying with regulations.
3. Support state water quality fee revisions and short-term funding to maintain existing, and if possible enhance, compliance staff at Department of Ecology.
4. Provide additional staff at the Department of Ecology to conduct field visits to improve compliance with shoreline and aquatic regulations.
5. Develop and implement a training program for designers and contractors who work in nearshore areas. Work with Association of General Contractors, Master Builders, and other professional organizations in the Puget Sound region to develop and implement training programs to educate designers and contractors who regularly work adjacent to or over waters of the state. Consider partnerships with existing university and community college extension programs.

Integrating scientific information to improve strategies over time: Two important areas of study identified in the Biennial Science Work Plan will help us work together more effectively and efficiently as a system. More details describing each of these coordinating frameworks can be found in the Biennial Science Work Plan.

- Apply the Integrated Ecosystem Assessment (IEA) framework and conduct first iteration of the IEA to refine indicators, assess risks, and evaluate strategies, integrating marine, nearshore and terrestrial efforts.
- Build capacity for conducting and coordinating strategic science for ecosystem recovery.

Priority E: Build an implementation, monitoring, and accountability management system

Current situation: A major part of the Partnership's charge is to create a new approach to the management of Puget Sound. Currently, there are thousands of volunteers, dedicated professionals in government and business, landowners and scientists working to protect and recover Puget Sound, and the Partnership is committed to build upon this work. These efforts need coordination and leadership to be effective and make the best use of scarce funding and resources. An adequate implementation system is lacking to track actions, coordinate monitoring, analyze progress, help set priorities for funding, or keep the public consistently informed. Most monitoring and reporting efforts are tied to specific and separate grant-funded programs or legal mandates. There are few mechanisms to distribute regional scientific findings to local resource managers or to integrate monitoring results into regional decision-making. Many programs report whether actions were completed, but there is little analysis of what has been achieved. Recent efforts at the state level to improve accountability and performance, and to organize monitoring, are helpful but these do not necessarily integrate information at a level that is needed to address the problems in Puget Sound. As a region, we need to know who is doing the work, what's getting done, whether programs are working, and what should be done differently. To solve the challenges to the health of Puget Sound, an efficient and effective implementation system is needed with the following elements:

- A **performance management system** that includes adaptive management, coordinated monitoring, accountability for action, and coordinated data management.
- **Sufficient, stable funding** focused on priority actions that target spending wisely on actions that will make the most difference.
- A focused **scientific program** with priorities for research, appropriate measures to improve understanding of the ecosystem and the effectiveness of our actions, and clear pathways for informing decision making.
- Sustained, coordinated efforts for **communication, outreach, and education** to increase public awareness and encourage individual stewardship.

Rationale for action: Studies of large-scale efforts to restore ecosystems in other parts of the nation indicate that accountability and adaptive management are essential elements of success. The Partnership has several roles to play in this effort, from defining the problem to providing advocacy for the solutions. To be effective, the Partnership must develop and articulate regional priorities, integrate new scientific findings into the Action Agenda, and continually convene key stakeholders throughout the region to link actions and resolve disputes. Because implementation of many actions will occur in the action areas, the Partnership will rely heavily upon local implementers throughout the region to align their work with regional priorities for action, funding, and scientific investigation. The management system will highlight gaps in knowledge and the allocation of resources, and enable the Partnership to be transparent about how and why decisions are made and what is getting done.

The Action Agenda identifies a comprehensive strategy for implementation that reflects four primary objectives:

E.1 *Build and use a performance management system to improve accountability for ecosystem outcomes, on-the-ground results, and implementation of actions.*

E.2 *Provide sufficient, stable funding and ensure funding is focused on priority actions to increase efficiency and effectiveness.*

E.3 *Continually improve the scientific basis for management actions in the Puget Sound through a comprehensive and prioritized regional science program.*

E.4 *Increase and sustain coordinated efforts for communication, outreach, and education to increase public awareness and encourage individual stewardship.*

The Partnership has been charged with moving the region toward a shared goal of a healthy Puget Sound by 2020. All of the partners at the national, regional, local and individual level need timely, accurate, and shared information to develop collective options and set priorities for actions and funding. Moreover, an informed and involved public is essential in making the Action Agenda work. With four million people in Puget Sound and more than one million on the way in the next two decades, progress in restoring and sustaining Puget Sound will be impossible unless people are aware of the problems and support the solutions.

E.1 Build and use a performance management system to improve accountability for ecosystem outcomes, on-the-ground results, and implementation of actions.

Accountability is at the heart of the Partnership's charge. It includes assessing progress toward the goals, ensuring that actions are implemented, and adjusting efforts along the way to improve effectiveness. Ultimately, it means a system where goals, outcomes, indicators and benchmarks are linked to strategies and actions. The Action Agenda begins to lay out this framework in Action Agenda Question 1. More work is needed to build the system.

The Puget Sound region has lacked an overall way to account for funds spent, actions taken, and progress achieved at the ecosystem scale. Some accountability mechanisms for localized ecosystem protection or restoration outcomes do exist, such as with relationships between regulatory agencies and entities working to comply with specific mandates and relationships between project sponsors and funders. However, the system has relied heavily on self-reporting and the consequences of not reporting, not meeting targets, or not fulfilling commitments are minimal and insufficient to impact behavior or alter funding. In addition, funding cannot be directed to the most effective actions because there is a lack of information to do a comparative analysis. Finally, many actions lack a single lead that can be held accountable for progress.

Adaptive management is currently not an organizing or central feature of most of the region's natural resource management efforts. While natural resource managers do adapt to numerous cues to be more effective, most implementers lack a formal way to adjust their actions. Formalized, rigorous, and transparent adaptive management is a prominent element of a few key management programs in the region, including the Puget Sound Salmon Recovery Plan, the Forests and Fish law, and the Puget Sound Nearshore Partnership. There is a range of maturity among these programs, and in spite of these important steps forward, Puget Sound still lacks an adaptive management program that works all the way from monitoring to evaluation to altering management approaches or strategies.

The Partnership has adopted a Plan/Do/Assess/Adapt framework for integrating science into management decisions and in aligning funding priorities with priorities for action. The framework will provide great benefits to the Partnership once the targets and benchmarks are better defined, although the ultimate ecosystem result of taking action is not yet known with much scientific certainty. Uncertainty is a frequent characteristic of complex environmental issues. The Science Panel will need to closely collaborate with policy makers and managers to design actions both to achieve objectives, and to inform us – through scientifically monitored outcomes – how to improve subsequent efforts. Through this process, the Partnership will continually define, refine, and invigorate Action agenda priority actions in light of new knowledge.

The Plan/Do/Assess/Adapt framework will also provide transparency about how resources are allocated, the effectiveness of implementers and the actions they take, and the progress against ecosystem goals. Equipped with this information, the Partnership can enhance accountability and effectiveness, and can communicate effectively with the public and stakeholders to sustain support for the evolving Action Agenda. As many of the indicators will be slow to respond to management actions, the Partnership will base early accountability for results on measures related to the actions themselves.

Performance management requires that implementers state before implementing an action what ultimate outcomes or benefits we can expect from their work and when we can expect to see it. The accountability system will include: information about actions and intended outputs and outcomes; expected benefits or reduction in threats to the ecosystem; and required reporting on progress by the implementer. A well-designed reporting system will capture this information and support evaluation of the Action Agenda. Performance management supports the adaptive management cycle, gathers results from ecosystem monitoring and accountability tracking and makes them available in a timely way to decision makers.

E.1.1 *Define the leadership roles, responsibilities, and processes that will support the implementation, evaluation, and revisions of the Action Agenda.* Strong and credible leadership supported by the region will be key to progress and results on the Action Agenda. We will need to clarify the role of the Partnership and its relationship to local coordinating groups and implementers, striking a balance between the need for leadership and accountability with the essential value of partnership, broad participation, and local engagement.

- E.1.1.1 Clarify and document the decision-making roles of the Leadership Council, Ecosystem Coordination Board, and Science Panel. Clarify and document relationship and responsibilities of the Executive Director and staff.
- E.1.1.2 Develop and implement a clear process for identifying and preparing leaders to serve on the Partnership's Leadership Council, Ecosystem Coordination Board, Science Panel, and the Salmon Recovery Council so the agency is capable of providing the leadership necessary to improve accountability across the ecosystem.
- E.1.1.3 Fully integrate the salmon recovery program elements into the Action Agenda and broader ecosystem effort, including clarifying and documenting the role of

the Salmon Recovery Council and aligning salmon plan goals and actions with Action Agenda priorities.

E.1.1.4 Clarify and communicate responsibilities and roles of implementers and local coordinating groups throughout the region making contributions to the Action Agenda. Continue outreach and communication with the action areas.

E.1.2 *Establish clear processes through which performance and results will be assessed and adaptive actions will be identified.* The legislation creating the Puget Sound Partnership requires a reevaluation of the Action Agenda every two years, "using an adaptive management process informed by tracking actions and monitoring results." The Partnership's evaluation of actions will be informed by relevant information from public outreach, ecosystem monitoring, targeted scientific investigations, accountability, monitoring, and finance data related to Action Agenda implementation. The Partnership will adapt methodologies used by the Governor's Management Accountability and Performance Program (GMAP) in designing its processes.

E.1.2.1 Develop and implement a process to identify strategies, actions, or groups of actions to actively adaptively manage and evaluate.

E.1.2.2 Convene and consult with a Science/Policy working group to plan adaptive management cycles and direct findings into revisions of the Action Agenda.

E.1.2.3 Align monitoring and effectiveness studies to measure outcomes of key strategies, actions or groups of actions in the Action Agenda. (Monitoring is addressed is E.3).

E.1.3 *Develop and maintain an Action Agenda work plan supported by an accountability system to track the progress of implementation of actions identified in the Action Agenda.* The Partnership will develop work plans that include the commitments needed to track, evaluate, analyze and report on progress toward implementation of projects critical for meeting ecosystem goals.

E.1.3.1 Establish a system to track the funds from state, federal, local, tribal, and other sources spent on actions intended to benefit the Puget Sound ecosystem.

E.1.3.2 For all actions, develop a detailed budget, a scope of work, an action lead, a schedule with milestones, and a performance measure.

E.1.3.3 Require action leads to account for dollars spent, actions accomplished, and outcomes achieved during each reporting period beginning in 2009.

E.1.3.4 Develop and maintain detailed work plans for Soundwide elements of the Action Agenda with links between goals, strategies, threats, actions, and performance measures. Assign staff support from the Partnership where appropriate.

E.1.3.5 Develop and maintain detailed work plans for each action area that integrate actions from the salmon plans, regional work plans or other initiatives consistent with the Action Agenda. Work plans will link Action Agenda goals, priorities, and outcomes with actions incorporated from other plans or programs. Assign staff support from the Partnership where appropriate.

E.1.4 *Develop and implement an information management system to support ecosystem management decision-making.* The data and information needed to inform ecosystem management is housed in different agencies and offices and in different information systems. Integration of all types of relevant financial, scientific, monitoring, spatial, management, and institutional data will be essential to supporting implementation of the Action Agenda.

- E.1.4.1 Develop a comprehensive data management strategy to support implementation of the Action Agenda and mission of the Partnership.
- E.1.4.2 Implement a distributed data and information exchange system that can be contributed to and accessed by scientists, implementers, policy makers and other interests.
- E.1.4.3 Take a leadership role in regional efforts to improve the quality, quantity, and accessibility of data relevant to the Action Agenda and its priorities.

E.1 Near-term Actions

1. Clarify and document roles of the Leadership Council, Ecosystem Coordination Board, Science Panel, and Partnership staff. Clarify relationships with the Salmon Recovery Council, local coordinating groups, and strategic planning bodies working on issues relevant to the Action Agenda.
2. Revise Action Agenda near-term actions as funding decisions are made and maintain an accurate list of funded and unfunded actions.
3. Develop specific benchmarks for outputs, intermediate outcomes, and environmental outcomes of the Action Agenda strategies, key suites of actions or individual actions against which we can measure and report progress. Incorporate refined indicators into reviews of Action Agenda effectiveness and efficiencies.
4. Develop a detailed work plan for near-term actions in the Action Agenda, identifying lead implementers, partners, funding source and amount, and timelines.
5. Negotiate performance agreements with leads of actions related to salmon recovery plans, state agency work programs, and projects funded by state grant or loan programs to include timelines, outputs, immediate outcomes, intermediate outcomes, and environmental outcomes, as well as reporting requirements.
6. Convene the information management working group proposed in the Biennial Science Work Plan to define a set of information exchange protocols and standards for sharing activities and performance information.
7. Convene a performance management/accountability working group of local experts and implementers to design the accountability system, drawing on examples from Baystat, GMAP, and the Association of Government Accountants standards for performance reporting and others.
8. Develop an activity integration database to support the Action Agenda accountability where implementers will report on outcomes and use of funds. The system will rely on existing data sources whenever possible to avoid burdening implementers with additional reporting requirements. The system will capture salmon actions, monitoring programs, science, and any other administrative or staff support funded through the Action Agenda priorities.

9. Develop a schedule and process to update the near-term actions, the work plan, and revise the Action Agenda strategies as necessary.
10. Submit recommendations to the Legislature to better align funding and resources with the Action Agenda in the November 2009 State of the Sound report.
11. Finalize the salmon recovery adaptive management plan as required by NOAA.
12. Develop a system to identify and track actions that are inconsistent with the Action Agenda.
13. Develop and implement a Partner Program as specified in the legislation that created the agency.
14. Prioritize data for sharing and begin placing information on the U.S. EPA Central Data Exchange.
15. Implementers of monitoring supported by the Action Agenda will make monitoring data accessible to the Partnership and begin steps to make it available to the other implementers, scientists, and the public.
16. Conduct review and approval of the Action Agenda in early 2009, as required by the National Estuary Program.

Note that ecological monitoring actions are addressed under E.3.

E.2 Provide sufficient, stable funding and ensure funding is focused on priority actions to increase efficiency and effectiveness.

Although significant expenditures have been made toward the protection and clean up of Puget Sound, implementation of the Action Agenda will require finding ways to spend existing dollars more effectively as well as raise new sources of funding. Many current sources are not aligned with Action Agenda priorities. Spending decisions on Puget Sound have been based upon the decisions of individual agencies and governments without the guidance of ecosystem priorities or a long-term investment strategy for the Sound. Existing grant and loan programs for infrastructure and capital improvement receive requests for funding that are substantially greater than the amount available. The scale of the Action Agenda will require finding new sources to support cleanup and recovery.

During the past year, the Partnership has taken several steps to address the complex issue of funding long-term restoration and protection of Puget Sound. This work has included evaluating existing spending on conservation and recovery, identifying strategies to raise additional funding from conventional and innovative sources, securing additional state and federal funding for the near term, and for the first time, evaluating and aligning state agency budgets with Action Agenda priorities. Four overarching funding strategies are identified and summarized below, and are presented in more detail in the funding strategy.

E.2.1 *Focus existing Puget Sound spending on Action Agenda priorities to increase efficiency.* Funds currently spent on Puget Sound conservation and recovery are raised from numerous sources, each of which has its own legal restrictions, fund constraints, administrators, policies, and priorities. The effectiveness of this spending is limited by this decentralized, uncoordinated approach. These sources should be integrated and coordinated to address Action Agenda priorities and maximize benefits to Puget Sound cleanup and recovery goals.

E.2.1.1 Align federal, state, and local funding with Action Agenda priorities. The authorizing statutes for the Partnership prohibit actions by state agencies that are inconsistent with the Action Agenda. Even further, the Partnership will work with federal, state, and local agencies to orient funding directed at Puget Sound to identified Action Agenda priorities.

E.2.1.2 Conduct targeted procurement toward desired outcomes rather than broad grant solicitations. Targeted procurement will require restructuring project solicitations to describe outcomes needed to achieve Action Agenda priorities, such as a specific decrease in nitrogen loading or a specific increase in oak prairie habitat, and soliciting proposals for actions that achieve these outcomes. Business, nonprofit, tribal, and agency applicants would be free to propose a variety of actions and the administering agency could select those with greater benefits and lower costs.

E.2.2 *Provide additional funding to increase our ability to address priority prevention, restoration, and cleanup needs.* Existing funding, even if realigned to be more effective, is not likely to be sufficient over the long term to meet Action Agenda goals. The Puget Sound region will need additional dedicated revenue sources. To begin to address this issue, the Partnership has evaluated sources of additional funding and the laws, policies, and practices that determine how they are raised and spent, and identified the amount of revenue that each option could produce.

E.2.2.1 Create a dedicated regional source of funding. This strategy may entail creation of a regional district with the ability to raise money with voter approval.

E.2.2.2 Create new and/or expand existing infrastructure loan programs for public infrastructure projects (e.g., sewers, stormwater retrofits, water quality facilities, and potentially natural systems).

E.2.3 *Use innovative funding methods, including market-based approaches, to increase diversity of funding mechanisms and to engage private sector interests.* In addition to new revenue sources, market-based mechanisms also hold the potential to help achieve Action Agenda goals. Existing regulatory frameworks do little to encourage market-driven conservation. More attention is needed on methods to harness the power of market approaches to produce conservation outcomes. During the past year, the Partnership has identified banking and trading approaches to mitigation and water quality compliance that simplify permitting yet achieve higher environmental performance. This included analyzing ecosystem service markets in the United States and applications for Puget Sound, particularly water quality trading. Under SSB 6805 (2008 Session) the Legislature directed the Washington State Conservation Commission to study and evaluation the feasibility of establishing farm-based or forest-based conservation markets.

E.2.3.1 Implement an in-lieu-fee mitigation program for Puget Sound.

E.2.3.2 Implement a pilot water quality credit and trading system to improve compliance by allowing a wide range of treatment and source control solutions.

E.2.3.3 Implement additional tools to set up ecosystem services markets. Expanding the use of ecosystem markets will require an evaluation of early pilot projects

around in-lieu-fee mitigation, water quality trading, and farm- and/or forest-based conservation markets. If these pilots are deemed successful, work would need to be done to develop methods for evaluating credits, establishing an institutional structure for trading, and establishing trading rules.

E.2.3.4 Implement a pilot cap-and-trade program for removal of impervious surface and/or removal of shoreline armoring to evaluate the effectiveness of the approach to reduce stormwater and restore habitat. These approaches could be used to address other Action Agenda priorities.

E.2.3.5 Implement programs to develop model incentive program for stormwater. These incentives would be targeted to actions that produce improvements in stormwater source control or on-site treatment (e.g. LID, disconnection of downspouts etc). Incentives would be in the form of either direct payments, tiered rate structures, fee-bates, or other rate discounts for specific actions.

Note that some of the actions below are also in Priority D. They are restated here because they have the potential to generate additional revenue for implementation.

E.2 Near-term Actions

1. Align state agency budget proposals for the 2009-2011 and 2011-2013 biennial budgets with the priorities in the Action Agenda.
2. Pursue state legislation authorizing the creation of a Puget Sound regional improvement district.
3. For grant requests to the state, per RCW 90.71.340, review grant and loan criteria to prohibit the funding of projects that are in conflict with the Action Agenda.
4. For federal and local budgets, to the extent possible, review and comment to encourage alignment with the Action Agenda.
5. Implement targeted procurement on a pilot basis for a portion of the Puget Sound Acquisition and Restoration program that is focused on salmon recovery.
6. Continue to evaluate potential state funding sources in greater detail, including full legal and fiscal analysis, and prepare proposals for enactment of revenue sources in the 2010 or 2011 legislative sessions.
7. For state agency grant programs, advocate for changes to policies and priorities of the Public Works Trust Fund, Salmon Recovery Funding Board, Washington Wildlife and Recreation Program, and other state grant and loan programs, to encourage consistency with Action Agenda goals.
8. Develop financial incentives and provide financial and technical assistance to local governments to develop high priority projects in the Action Agenda for funding with existing Department of Ecology and the Public Works Board programs.
9. As part of implementing the Mitigation That Works recommendations (D.4.2), develop agreements with the U.S. Army Corps of Engineers, the state Department of Ecology, and other relevant permitting agencies by 2010 on the design of a regional in-lieu-fee program.
10. Identify and implement one or more pilot projects to demonstrate the application of the in-lieu-fee program. Invest in several restoration projects that can provide initial credits for use in the in-lieu-fee program.

11. Evaluate and if possible implement a water quality trading program to address dissolved oxygen issues in southern Puget Sound.
12. Develop proposals for the 2011-2013 biennium to establish, improve or expand the use of ecosystem markets.
13. In cooperation with a local government or stormwater utility, implement a pilot cap-and-trade program for the removal of impervious surface and/or removal of shoreline armoring.
14. Evaluate, and incorporate as appropriate into the Action Agenda, the recommendations in the Washington State Conservation Commission's 2008 conservation markets study for farmlands and forest landowners.

E.3 Continually improve the scientific basis for management actions in the Puget Sound through a comprehensive and prioritized regional science program.

A commitment to science-based ecosystem recovery and adaptive management will require timely, focused, and credible information about ecosystem conditions, factors affecting the ecosystem and human benefits, and the effects of management actions. Existing scientific capacities vary in breadth and depth across Puget Sound governmental and non-governmental entities. In general, most of the existing capacity, even where it is focused and effective in addressing discretely defined technical questions, would be more valuable within the context of a coordinated regional science program. This program will need to be supplemented and leveraged with investments in science to ensure that the Partnership has the information to evaluate progress toward goals and continually improve the scientific understanding of ecosystem recovery.

The Partnership's Science Panel has prepared a Biennial Science Work Plan for 2009-11. This plan details the high-priority science activities required to: support the implementation of the Action Agenda; build capacity to revise and improve future Action Agendas; and enhance the Puget Sound Partnership's ability to lead the ecosystem protection and restoration effort. Because this is the initial Work Plan, it focuses not only on identifying gaps and opportunities, but also on building and sustaining the technical procedures, capacity, and tools required for the Partnership. The Science Panel anticipates subsequent Work Plans will center on prioritized research, observations, and analysis required to advance Puget Sound protection and restoration. The strategies below summarize the major elements of the Biennial Science Work Plan.

E.3.1 *Develop and oversee a coordinated monitoring program.* To understand the ecosystem and to adapt management activities through time, the Partnership needs information about: (a) status and trends of ecosystem conditions, impacts to important ecosystem goods and services, and factors that affect ecosystem conditions; (b) effectiveness of strategies, programs, and projects; and (c) cause and effect linkages for issues involving high risks and difficult tradeoffs. Substantial monitoring programs are currently under way in the Puget Sound region, but these programs are neither well coordinated nor targeted to addressing the needs of the Partnership.

The Partnership will use monitoring of ecosystem indicators and of cause-and-effect relationships to evaluate progress towards ecosystem recovery. Ongoing status and trends monitoring provide some of these indicators; new monitoring capacity may be required to

provide information for additional indicators, especially indicators of pollution loading and other factors that affect ecosystem condition.

Investigations of whether management programs and projects achieve their expected outcomes will allow the Partnership to evaluate strategies and actions and to find out whether the reasons for selecting strategies and actions appear to be correct or should be adjusted. Existing capacity provides some information about program and project effectiveness. New monitoring and research capacity most likely will be required to provide information about programs and projects that are not currently evaluated.

E.3.1.1 Align regional monitoring efforts with the goals, outcomes, strategies, and actions outlined in the Action Agenda. Evaluate existing monitoring efforts to identify opportunities to better meet Action Agenda needs by building from or adapting existing efforts or adding new efforts.

E.3.1.2 Conduct status and trend, effectiveness, and cause-and-effect monitoring to provide information about the state of the Sound and the effects of management actions.

E.3.1.3 Coordinate with science programs of state and federal agencies to better align with Partnership interests and contribute to Partnership science program needs.

E.3.2 *Conduct priority investigations.* Investigations about how the Puget Sound ecosystem works, what threatens ecosystem recovery, and how the ecosystem might respond to management actions can provide information to improve the science basis for the Partnership's work. The Biennial Science Work Plan describes priority investigations for 2009-11 and capacities needed to ensure that investigations would provide credible information and address key needs.

As part of the development of the Biennial Science Work Plan, the Science Panel reviewed inventories of recent and ongoing science projects and recommendations for studies relevant to recovery of the Puget Sound ecosystem. These inventories identify nearly 300 studies that were completed in the past five years and more than 450 recommendations for scientific investigations. Building from this material and an understanding of the strategic priorities and guiding ecological principles of the Partnership, the Science Panel identified top priority investigations for 2009-11.

E.3.2.1 Analyze existing and evolving information with best available tools. Using the integrated ecosystem assessment framework, conduct modeling studies and other analyses to identify ecosystem indicators and thresholds, assess threats, and evaluate potential management strategies.

E.3.2.2 Conduct focused scientific investigations to collect information about how the ecosystem functions and the effectiveness of management actions. These studies should work across ecosystem issues of landscape ecology, contaminant loadings, food web structure and function, restoration science, and the integration of natural social science.

E.3.3 *Synthesize results and communicate science findings.* Integrate and synthesize findings from scientific investigations to communicate a scientific understanding of the Puget Sound ecosystem to the Partnership, its stakeholders, and citizens. Successfully completing this work will require coordination among participating groups, sharing of information, and interpreting results and findings in a collaborative manner. The Partnership will produce a State of the Sound report to communicate with stakeholders and the public about progress toward and uncertainties about ecosystem recovery. In addition, the Partnership will produce a Puget Sound Science Update, a compendium of scientific findings related to ecosystem recovery. The Partnership will produce these reports on a regular schedule. Findings and synthesis products should be peer-reviewed and the technical data and information on which they are based should be publicly available.

- E.3.3.1 Assemble and synthesize status and trends information on ecosystem indicators and findings from effectiveness and cause-and-effect monitoring studies.
- E.3.3.2 Prepare science portions of State of the Sound reports, including findings from monitoring and assessment program and Science Panel comments on implementation of the Action Agenda.
- E.3.3.3 Prepare Puget Sound Science Update reports to synthesize findings.

E.3.4 *Build and sustain regional capacity to conduct science.* Integrated, focused, and balanced capacities for monitoring, modeling, research, and data management will ensure that the Partnership obtains the information it needs to continually improve the science basis for ecosystem recovery. The Partnership will develop processes and organization to ensure the integrity of the science program and to engage the regional science community in this program.

- E.3.4.1 Develop and sustain capacities for coordinated ecosystem monitoring and applied research, modeling of current and future ecosystem impacts, and research of emerging issues.
- E.3.4.2 Support science education, training, and outreach.
- E.3.4.3 Develop and sustain data management approach.
- E.3.4.4 Develop and follow processes to ensure the integrity of scientific contributions to ecosystem recovery, including approaches to awarding funds for scientific investigation, peer review of materials forming the basis for Partnership decisions, external program peer review, and defining key research needs.
- E.3.4.5 Organize and coordinate regional science capacities to align with needs of the Action Agenda and Puget Sound Partnership. This would include: a) convening working groups (organized around topics, strategies, or geographic areas) to provide avenues for scientific community participation in the science program; b) coordinating with other science advisory groups, including Puget Sound Salmon Recovery's regional implementation technical team and the Puget Sound Nearshore Partnership's nearshore science team; and c) reviewing agency science programs and proposals and recommending adjustments and investments to align agency contributions to the Partnership's needs.

E.3 Near-term Actions

1. Sustain ongoing monitoring programs to provide status and trend and effectiveness information to inform State of the Sound reporting and other synthesis.
2. Implement transition to a coordinated regional program for monitoring ecosystem status and trends, program and project effectiveness, and cause-and-effect relationships. The coordinated program will combine elements of ongoing monitoring with adaptations and new studies to generate the information the Partnership will need to evaluate progress toward ecosystem recovery goals and to evaluate and adapt ecosystem recovery efforts. Ongoing efforts to improve the design and coordination of ecosystem monitoring will contribute to this transition, especially the work of the stormwater monitoring work group of the Puget Sound Monitoring Consortium and the Puget Sound Salmon Recovery Monitoring and Adaptive Management Program.
3. Use the framework of Integrated Ecosystem Assessment to refine ecosystem indicators, assess threats to the ecosystem, and evaluate potential management strategies. Through this action the Partnership will coordinate various ecosystem assessment efforts for the Puget Sound, including efforts by NOAA's Northwest Fisheries Science Center, Washington Biodiversity Council, and Puget Sound Nearshore Partnership. This action will include projects to: a) identify and develop new indicators and develop indices that combine multiple indicators; b) evaluate current ecosystem status and the primary threats and drivers affecting desired ecosystem outcome to understand the relative importance of threats and drivers and the geographic distribution of threats and impacts across the ecosystem; and c) evaluate historical data and develop projections of future scenarios for some key issues, such as land use and habitat changes, to examine how ecosystem conditions and threats change and how they might respond to management actions.
4. Design and implement studies to collect new information about: a) the effects of nearshore restoration actions; b) watershed-wide pollution loading and effects of runoff; c) stressors affecting forage fish and pelagic food webs; and d) ecosystem services and socioeconomic indicators. These studies will provide information about the benefits of management actions by increasing our understanding of how the ecosystem functions and how it is affected by management actions.
5. Assemble and synthesize findings that describe ecosystem conditions and threats for the 2009 State of the Sound report during mid-2009. Conduct peer review of science contributions to 2009 State of the Sound.
6. Publish 2010 Puget Sound Science Update to provide best available answers about how the ecosystem works, how it has changed over time, and how it is affected by management actions. Producing the Science Update will include commissioning lead authors for various sections of the report, encouraging peer contributions, and conducting an open peer review.
7. Identify research priorities and recommend topics for Partnership sponsored science in 2011-2013 (e.g., for the next Biennial Science Work Plan).
8. Develop and coordinate the organization to support implementation of the Partnership's science program, especially by convening working groups to organize the regional science community's participation.
9. Develop processes for: a) soliciting science projects via competitive requests for proposals; b) conducting peer review of materials that form the science basis for Partnership decisions; and c) establishing a process for external peer review of the Partnership's science program.

10. Develop a technical plan for increasing capabilities for modeling future scenarios by identifying the goals and milestones for this work, defining the requirements, functions and assets needed to support ecosystem recovery, and describing the roles and relationships of collaborators carrying forward portions of this work.
11. Identify priorities for research to fill gaps in knowledge about ecosystem processes; design and implement studies to fill gaps.
12. Coordinate with science programs of state and federal agencies to better align with Partnership interests and contribute to Partnership science program needs.

E.4 Increase and sustain coordinated efforts for communication, outreach, and education to increase public awareness and encourage individual stewardship.

Public opinion research confirms that while a majority of residents highly value Puget Sound, current awareness and concern about its decline is low. For citizens to understand their stake in protecting and cleaning up the Sound and the opportunities to help, awareness of the problem must substantially increase and be maintained over time. Greater awareness, along with citizen support for policy and behavioral changes, is critical for successful recovery and protection of Puget Sound.

This work would build on and be coordinated with existing programs. More detail will be available in February 2009 in the Partnership's education, communications, and outreach plan.

E.4.1 *Implement a long-term, highly visible communications effort to increase public understanding of the threats facing Puget Sound and engagement in reducing personal impact.* The Partnership communication strategy is designed to: a) raise broad public awareness regarding the health of Puget Sound; b) turn public awareness into individual citizen actions and behavior change using community-based social marketing techniques; c) build and sustain a long-term coalition of diverse interests working together to protect and restore Puget Sound; and d) focus messages on priority solutions.

- E.4.1.1 Create focused communications messages for audiences.
- E.4.1.2 Coordinate communication efforts and behavior change messages Soundwide.
- E.4.1.3 Deliver communications through a variety of mediums including, but not limited to, direct communications, presentations to associations and civic groups, news media, paid media, and grassroots outreach.
- E.4.1.4 Create and deliver coordinated messages with actions citizens can take to assist in the effort to protect and restore Puget Sound.

E.4.2 *Expand and sustain local volunteer, stewardship, and education programs focused on Action Agenda priorities to increase participation rates and improve efficiency of communications efforts.* Volunteering is one of the most effective ways for the public to engage directly in protecting and restoring Puget Sound. Thousands of volunteers are already working hard, but their efforts and programs are not well coordinated. A better-coordinated approach will be necessary to harness existing and add new volunteer energy in Puget Sound.

E.4.2.1 Manage the Education, Communication and Outreach Network (ECO Net) to coordinate education, outreach, and volunteer efforts with consistent and strategic messaging and programs based on the priorities of the Action Agenda.

E.4.2.2 Facilitate an Education Working Group of federal, state, and local agency representatives to coordinate education- and outreach-related policy and grant funding with the priorities and goals of the Action Agenda.

E.4.2.3 Provide easy-to-access and coordinated local volunteer activities to Puget Sound residents. The network will include opportunities for restoration, citizen science, stewardship, education, and outreach.

E.4.2.4 Provide technical assistance and training to education, outreach, and volunteer efforts to help them successfully meet the challenge of increasing public awareness and stewardship based on up-to-date scientific and technical information.

E.4.3 *Strengthen K-12 environmental programs to improve long-term understanding of Puget Sound issues and solutions.* This effort will build on and tie into existing efforts. Outdoor learning centers and other educational opportunities can help increase project-based learning and community partnerships. Above all actions, this will help ensure long-term stewardship and support for Puget Sound protection and restoration by future generations.

E.4.3.1 Provide a "Meaningful Watershed Education Experience" to primary, middle and high school students in Puget Sound. Teacher training, project-based learning, and outreach will be needed.

E.4.3.2 Support the inclusion of Puget Sound-related environmental, social, and economic issues in curriculum where possible and work to increase Puget Sound environmentally related service projects.

E.4 Near-term Actions

1. Research and develop targeted communications messages for audiences.
2. Create a process to develop consistent, targeted, and scientifically based actions and messages for citizens. Deliver the messages.
3. Expand efforts to improve coordination of communication efforts and behavior change messages across government agencies, watershed groups, and interest groups, such as STORM group (STormwater Outreach for Regional Municipalities, a consortium of municipalities working on a coordinated behavior change campaign).
4. Work with the Leadership Council to explore establishing a Public Education Panel to help guide the public communication, outreach, and education mission of the Puget Sound Partnership and its supporting entities (Leadership Council, Ecosystem Coordination Board, and Science Panel).
5. Deliver regular communications to a variety of audiences and through a variety of mediums.
6. Conduct a pilot program with Washington State Ferries to educate riders about the condition of Puget Sound and actions they can take to help.
7. Conduct two-day workshops in each action area with local ECO Net members to coordinate and prioritize local efforts in support of Action Agenda goals.

8. Develop a Puget Sound Partnership volunteer and outreach grant to sustain and expand effective and successful volunteer opportunities.
9. Increase training for education and outreach providers in up-to-date tools and techniques such as community-based social marketing, use of new technologies, and program evaluation and assessment.
10. Develop and implement a coordinated citizen science program. This will include cataloging and analyzing existing efforts, coordinating existing efforts, and replicating those that are effective, providing technical and scientific assistance to community members to conduct local monitoring and assessment that supports Action Agenda priorities.
11. Implement the WSU Beach Watcher Sustainability Plan to sustain current programs and expand the effort to all 12 Puget Sound counties.
12. Coordinate with the Pacific Northwest NOAA B-WET grant provider to increase the "Meaningful Watershed Education Experience" model for students in Puget Sound.
13. Promote the use of and make Puget Sound-related curriculum widely available to all teachers and schools.
14. Work with Partnership to create Puget Sound environmentally based student service projects.

QUESTION 4: Where do we start?

Preparation of the Action Agenda has been much like drawing a map to ecosystem health in Puget Sound. Questions 1 through 3 have established where we want to go, where we are now, and a rational and focused set of priorities and actions that will help us get there. Although the information will never be perfect, there is enough information to get started along the journey to a healthy ecosystem. Given the additional challenges that Puget Sound will face from human population growth and a changing climate, there are also huge risks if concerted action to protect and restore Puget Sound is delayed.

The near-term actions identified in Question 3 are not the only actions that will be needed to restore Puget Sound to health. As we begin to implement these actions we will also be putting systems in place to ensure that they are implemented fully and to monitor the degree to which the intended results of each action are achieved. This information will help us adjust our management strategies and gain a better understanding of the full set of actions needed to reach our goals.

Development and ranking of near-term action lists

Table 4-1 contains ranked lists of near-term actions for priorities A through C, organized by strategic priority. These lists were created by evaluating ecological benefits and other factors such as cost, readiness, and likelihood of effectiveness of each action. Ecological benefits were evaluated using criteria based on the ecosystem management principles identified in Question 3. Equal weight was given to each of the following criteria:

- **Priority threats:** Staff evaluated the extent to which each near-term action would address an identified threat to the ecosystem. Actions that address the alteration of habitat or the input of pollution were ranked higher than actions that did not address these threats. Actions that address more than one threat were given higher priority.
- **Strategic priorities:** Actions were evaluated to determine the extent to which they would employ one of the strategic priorities established by the Leadership Council. Equal weight was given to each priority and actions that address more than one priority were ranked proportionally higher.
- **Magnitude of benefit:** Actions that had the potential to make the greatest contribution to the achievement of ecosystem goals were ranked higher than others. Both potential effectiveness and geographic extent of expected benefit contributed to this ranking.
- **Ecosystem goals:** Actions were ranked according to how well they addressed each ecosystem goal. Actions that address multiple goals were ranked proportionally higher. Special consideration was also given to near-term actions that would contribute to the human well-being goal by protecting or creating employment in the region.
- **Urgency and irreversibility:** Actions that address imminent threats to ecosystem health, especially when the potential damage would be costly or impossible to reverse, were given proportionally higher rankings than other actions.
- **Implementation criteria:** Key project factors were considered, such as: cost; probability to achieve intended results; readiness to implement; and the ability to create near-term jobs.

Draft prioritized lists were presented to the public at the Ecosystem Coordination Board and the Leadership Council meetings immediately after the Draft Action Agenda was made available for review. Many comments were received from the public regarding the ranked near-term actions. Staff reconsidered the ranking of actions that were identified as concerns in public comments. Near-term actions for priorities D and E were not ranked. Actions for priority D were considered too diverse for ranking to be of value. Actions for priority E fall under the responsibility of the Partnership and are planned for near-term implementation.

Roles and responsibilities

Everyone who lives, works, or plays in the Puget Sound region has a role in restoring Puget Sound to health. Federal, state, tribal, and local governments have jurisdictional authorities over different activities that potentially affect ecosystem health, including land use, development permits, water resources, fisheries management, habitat protection, and enforcement. Nonprofit organizations and other groups have worked tirelessly for many decades on issues of special importance to their members and the Puget Sound region. As the Action Agenda is implemented, citizen groups will be able to see how their efforts support and help to shape regional priorities for ecosystem health.

Many Puget Sound businesses depend on ecosystem services for their survival and prosperity, but regional growth and development is also expected to be one of the major stressors to ecosystem health. Innovation and improved efforts to transition business operations toward practices that help the environment will move regional prosperity and ecosystem health forward at the same time. Individual citizens will have opportunities to make personal choices, such as driving, recycling, disposing of waste carefully, and conserving water, which will reduce harmful impacts to Puget Sound. Widespread and energetic public support is essential for implementing the actions needed to restore and protect Puget Sound.

Table 4-2 outlines the specific expectations, roles, and responsibilities of entities responsible for implementation of near-term actions. The table is a summary and may not include all of the important partners; however, all efforts to successfully implement the Action Agenda are encouraged and welcome.

Implementation plans

In 2009, the state Legislature will choose which of the recommended, prioritized actions to fund for the 2009-2011 biennium. Other sources of support such as federal appropriations will also be identified in early 2009.

Once it is clear which actions will be funded, the Partnership will develop detailed implementation plans for all funded items. In addition to responsibility and budget information presented in Table 4-2, implementation plans will include a scope of work with key steps, associated schedules, and performance measures. The performance measures will track both the implementation of actions (outputs) and the initial expected outcomes (ecosystem impacts or results). A narrative rationale will support the selected performance measures.

For actions that are not funded, the Partnership will work with lead and partner implementers to fit the actions into the ongoing operations of one or more partner entities. For actions that cannot be absorbed into an existing workload, steps will be identified to prepare the action for implementation once resources are available, including identifying possible sources of funding.

Next steps for the Partnership

Continued work is needed by the Puget Sound Partnership to define the next steps to implement the Action Agenda. Based on the final funding level provided by the Legislature, the Partnership will develop a work plan for these actions by July 1, 2009.

For the near term, Partnership will focus on a number of activities, including:

- Securing funding for near-term actions and develop detailed implementation plans.
- Initiating the system for implementation by establishing responsibilities, timelines, reporting requirements, and data management needs.
- Advancing scientific input into the Partnership's efforts by:
    - Adopting benchmarks and targets to measure progress
    - Refining provisional indicators
    - Preparing the 2009 State of the Sound Report
    - Preparing the first version of an Integrated Ecosystem Assessment for Puget Sound
    - Conducting the next stage of the ecosystem services analysis to begin assigning values and tradeoffs related to ecosystem actions
    - Reforming monitoring programs in Puget Sound
- Working with partners to implement near-term actions.
- Working with the action areas to prioritize local near-term actions, and identify roles and responsibilities.
- Continuing to work with watershed groups to incorporate the Salmon Recovery Plan into the Action Agenda and better integrate local efforts.

The Puget Sound Action Agenda will be improved and adjusted for many years to come, but the early years of implementation will rely heavily on the groundwork that has already been completed by the many governments, organizations, and individuals working on the health of Puget Sound. Based largely on existing plans, the Partnership has identified a suite of near-term priority actions that will move us toward long-term ecosystem health. One of the clear messages to the Puget Sound Partnership in our many public forums this year is that people want to see the plans they already have get implemented, and they want to get started as soon as possible.

Table 4-1 Ranked near-term actions priorities A through C.

Rank	Near-Term Action Description	Action Number
Priority A: Protect intact ecosystem processess, structures, and functions		
1	Initiate or complete Action Agenda-based watershed assessments and related maps for each of the watersheds within the Puget Sound basin to identify sites and functions that are the most urgent and important for protection.	A.1 (3)
2	Provide funding and technical assistance to local jurisdictions to update local shoreline management programs by current deadlines, with all updates complete by 2013.	A.2 (5)
3	Protect high-value habitat and land at immediate risk of conversion as identified through existing processes such as the salmon recovery plans and others.	A.2 (1)
4	Convene a regional planning forum to create a coordinated vision for guiding growth at an ecosystem scale.	A.1 (1)
5	Continue to implement existing forest practice plans and regulations consistent with the Action Agenda, including the state trust lands HCP, state forest practices rules, and Road Maintenance and Abandonment Plans as informed by the Forest and Fish Plan, and others.	A.4 (4)
6	Change Shoreline Management Act statues and regulations to require a shoreline conditional use permit for: bulkheads and docks associated with all residential development; all new and replacement shoreline hardening; all seawall/bulkhead/revetment repair projects; and new docks and piers.	A.2 (7)
7	Purchase or transfer development rights or use conservation easements for working lands at immediate risk of conversion.	A.4 (1)
8	Support legislation that seeks to continue to direct growth away from rural and working resource lands and into cities.	A.1 (4)
9	Implement state ballast water requirements until a national or West Coast standard is established.	A.5 (2)
10	Advocate for national or West Coast regional ballast water discharge standards.	A.5 (1)
11	Prepare a set of criteria to guide decisions for acquiring and protecting high-value, high-risk habitat.	A.1 (2)
12	Implement the recommendations from approved watershed plans prepared under the Watershed Planning Act (RCW 90.82) consistent with the Action Agenda and coordinated with other local restoration and protection efforts.	A.3 (4)
13	Develop a Puget Sound baseline and database of invasive species to guide control efforts.	A.5 (3)
14	Provide funding and technical assistance to local governments that have not yet completed their Critical Area Ordinance updates.	A.2 (8)
15	Support and implement recommendations from the CTED TDR Policy Advisory Committee.	A.2 (9)
16	Implement components of the Washington Department of Natural Resources Aquatic HCP that protect critical habitat.	A.4(6)
17	Enhance and target existing capacity to rapidly respond to immediate invasive species risks.	A.5 (4)
18	Support the Conservation Commission's efforts to protect productive agricultural areas consistent with the Action Agenda priorities.	A.4 (3)

Table 4-1 Ranked near-term actions priorities A through C.

Rank	Near-Term Action Description	Action Number
Priority A: Protect intact ecosystem processess, structures, and functions		
19	Provide local governments with guidance on how to achieve and measure no-net-loss of ecological function as required by the Shoreline Management Act and the Shoreline Master Program guidelines.	A.2 (6)
20	Support municipal water systems' implementation of Washington Department of Health's Water Use Efficiency Rule, including establishing water conservation goals, metering, and reporting from all municipal suppliers.	A.3 (7)
21	Set flow rules in watersheds that currently do not have instream flow rules, with priority given to critical basins or those with known significant problems meeting instream or out-of-stream demands.	A.3 (1)
22	Establish local water masters in each watershed to increase water code compliance and enforcement.	A.3 (6)
23	Adopt water reuse rules.	A.3 (9)
24	Develop and implement the comprehensive basin flow protection and enhancement programs called for in the recovery plans for Puget Sound Chinook and Hood Canal/Strait of Juan de Fuca summer chum.	A.3 (3)
25	Convene a task force to develop a funding mechanism to rapidly acquire properties with high ecological value and imminent risk of conversion.	A.2 (3)
26	Advocate for proposed Wilderness designations: a) support Alpine Lakes Wilderness addition; and b) Pratt River Wild and Scenic Designation.	A.2 (2)
27	Continue ongoing work to resolve conflicts between aquaculture and upland uses.	A.4 (5)
28	Update instream flow rules based on current science.	A.3 (2)
29	Work with the Marine Managed Areas Work Group chaired by DFW to develop recommendations to improve the effectiveness of MPAs by December 2009.	A.2 (4)
30	Coordinate with the SSB 5248 project by the Ruckelshaus Center that is working to resolve conflicts between agricultural activities and critical areas regulations.	A.4 (2)
31	Develop a treated wastewater reuse rule by December 31, 2010.	A.3 (8)
32	Evaluate and implement solutions to exempt well issues.	A.3 (5)

Table 4-1 Ranked near-term actions priorities A through C.

Rank	Near-Term Action Description	Action Number
Priority B: Restore ecosystem processess, structures, and functions		
1	Implement restoration projects in the salmon recovery three-year work plans and the Estuary and Salmon Restoration Program of the Nearshore Partnership.	B.1 (1)
2	Complete the Puget Sound Nearshore Partnership's General Investigation in a timely way to help identify and refine nearshore restoration opportunities and move toward implementation.	B.1 (5)
3	Complete large-scale restoration projects at the mouths of major river systems in Puget Sound where there is a high likelihood of re-creating ecosystem function.	B.1 (2)
4	Implement coordinated incentive and technical assistance programs for private landowners through the Conservation Commission, Conservation Districts, Department of Natural Resources, other state agencies, Washington State University Extension, local governments, non-governmental organizations, and others as appropriate.	B.3 (1)
5	Remove derelict fishing gear as proposed by the Northwest Straits Commission and local Marine Resource Committees in sites with known problems for species.	B.1 (6)
6	Continue Bellingham Bay Pilot Program to clean up Bellingham Bay in a coordinated way.	B.2 (2)
7	Fund a one year pilot program to develop a coordinated clean up and restoration plan for the Port Angeles Harbor and waterfront.	B.2 (1)
8	Restore floodplain and river processes where there is a high likelihood of re-creating ecosystem function.	B.1 (3)
9	Remove significant blockages of ecosystem processes and provide access to habitat.	B.1 (4)
10	Continue to control pollutant sources and remediate toxics in Duwamish Bay.	B.2 (3)

Table 4-1 Ranked near-term actions priorities A through C.

Rank	Near-Term Action Description	Action Number
Priority C: Reduce the sources of water pollution		
1	Implement immediate remediation actions to address Hood Canal's low dissolved oxygen concentrations through the Hood Canal Dissolved Oxygen Program.	C.1 (8)
2	Provide financial and technical assistance to cities and counties to implement NPDES Phase I and II permits, as well as Ecology for permit oversight and implementation.	C.2 (2)
3	Retrofit existing stormwater systems by: a) developing high-level criteria that can be used in 2009 to determine the highest priority areas around the Sound for stormwater retrofits; and b) implementing stormwater retrofit projects in the highest priority areas based upon these criteria to bring areas into compliance with current stormwater regulations.	C.2 (6)
4	Assist cities and counties in incorporating LID requirements for development and redevelopment into all stormwater codes.	C.2 (3)
5	Implement priority strategies and actions to address low dissolved oxygen in South Sound, targeted areas in the Whidbey Basin, and other vulnerable areas.	C.1 (9)
6	Assist the Department of Ecology in implementing its PBT program to reduce and eventually eliminate the use of all chemicals on the PBT list, and other programs to reduce toxins such as metals.	C.1 (2)
7	Develop and implement on-site sewage system management plans in each Puget Sound county.	C.4 (1)
8	Pursue stimulus package funding to implement priority upgrades of municipal and industrial wastewater facilities, especially in nutrient sensitive and recoverable shellfish areas of Puget Sound.	C.3 (2)
9	Permanently fund a rescue tug at Neah Bay.	C.1 (3)
10	Implement NPDES industrial permits and Washington State Department of Transportation permits, including Ecology for permit oversight and implementation.	C.2 (9)
11	Implement private property stewardship, incentive, and technical assistant programs (e.g. Conservation Districts, WSU Extension, Washington Sea Grant, local government programs) that focus on reducing sources of water pollution, from commercial and non-commercial farms and other nonpoint sources, particularly in priority areas.	C.2 (8)
12	Continue to implement road maintenance and abandonment programs for federal, state (including trustlands), and private timber lands.	C.2 (7)
13	Implement Shellfish Protection District plans, on-site sewage treatment plans in marine recovery areas, and related projects to restore water quality at commercial and recreational shellfish areas that are degraded or threatened.	C.1 (7)
14	Conduct a focused outreach campaign for the public and businesses to reduce pollutants identified in toxic loading and other studies that are priority threats to Puget Sound.	C.1 (1)
15	Revise the current on-site sewage treatment rule no later than June 30, 2011, so standards are established to address new on-site sewage treatment technologies.	C.4 (2)
16	Petition EPA to establish Puget Sound as a No Discharge Zone for commercial and/or recreational vessels to eliminate bacteria, nutrients, and pathogens from being discharged into Puget Sound.	C.1 (5)

Table 4-1 Ranked near-term actions priorities A through C.

Rank	Near-Term Action Description	Action Number
Priority C: Reduce the sources of water pollution		
17	Implement existing air management plans consistent with the Action Agenda.	C.1 (6)
18	Support federal facilities in reducing nutrient and pathogens, particularly in already impaired areas.	C.3 (3)
19	Continue to fund the shellfish and fish advisory monitoring and advisory programs.	C.6 (2)
20	Develop and implement LID incentives.	C.2 (4)
21	Continue to implement ongoing, high-priority remediation and cleanup projects.	C.5 (1)
22	Enhance and target on-site sewage treatment loan programs and grants to ensure programs are targeted to areas of with demonstrated loading issues and vulnerable waters.	C.4 (3)
23	Convene a group of regulating agencies, implementers with key funding responsibilities, and other stakeholders as appropriate to evaluate the technical and programmatic solutions for CSOs to meet overall program goals of improving water quality in fresh and marine water.	C.2 (5)
24	Continue to fund the swimming beach monitoring program.	C.6 (1)
25	Establish a regional coordinated monitoring program for stormwater, working with the Monitoring Consortium of the Stormwater Work Group.	C.2 (1)
26	Refine the Department of Ecology near-term prioritization criteria for site cleanups to be consistent with the Action Agenda and incorporate criteria into toxic cleanup grant programs.	C.5 (2)
27	Obtain delegated authority from the Coast Guard to expand and enhance the scope of authority of the Department of Ecology's vessel and facility inspections, marine incident investigations, and the agency's ability to augment Coast Guard prevention activities and review spill prevention and response plans on behalf of the Coast Guard.	C.1 (4)
28	Use advanced wastewater treatment where needed in nutrient sensitive and shellfish recoverable areas, such as Hood Canal, South Sound, and the Whidbey Basin.	C.3 (1)

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
Priority A: Protect intact ecosystem processes, structures, and functions											
A.1 Focus growth away from ecologically important and sensitive areas by encouraging dense, compact cities, vital rural communities, and protected areas that support the ecosystem Soundwide.											
1	Convene a regional planning forum to create a coordinated vision for guiding growth at an ecosystem scale.	Program (new)	Implement	Convene		PSP	CLC, Quality Growth Alliance, CTED, DNR, Local Gov't, PSNERP, PSRC, WSDA, Canada	0	OT	$80,000	
2	Prepare a set of criteria to guide decisions for acquiring and protecting high-value, high-risk habitat.	Program (new)	Implement			PSP	Ecology, DFW, DNR, NMFS, USFWS, TNC, RCO, SRFB, Biodiversity Council		OT	$80,000	
3	Initiate or complete Action Agenda-based watershed assessment and related maps for each of the watersheds within the Puget Sound basin to identify sites and functions that are the most urgent and important for protection.	Research/monitoring	Lead fund			PSP	Ecology, DFW, DNR, CTED, Local Gov't, Federal Gov't, tribes, PSNERP		OT	$1,300,000	
4	Support legislation that seeks to continue to direct growth away from rural and working resource lands and into cities.	Legislation			Policy	CTED	Local Gov't, Tribes, WCC, Regional Council's, Ecology			*$0*	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
A.2 Permanently protect the intact areas of the Puget Sound ecosystem that still function well.											
1	Protect high-value habitat and land at immediate risk of conversion as identified through existing processes such as the salmon recovery plans and others.	Capital	Lead fund		Funding	Varies by project	Varies by project		O	$11,500,000	$11,500,000
2	Advocate for proposed Wilderness designations: a) support Alpine Lakes Wilderness addition; and b) Pratt River Wild and Scenic Designation.	Legislation			Policy	Washington Wilderness Coalition, Sierra Club	Federal delegation		O	$20,000	
3	Convene a task force to develop a funding mechanism to rapidly acquire properties with high ecological value and imminent risk of conversion.	Program (new)	Implement		Funding	PSP	TNC, CLC, TPL, NFWF, DFW, DNR, tribes, RCO, Biodiversity Council, Local Gov't		OT	$80,000	
4	Work with the Marine Managed Areas Work Group chaired by DFW to develop recommendations to improve the effectiveness of MPAs by December 2009.	Program (continue)		Participate	Policy	DFW	People for Puget Sound, Tribes, Northwest Straights Commission, Canada	$45,000	OT	$60,000	
5	Provide funding and technical assistance to local jurisdictions to update local shoreline management programs by current deadlines, with all updates complete by 2013.	Program (continue)			Funding	Ecology	Local Gov't, CTED, DFW	$8,509,920	O	$3,000,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
6	Provide local governments with guidance on how to achieve and measure no-net-loss of ecological function as required by the Shoreline Management Act and the Shoreline Master Program guidelines.	Program (new), Regulatory change		Convene, Participate		Ecology	Local Gov't, CTED, DFW		OT	*$350,000*	
7	Change Shoreline Management Act statues and regulations to require a shoreline conditional use permit for: bulkheads and docks associated with all residential development; all new and replacement shoreline hardening; all seawall/bulkhead/revetment repair projects; and new docks and piers.	Regulatory change			Policy	PSP	Ecology, Local Gov't, Development interests		OT	$160,000	
8	Provide funding and technical assistance to local governments that have not yet completed their Critical Area Ordinance updates.	Program (continue)			Funding	CTED	Ecology, Local Gov't	$6,900,000			
9	Support and implement recommendations from the CTED TDR Policy Advisory Committee.	Program			Policy	CTED	WCC, NGO's, Local Gov't			$800,000	
A.3 Protect and conserve freshwater resources to increase and sustain water availability for instream and human uses.											

Table 4-2 Near-term action implementation responsibilities

Actions		Type	Partnership Role			Lead Agency	Partners	Budget Estimate			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
1	Set flow rules in watersheds that currently do not have instream flow rules, with priority given to critical basins or those with known significant problems meeting instream or out-of-stream demands.	Program (continue)			Funding	Ecology	DFW, Watersheds Planning Groups	$355,579	OT	$0	
2	Update instream flow rules based on current science.	Program (continue)			Funding	Ecology	DFW, Watersheds Planning Groups		O	$1,728,000	
3	Develop and implement the comprehensive basin flow protection and enhancement programs called for in the recovery plans for Puget Sound Chinook and Hood Canal/Strait of Juan de Fuca summer chum.	Program (new)	Lead fund			Ecology	Ecology, DFW, Watersheds Planning Groups, Utilities, Flood Reservoir Managers		O	$320,000	
4	Implement the recommendations from approved watershed plans prepared under the Watershed Planning Act (RCW 90.82) consistent with the Action Agenda and coordinated with other local restoration and protection efforts.	Program (continue)			Policy	Ecology	Watersheds Planning Groups, Utilities, Local Gov't, DFW, CTED, WCC, Business	16,548,606	O	$20,000,000	$20,000,000
5	Evaluate and implement solutions to exempt well issues.	Legislation (state), Program (new)		Convene	Policy	Ecology	Local Gov't, DOH, CTED		OT	$160,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
6	Establish local water masters in each watershed to increase water code compliance and enforcement.	Program (new)			Funding	Ecology	Local Gov't	864,847	O	$913,000	
7	Support municipal water systems' implementation of Washington Department of Health's Water Use Efficiency Rule, including establishing water conservation goals, metering, and reporting from all municipal suppliers.	Program (new)			Funding	DOH	Utilities, Local Gov't	163,928	O	NA	
8	Develop a treated wastewater reuse rule by December 31, 2010.	Program (new)			Policy	Ecology	DOH, Utilities, Local Gov't		OT	$250,000	
9	Adopt water reuse rules.	Regulatory			Policy	Ecology	DOH			NA	
A.4 Support long-term protection and stewardship of working farms, forests, and shellfish farms to help maintain ecosystem function, sustain quality of life, and improve the viability of rural communities.											
1	Purchase or transfer development rights or use conservation easements for working lands at immediate risk of conversion.	Capital	Lead fund		Funding	Varies by project	WCC, TNC, CLC, TPL, Local Gov't, Forest groups, Ag Groups, CTED, DFW, RCO, SRFB		O	$25,000,000	$25,000,000
2	Coordinate with the SSB 5248 project by the Ruckelshaus Center that is working to resolve conflicts between agricultural activities and critical areas regulations.	Program (continue)			Policy	Ruckelshaus Center/UW	Local Gov't, Ag groups, CTED, WCC		OT	$80,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
3	Support the Conservation Commission's efforts to protect productive agricultural areas consistent with the Action Agenda priorities.	Program (continue)			Funding	CC	Local Gov't, Ag groups, CTED, RCO, Biodiversity Council, WSDA		O	$1,700,000	
4	Continue to implement existing forest practice plans and regulations consistent with the Action Agenda, including the state trust lands HCP, state forest practices rules, and Road Maintenance and Abandonment Plans as informed by the Forest and Fish Plan, and others.	Program (continue)			Funding	DNR	DFW, forest industry, Watershed Planning Groups, RCO, SRFB	$10,491,384	O	$0	
5	Continue ongoing work to resolve conflicts between aquaculture and upland uses.	Program (continue), Research/monitoring		Convene	Funding	Ecology	SARC, aquaculture industry, environmental groups, tribes, shoreline property owners, DNR, CTED, WSG, WSDA	$3,973,800	O	$80,000	
6	Implement components of the Washington Department of Natural Resources Aquatic HCP that protect critical habitat.	Program (continue)			Funding	DNR	RCO		O	$4,200,000	
A.5 Prevent and rapidly respond to the introduction of invasive species.											

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
1	Advocate for national or West Coast regional ballast water discharge standards.	Legislation (federal), Regulatory change			Policy	Ecology	DFW, NMFS, USFWS, Invasive Species Council, WSG, Canada		OT	$60,000	
2	Implement state ballast water requirements until a national or West Coast standard is established.	Program (continue)			Funding	DFW	Ecology, Shipping Industry, NMFS, USFWS, Invasive Species Council, WSG, Canada	$220,400	O	$318,000	
3	Develop a Puget Sound baseline and database of invasive species to guide control efforts.	Program (new)			Funding	DFW	DNR, Invasive Species Council, Ecology, USGS, WSG, RCO, WSDA, Canada	$200,000	OT	$494,000	
4	Enhance and target existing capacity to rapidly respond to immediate invasive species risks.	Program (continue)			Funding	PSP	Invasive Species Council and multiple agencies with invasive species responsibilities, Canada	$1,200,000	O	*$0*	
Priority B: Restore ecosystem processes, structures, and functions											
B.1 Implement and maintain priority ecosystem restoration projects for marine, marine nearshore, estuary, freshwater riparian, and uplands.											

Table 4-2 Near-term action implementation responsibilities

Actions		Type	Partnership Role			Lead Agency	Partners	Budget Estimate			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
1	Implement restoration projects in the salmon recovery three-year work plans and the Estuary and Salmon Restoration Program of the Nearshore Partnership.	Capital	Lead fund		Funding	PSP	Watersheds, NMFS, WSG, Nearshore Partnership, RCO, SRFB, WCC, USFWS	$110,000	OT	$69,000,000	$69,000,000
2	Complete large-scale restoration projects at the mouths of major river systems in Puget Sound where there is a high likelihood of re-creating ecosystem function.	Capital	Lead fund		Funding	PSP	Varies by project		OT	$16,700,000	
3	Restore floodplain and river processes where there is a high likelihood of re-creating ecosystem function.	Capital	Lead fund		Funding	PSP	Varies by project		OT	See B.1.1 and B.1.2	
4	Remove significant blockages of ecosystem processes and provide access to habitat.	Capital	Lead fund		Funding	PSP	Varies by project		OT	See B.1.1 and B.1.2	
5	Complete the Puget Sound Nearshore Partnership's General Investigation in a timely way to help identify and refine nearshore restoration opportunities and move toward implementation.	Program (continue)		Participate	Funding	DFW	PSNERP Partners, Ports		OT	$800,000	
6	Remove derelict fishing gear as proposed by the Northwest Straits Commission and local Marine Resource Committees in sites with known problems for species.	Capital			Funding	NSC	DNR, Canada	$100,000		$1,125,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
B.2 Revitalize waterfront communities while enhancing marine and freshwater shoreline ecosystem processes.											
1	Fund a one-year demonstration program to develop a coordinated cleanup and restoration plan for the Port Angeles Harbor and waterfront and work plan for project completion.	Capital			Funding	Port	DNR, Ecology, tribes, community groups		OT	NA	
2	Continue Bellingham Bay Pilot Program to clean up Bellingham Bay in a coordinated way.	Program (continue), Capital			Funding	Port	Ecology, DFW, DNR, Watersheds, Watersheds		O	NA	
3	Continue to control pollutant sources and remediate toxics in Duwamish Bay.	Program			Funding	Ecology	City of Seattle, King County, Industry, NGO's				
B.3 Support and implement stewardship incentive programs to increase the ability of private landowners to undertake and maintain restoration projects that improve ecosystem processes.											
1	Implement coordinated incentive and technical assistance programs for private landowners through the Conservation Commission, Conservation Districts, Department of Natural Resources, other state agencies, Washington State University Extension, local governments, non-governmental organizations, and others as appropriate.	Program (new)			Funding	WCC	Local conservation districts, WSU, local gov't, WSG, DNR	$500,000	O	See C.2.8	
Priority C: Reduce the sources of water pollution											

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
C.1 Prevent pollutants from being introduced in the Puget Sound ecosystem to decrease the loadings from toxics, nutrients, and pathogens.											
1	Conduct a focused outreach campaign for the public and businesses to reduce pollutants identified in toxic loading and other studies that are priority threats to Puget Sound.	Education/outreach			Funding	Ecology	Local hazrardous waste management programs, WSDA, Businesses, WSDOT		O	$970,000	
2	Assist the Department of Ecology in implementing its PBT program to reduce and eventually eliminate the use of all chemicals on the PBT list, and other programs to reduce toxins such as metals.	Program (continue)			Funding	Ecology	Industry, Vendors, Environmental groups, WSDA, WSDOT	$658,553	O	$0	
3	Permanently fund a rescue tug at Neah Bay.	Legislation (federal)			Funding, Policy	Ecology	Ecology, Tribes, environmental groups, shipping interests, Coast Guard, Tribes, Oil Spill Advisory Council, Canada	$0	O	$6,400,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
4	Obtain delegated authority from the Coast Guard to expand and enhance the scope of authority of the Department of Ecology's vessel and facility inspections, marine incident investigations, and the agency's ability to augment Coast Guard prevention activities and review spill prevention and response plans on behalf of the Coast Guard.	Regulatory change		Facilitate	Policy	Ecology	Coast Guard	$5,557,542	OT	$60,000	
5	Petition EPA to establish Puget Sound as a No Discharge Zone for commercial and/or recreational vessels to eliminate bacteria, nutrients, and pathogens from being discharged into Puget Sound.	Program (new), Regulatory change			Funding, Policy	Ecology	EPA, Ecology, Ports, Marinas, DOH, Parks, Boat owners, Canada		OT	$300,000	
6	Implement existing air management plans consistent with the Action Agenda.	Program (continue)			Funding	Ecology	PSCAA, Canada, WSDOT	$13,579,114	O	$0	
7	Implement Shellfish Protection District plans, on-site sewage treatment plans in marine recovery areas, and related projects to restore water quality at commercial and recreational shellfish areas that are degraded or threatened.	Program (continue)			Funding	Varies	Ecology, DOH, DFW, DNR, Local Gov't, Utilities, SARC, WSG, Tribes		O	$244,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
8	Implement immediate remediation actions to address Hood Canal's low dissolved oxygen concentrations through the Hood Canal Dissolved Oxygen Program.	Capital	Lead fund		Funding	Ecology	DOH, Utilities, Local Gov't Tribes, land owners, WSG, WCC		O	$31,000,000	
9	Implement priority strategies and actions to address low dissolved oxygen in South Sound, targeted areas in the Whidbey Basin, and other vulnerable areas.	Capital			Funding	Ecology	DOH, Utilities, Local Gov't Tribes, land owners, WCC	$2,134,000	O	$3,600,000	
C.2 Use a comprehensive, integrated approach to managing urban stormwater and rural surface water runoff to reduce stormwater volumes and pollutant loadings.											
1	Establish a regional coordinated monitoring program for stormwater, working with the Monitoring Consortium of the Stormwater Work Group.	Program (new), Research/monitoring		Convene	Funding	Ecology	Ecology, EPA, Monitoring Consortium, RCO, Local Gov't	See E.3.2	OT	$0	
2	Provide financial and technical assistance to cities and counties to implement NPDES Phase I and II permits, as well as Ecology for permit oversight and implementation.	Program (continue)			Funding	Ecology	Local Gov't	$4,466,000	OT	$0	
3	Assist cities and counties in incorporating LID requirements for development and redevelopment into all stormwater codes.	Regulatory change		Participate	Policy	PSP	Ecology, Local Gov't, CTED, WSDOT	$500,000	O	$0	

Table 4-2 Near-term action implementation responsibilities

Actions		Type	Partnership Role			Lead Agency	Partners	Budget Estimate			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
4	Develop and implement LID incentives.	Program (new)			Funding, Policy	Ecology	CC, Local Gov't, Developers, CTED		O	$10,000,000	
5	Convene a group of regulating agencies, implementers with key funding responsibilities, and other stakeholders as appropriate to evaluate the technical and programmatic solutions for CSOs to meet overall program goals of improving water quality in fresh and marine water.	Program (new)		Facilitate, Convene		PSP	EPA, King County, City of Seattle		OT	$160,000	
6	Retrofit existing stormwater systems by: a) developing high-level criteria that can be used in 2009 to determine the highest priority areas around the Sound for stormwater retrofits; and b) implementing stormwater retrofit projects in the highest priority areas based upon these criteria to bring areas into compliance with current stormwater regulations.	Program (new)	Implement			PSP	Ecology, Local Gov't, CTED, WSDOT		O	$30,000,000	$18,000,000
7	Continue to implement road maintenance and abandonment programs for federal, state (including trustlands), and private timber lands.	Program (continue)			Funding	DNR	Forest land owners, Federal Gov't	$8,431,020	O	$10,000,000	$10,000,000

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
8	Implement private property stewardship, incentive, and technical assistant programs (e.g. Conservation Districts, WSU Extension, Washington Sea Grant, local government programs) that focus on reducing sources of water pollution, from commercial and non-commercial farms and other nonpoint sources, particularly in priority areas.	Program (continue)			Funding	WCC	Ecology, EPA, Counties, Extension Programs, WSG, WSDA, WCC, WDFW		O	$6,200,000	$0
9	Implement NPDES industrial permits and Washington State Department of Transportation permits, including Ecology for permit oversight and implementation.	Program (continue)			Funding	Ecology	WSDOT, Industry	$2,660,546	O	$14,194,080	
C.3 Prioritize and complete upgrades to wastewater treatment facilities to reduce pollutant loading.											
1	Use advanced wastewater treatment where needed in nutrient sensitive and shellfish recoverable areas, such as Hood Canal, South Sound, and the Whidbey Basin.	Program (continue)			Funding	Ecology	Utilities		O	$160,000	
2	Pursue stimulus package funding to implement priority upgrades of municipal and industrial wastewater facilities, especially in nutrient sensitive and recoverable shellfish areas of Puget Sound.	Capital			Funding	Public Works Trust Fund	DOH, Ecology	$8,502,569	O	$20,000,000	$20,000,000

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
3	Support federal facilities in reducing nutrient and pathogens, particularly in already impaired areas.	Capital			Funding	EPA	DOD, COE, Canada		O	$40,000	
C.4 Establish and maintain locally coordinated, effective on-site sewage system management to reduce pollutant loading to vulnerable surface waters.											
1	Develop and implement on-site sewage system management plans in each Puget Sound county.	Program (new)			Funding	Health Districts	DOH, Counties	$3,944,800	O	$8,800,000	
2	Revise the current on-site sewage treatment rule no later than June 30, 2011, so standards are established to address new on-site sewage treatment technologies.	Regulatory change			Policy	DOH	Health Districts		OT	$394,000	
3	Enhance and target on-site sewage treatment loan programs and grants to ensure programs are targeted to areas of with demonstrated loading issues and vulnerable waters.	Program (continue)			Funding, Policy	Ecology	Shorebank, DOH, Health Districts, Gates Foundation, Local Gov't		OT	$40,000	
C.5 Prioritize and continue to implement toxic cleanup programs for contaminated waterways and sediments.											
1	Continue to implement ongoing, high-priority remediation and cleanup projects.	Capital			Funding	Ecology	EPA, Responsible Parties	$20,959,166	O	$48,261,000	$48,261,000
2	Refine the Department of Ecology near-term prioritization criteria for site cleanups to be consistent with the Action Agenda and incorporate criteria into toxic cleanup grant programs.	Program (modify)		Participate	Policy	Ecology	EPA		OT	$40,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
C.6 Continue to monitor swimming beaches as well as conduct shellfish and fish advisory programs to reduce human exposure to health hazards.											
1	Continue to fund the swimming beach monitoring program.	Program (continue)			Funding	DOH	Parks, Heath Districts	$550,000	O	$546,000	
2	Continue to fund the shellfish and fish advisory monitoring and advisory programs.	Program (continue)			Funding	DOH	Parks, DNR, DFW Aquaculture Industry	$1,835,300	O	$676,000	
Priority D: Work effectively and efficiently together on priority actions.											
D.1 Conduct planning, implementation, and decision-making in an integrated way and from an ecosystem perspective consistent with the Action Agenda.											
1	Coordinate implementation of existing plans and programs that support the Action Agenda, and realign or discontinue plans and programs that conflict with the strategies and actions set forth in the Action Agenda.	Program (modify)		Facilitate		PSP	various gov't agencies, NGO's		O	$320,000	
2	Develop and implement the required Steelhead Recovery Plan, building on the Chinook Recovery Plan and integrating the Action Agenda priorities.	Program (new)			Funding	NMFS	Salmon Recovery Council, Watershed Planning Groups, CTED, RCO, SRFB, DFW, Tribes, Local Gov't	$1,100,000	O	$80,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
3	Continue the integration of habitat, harvest, and hatchery efforts in the salmon recovery plans and watershed three-year work plans.	Program (continue)	Lead fund		Funding	Tribes	Salmon Recovery Council, Watershed Planning Groups, RCO, SRFB		O	$160,000	
4	Implement the southern resident killer whale plan and continue to prioritize and identify actionable recovery measures with assignments and implementation timelines.	Program (modify)			Policy	NMFS	Gov't agencies, tribes, NGO's, others		O	$4,300,000	
5	Implement the 2008 revision to the Pacific Salmon Treaty.	Program (continue)			Policy	DFW	Tribes, Alaska Fish and Game, Governor's Office, Canada	$602,000	O	$600,000	
6	Implement the priority hatchery reform recommendations to update state and tribal hatcheries to protect wild salmon stocks, as well as achieve fisheries objectives.	Program (continue)			Funding, Policy	DFW	Tribes, Hatchery Scientific Review Group		O	$13,000,000	$1,000,000
D.2 Support, develop, and integrate climate change programs, including mitigation and adaptation strategies to improve local and regional readiness for anticipated changes.											
1	Once the recommendations of the Climate Change Study Groups are available, integrate and coordinate them with the Action Agenda.	Program (new)	Implement			PSP	CIG, Governor's Office, various gov't agencies, CTED, Canada		O	$80,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
D.3 Build and sustain long-term capacity of partners to effectively and efficiently implement the Action Agenda.											
1	Integrate the work of PSNERP, including the Estuary and Salmon Restoration Program, into the Puget Sound Partnership to improve efficiency, coordination, and to avoid overlap and duplication of efforts, as well as focus sufficient state, federal, tribal, and nonprofit organizational resources on protecting and restoring sites identified as part of the General Investigation.	Program (modify)	Implement			PSP	PSNERP		OT	$0	
2	Fund salmon recovery lead entities and other collaborative groups such as Regional Fisheries Enhancement Groups, marine resource committees, and RCW 90.82 watershed planning groups in the near term to continue existing work and address Action Agenda priorities.	Program (continue)			Policy	PSP	Planning groups	$1,115,299	O	$2,300,000	
3	Fund tribes to participate in the refinement and implementation of the Action Agenda, including salmon recovery plans.	Program (new)	Lead fund			PSP	Tribes		O	$4,400,000	
4	Establish a Federal Puget Sound Office	Program (new), Legislation (federal)			Funding, Policy	Federal Delegation	Federal Delegation		OT	NA	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
5	Consider the recommendations of the Partnership's Local Integration Task Force and implement appropriate follow up actions.	Program (new)	Implement			PSP	Task Force		O	NA	
6	Support appropriations to federal agencies to implement specific priorities in the Action Agenda, especially those that are actively coordinating with state and local partners to implement Action Agenda priorities.	Program (continue)			Funding	Non-Federal Partners	Federal Delegation		O	$80,000	
7	Engage with stakeholders throughout the region to advance shared priorities.	Education/outreach	Implement			PSP	All parties		O	$480,000	
8	Develop a joint federal agency work plan for Puget Sound restoration and protection actions in coordination with the Partnership.	Program (new)			Policy	EPA	Federal Agencies, PSP, Canada		OT	$0	
9	Work with federal delegation to support reauthorization of the Coastal Zone Management Act and other federal legislation vital to Puget Sound protection and restoration.	Program (continue), Legislation			Policy	PSP	State and Federal Agencies, Federal Delegation		OT	$0	
D.4 Reform the environmental regulatory system to protect habitat at an ecosystem scale.											

Table 4-2 Near-term action implementation responsibilities

Actions		Type	Partnership Role			Lead Agency	Partners	Budget Estimate			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
1	Conduct an institutional analysis of local, state, and federal agencies with regulatory authority over upland terrestrial and aquatic habitats, species protection, and water quality.	Program (modify)	Implement			PSP	Federal, State and Local agencies, Canada		OT	$160,000	
2	Evaluate the effectiveness of the Clark County pilot project related to aquatic habitats of the Office of Regulatory Assistance's iPermit program.	Program (new)	Implement			CTED	PSP, ORA, Clark County		OT	$250,000	
3	Convene a process for making recommendations to the Partnership about streamlining permitting processes for habitat restoration projects.	Program (new)		Convene		PSP	DFW, Ecology, COE, Local Gov't, Salmon Recovery Council, WCC		OT	$80,000	
4	Convene a process with Corps, NMFS, USFWS, jurisdictions responsible for levee maintenance, and stakeholders to identify and describe conflicts between levee maintenance standards and healthy habitat.	Program (new)		Convene		PSP	COE, NMFS, USFWS, Local Gov't, FEMA		OT	$0	
5	Support funding and legislation to allow state loans to local governments to conduct environmental reviews under SEPA at the planning or programmatic level.	Program (continue), Legislation			Funding, Policy	CTED	Ecology		OT	$0	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
6	Develop, fund, and implement a pilot in-lieu-fee mitigation program for aquatic habitats in one to three Puget Sound watersheds.	Program (new)	Implement			PSP	Ecology, COE, Local Gov't	$6,822,683	OT	$4,200,000	
7	Resolve issues related to the Hydraulic Project Approval including effectiveness, compliance, and enforcement.								O	NA	
D.5 Improve compliance with rules and regulations to increase the likelihood of achieving ecosystem outcomes.											
1	Convene a process with federal, state, and local jurisdictions and tribes to develop an ideal compliance assistance and inspection program that would leverage existing fragmented inspection programs into an integrated program without co-opting the regulatory and enforcement authority of any jurisdiction.	Program (new)		Convene		PSP	Ecology, COE, DFW, Local Gov't, Health Districts, WSDA, WCC		OT	$80,000	
2	Provide additional state compliance inspectors to ensure that businesses producing hazardous waste are complying with regulations.	Program (modify)			Funding	Ecology	DFW	$4,030,600	O	$3,148,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
3	Support state water quality fee revisions and short-term funding to maintain existing, and if possible, enhance compliance staff at Department of Ecology	Program (modify)			Funding	Ecology			OT	$4,600,000	
4	Provide additional staff at the Department of Ecology to conduct field visits to improve compliance with shoreline and aquatic regulations.	Program (modify)			Funding	Ecology			O	$2,054,000	
5	Develop and implement a training program for designers and contractors who work in nearshore areas.	Education/outreach	Implement			PSP	Development Interests, Local Gov't, WCC		O	$250,000	
Priority E: Build an implementation, monitoring, and accountability management system.											
E.1 Build and use a performance management system to improve accountability for ecosystem outcomes, on-the-ground results, and implementation of actions.								-	-	-	
1	Clarify and document roles of the Leadership Council, Ecosystem Coordination Board, Science Panel, and Partnership staff.	Program (continue)	Implement			PSP	Legislature Council and Board Members, Staff	$40,000	O		
2	Revise Action Agenda near-term actions as funding decisions are made and maintain an accurate list of	Program (modify)	Implement			PSP	Staff	$40,000	O		

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
	funded and unfunded actions.										
3	Develop specific benchmarks for outputs, intermediate outcomes, and environmental outcomes of the Action Agenda strategies, key suites of actions or individual actions against which we can measure and report progress.	Program (new)	Implement	Convene Facilitate Participate	Policy	PSP	All implementers	$40,000	O		
4	Develop a detailed work plan for near-term actions in the Action Agenda, identifying lead implementers, partners, funding source and amount, and timelines.	Program (new)	Implement	Convene Facilitate Participate	Policy	PSP	All implementers	$40,000	O		
5	Negotiate performance agreements with leads of actions related to salmon recovery plans, state agency work programs, and projects funded by state grant or loan programs to include timelines, outputs, immediate outcomes, intermediate outcomes, and environmental outcomes, as well as reporting requirements.	Program (continue)	Implement			PSP	All implementers	$40,000	O		

Table 4-2 Near-term action implementation responsibilities

Actions		Type	Partnership Role			Lead Agency	Partners	Budget Estimate			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
6	Convene the information management working group proposed in the Biennial Science Work Plan to define a set of information exchange protocols and standards for sharing activities and performance information.	Program (new)	Implement			PSP	All Gov't, Tribes, Educational Institutions	$40,000	OT		
7	Convene a performance management/accountability working group of local experts and implementers to design the accountability system, drawing on examples from Baystat, GMAP, and the Association of Government Accountants standards for performance reporting and others.	Program (new)	Implement			PSP	Gov't and Non-Gov't experts	$0	O		
8	Develop an activity integration database to support the Action Agenda accountability where implementers will report on outcomes and use of funds.	Program (new)	Implement	Participate	Funding, Policy	PSP			OT	$734,000	
9	Develop a schedule and process to update the near-term actions, the work plan, and revise the Action Agenda strategies as necessary.	Program (new)	Implement	Participate Facilitate		PSP	Implementers of actions	$40,000	O		
10	Submit recommendations to the Legislature to better align funding and resources with the Action Agenda in the November 2009 State of the Sound report.	Program (continue)	Fund Implement	Participate	Funding, Policy	PSP			OT	See E.2.1	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
11	Finalize the salmon recovery adaptive management plan as required by NOAA.	Program (continue)	Fund Implement	Convene Facilitate Participate	Funding	PSP	DFW, Ecology, NOAA, tribes, local jurisdictions, NWIFC, watershed leads	$80,000	OT		
12	Develop a system to identify and track actions that are inconsistent with the Action Agenda.	Program (new)	Implement	participate	Policy	PSP			OT	See E.1.8	
13	Develop and implement a Partner Program as specified in the legislation that created the agency.	Program (new)	Implement	Convene Facilitate Participate	Policy	PSP	Local jurisdictions		OT	$0	
14	Prioritize data for sharing and begin placing information on the U.S. EPA Central Data Exchange.	Program (new)	Implement	Convene Facilitate	Funding	PSP	NWIFC, tribes, DFW, Ecology, RCO, NOAA, EPA	$500,000	OT	0	
15	Implementers of monitoring supported by the Action Agenda will make monitoring data accessible to the Partnership and begin steps to make it available to the other implementers, scientists and the public.	Program (new)	Fund Implement	Convene Facilitate Participate	Funding, Policy	PSP	PSAMP, implementers of effectiveness studies and other monitoring actions		O	$0	
16	Conduct review and approval of the Action Agenda in early 2009, as required by the National Estuary Program.	Program	Implement			PSP	EPA		OT	$0	
E.2 Provide sufficient, stable funding and ensure funding is focused on priority actions to increase efficiency and effectiveness.											

Table 4-2 Near-term action implementation responsibilities

Actions		Type	Partnership Role			Lead Agency	Partners	Budget Estimate			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
1	Align state agency budget proposals for the 2009-2011 and 2011-2013 biennial budgets with the priorities in the Action Agenda.	Program (continue)	Implement			PSP	State Agencies, OFM	$80,000	O		
2	Pursue state legislation authorizing the creation of a Puget Sound regional improvement district.	Program			Policy	PSP		$0	OT		
3	For grant requests to the state, per RCW 90.71.340, review grant and loan criteria to prohibit the funding of projects that are in conflict with the Action Agenda.	Program (continue)			Funding, Policy	PSP	State Agencies, OFM		OT	$0	
4	For federal and local budgets, to the extent possible, review and comment to encourage alignment with the Action Agenda.	Program (continue)		Participate		PSP	Federal and Local Gov't		O	$0	
5	Implement targeted procurement on a pilot basis for a portion of the Puget Sound Acquisition and Restoration program that is focused on salmon recovery.	Program	Implement			PSP			O	See B1.1	
6	Continue to evaluate potential state funding sources in greater detail, including full legal and fiscal analysis, and prepare proposals for enactment of revenue sources in the 2010 or 2011 legislative sessions.	Program	Implement			PSP	State Agencies, OFM	$20,000	O		

Table 4-2 Near-term action implementation responsibilities

Actions		Type	Partnership Role			Lead Agency	Partners	Budget Estimate			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
7	For state agency grant programs, advocate for changes to policies and priorities of the Public Works Trust Fund, Salmon Recovery Funding Board, Washington Wildlife and Recreation Program, and other state grant and loan programs, to encourage consistency with Action Agenda goals.	Program (continue)			Funding, Policy	PSP	State Agencies, OFM	$40,000	OT		
8	Develop financial incentives and provide financial and technical assistance to local governments to develop high priority projects in the Action Agenda for funding with existing Department of Ecology and the Public Works Board programs.	Program	Implement			PSP	Ecology, PWTF		OT	NA	
9	As part of implementing the Mitigation That Works recommendations (D.4.2), develop agreements with Corps, Ecology, and other relevant permitting agencies by 2010 on the design of a regional in-lieu-fee program.	Program	Implement			PSP	Federal and State Gov't		O	See D.4.2	
10	Identify and implement one or more pilot projects to demonstrate the application of the in-lieu-fee program.	Capital	Implement			PSP			O	See D.4.2	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
11	Evaluate and if possible implement a water quality trading program to address dissolved oxygen issues in southern Puget Sound.	Program	Implement			PSP			O	NA	
12	Develop proposals for the 2011-2013 biennium to establish, improve or expand the use of ecosystem markets.	Program	Implement			PSP		$10,000	OT	NA	
13	In cooperation with a local government or stormwater utility, implement a pilot cap-and-trade program for the removal of impervious surface and/or removal of shoreline armoring.	Program	Implement			PSP	Local Gov't, Utilities	$10,000	O	NA	
14	Evaluate, and incorporate as appropriate into the Action Agenda, the recommendations in the Washington State Conservation Commission's 2008 conservation markets study for farmlands and forest landowners.	Program	Implement			PSP			OT	NA	
E.3 Continually improve the scientific basis for management actions in the Puget Sound through a comprehensive and prioritized regional science program.											
1	Sustain ongoing monitoring programs to provide status and trend and effectiveness information to inform State of the Sound reporting and other synthesis.	Program (continue), Science/monitoring		Facilitate	Funding	PSP	Entities conducting ecosystem monitoring	$35,000,000	O	$80,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
2	Implement transition to a coordinated regional program for monitoring ecosystem status and trends, program and project effectiveness, and cause-and-effect relationships.	Program /new), Science/monitoring	Implement	Convene	Funding, Policy	PSP	Washington Monitoring Forum, CMER, PSAMP, PS Monitoring Consortium, salmon recovery monitoirng program; also government, academic, business, and NGO partners	$400,000	O	$10,080,000	
3	Use the framework of Integrated Ecosystem Assessment to refine ecosystem indicators, assess threats to the ecosystem, and evaluate potential management strategies.	Program (new), Science/research/monitoring	Implement	Convene	Funding	PSP	Varies by project, but especially NWFSC, Biodiversity Council, and PS Nearshore Partnership		OT	$3,872,000	
4	Design and implement studies to collect new information about: a) the effects of a nearshore restoration actions; b) watershed-wide pollution loading and effects of runoff; c) stressors affecting forage fish and pelagic food webs; and d) ecosystem services and socioeconomic indicators.	Program (new), Science/research/monitoring	Lead fund		Funding	PSP	Varies by project		OT	$7,960,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
5	Assemble and synthesize findings that describe ecosystem conditions and threats for the 2009 State of the Sound report during mid-2009.	Science/research/monitoring	Implement	Convene		PSP	Entities conducting ecosystem monitoring		O	$280,000	
6	Publish 2010 Puget Sound Science Update to provide best available answers about how the ecosystem works, how it has changed over time, and how it is affected by management actions.	Science/research/monitoring	Implement	Convene		PSP	Science community (government, academic, business, NGO)		O	$580,000	
7	Identify research priorities and recommend topics for Partnership sponsored science in 2011-13 (e.g., for the next Biennial Science Work Plan).	Science/research	Implement	Convene		PSP	Science community (government, academic, business, NGO)		O	$0	
8	Develop and coordinate the organization to support implementation of the Partnership's science program, especially by convening working groups to organize the regional science community's participation.	Program (new), Science/research/monitoring	Implement	Convene		PSP	Science community (government, academic, business, NGO)	$172,000	O	$500,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
9	Develop processes for: a) soliciting science projects via competitive requests for proposals; b) conducting peer review of materials that form the science basis for Partnership decisions; and c) establishing a process for external peer review of the Partnership's science program.	Science/research/monitoring	Implement	Convene		PSP	Science community (government, academic, business, NGO)		O	$198,000	
10	Develop a technical plan for increasing capabilities for modeling future scenarios by identifying the goals and milestones for this work, defining the requirements, functions and assets needed to support ecosystem recovery, and describing the roles and relationships of collaborators carrying forward portions of this work.	Science/research/monitoring	Implement	Convene		PSP	Science community (government, academic, business, NGO)		O	$580,000	
11	Identify priorities for research to fill gaps in knowledge about ecosystem processes; design and implement studies to fill gaps.	Science/research	Lead fund	Convene	Funding	PSP	Science community (government, academic, business, NGO)		OT	$500,000	
12	Coordinate with science programs of state and federal agencies to better align with Partnership interests and contribute to Partnership science program needs.	Science/research/monitoring	Implement	Convene		PSP	Science community (government, academic, business, NGO)		OT	$200,000	

Table 4-2 Near-term action implementation responsibilities											
Actions		**Type**	**Partnership Role**			**Lead Agency**	**Partners**	**Budget Estimate**			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
E.4 Increase and sustain coordinated efforts for communication, outreach, and education to increase public awareness and encourage individual stewardship.											
1	Research and develop targeted communications messages for audiences.	Program	Implement			PSP			O		
2	Create a process to develop consistent, targeted, and scientifically based actions and messages for citizens.	Program	Implement			PSP			O		
3	Expand efforts to improve coordination of communication efforts and behavior change messages across government agencies and interest groups, such as STORM group.	Program	Implement			PSP	Gov't Agencies, NGO's		O	$134,000	
4	Work with the Leadership Council to explore establishing a Public Education Panel to help guide the public communications, outreach and education mission of the Puget Sound Partnership and its supporting entities (Leadership Council, Ecosystem Coordination Board, and Science Panel).	Program	Implement			PSP			OT		
5	Deliver regular communications to a variety of audiences and through a variety of mediums.	Program	Implement			PSP		$1,840,000	O		

Table 4-2 Near-term action implementation responsibilities

Actions		Type	Partnership Role			Lead Agency	Partners	Budget Estimate			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
6	Conduct a pilot program with the Washington State Ferries to educate riders about the condition of Puget Sound and actions they can take to help.	Program	Implement			PSP	WSDOT		OT	NA	
7	Conduct two-day workshops in each action area with local ECO Net members to coordinate and prioritize local efforts in support of Action Agenda goals.	Program		Convene		PSP	ECO Net Members		OT		
8	Develop a Puget Sound Partnership volunteer and outreach grant to sustain and expand effective and successful volunteer opportunities.	Program	Implement			PSP	Citizens	$160,000	O		
9	Increase training for education and outreach providers in up-to-date tools and techniques such as community-based social marketing, use of new technologies, and program evaluation and assessment.	Program	Implement			PSP	WSG, WSU Extension	$2,661,836	O		
10	Develop and implement a coordinated citizen science program.	Program	Implement			PSP	WSG, WSU Extension		O	$500,000	
11	Implement the WSU Beach Watcher Sustainability Plan to sustain current programs and expand the effort to all 12 Puget Sound counties.	Program	Implement			PSP	WSG, WSU Extension	$420,000	O	$2,260,000	

Table 4-2 Near-term action implementation responsibilities

Actions		Type	Partnership Role			Lead Agency	Partners	Budget Estimate			
			Fund Implement	Convene Facilitate Participate	Advocate funding Advocate policy			Ongoing Biennial State Spending	One-Time or Ongoing?	Additional 2009-2011 Cost	Ongoing Capital Programs
12	Coordinate with the Pacific Northwest NOAA B-WET grant provider to increase the "Meaningful Watershed Education Experience" model for students in Puget Sound.	Program		Participate		PSP	NOAA		O	$850,000	
13	Promote the use of and make Puget Sound-related curriculum widely available to all teachers and schools.	Program	Implement			PSP	Schools		O	$45,000	
14	Work with Partnership to create Puget Sound environmentally based student service projects.	Program	Implement			PSP			O	$0	

Table 4-3 Partnership near-term action next steps.

		Near-Term Action	First Steps for the Partnership	First Steps Start	First Steps End	Results
A.1	1	Convene a regional planning forum to create a coordinated vision for guiding growth at an ecosystem scale.	Convene a focus group to plan and schedule this process. Identify and appoint the most appropriate lead as part of that process.	Q2-09	Q2-09	Process and schedule for the planning forum.
A.1	2	Prepare a set of criteria to guide decisions for acquiring and protecting high-value, high-risk habitat.	Convene a work group with representatives from the Science Panel and staff with scientific expertise from tribes, non-profit organizations, watershed lead entities and relevant government agencies to develop the work plan for this effort. Once the work plan is complete, this effort should be completed within three months. PSP and the work group may appoint an alternative lead.	Q2-09	Q4-09	Set of criteria and guidelines for application.
A.1	3	Initiate or complete maps for each of the watersheds within the Puget Sound basin to identify sites and functions that are the most urgent and important for protection.	Work with partners to prioritize watersheds for characterization studies. Produce a scope and budget for consultant assistance.	Q1-09	Q2-09	Prioritized set of watersheds, scope and budget.
A.2	1	Protect high-value habitat and land at immediate risk of conversion as identified through existing processes such as the salmon recovery plans and others.	Convene a work group with representatives from the Science Panel and staff with scientific expertise from tribes, non-profit organizations, watershed lead entities and relevant government agencies to develop the work plan for this effort. Once the work plan is complete, this effort should be completed within three months. PSP and the work group may appoint an alternative lead.	Q2-09	Q4-09	Set of criteria and guidelines for application.
A.2	3	Convene a task force to develop a funding mechanism to rapidly acquire properties with high ecological value and immenent risk of conversion.	Inventory existing programs. Identify gaps in program coverage. Convene task force in time to make a recommendation for funding in the next biennium.	Q4-09	Q3-10	Budget proposal for the '11-'13 biennium

Table 4-3 Partnership near-term action next steps.

		Near-Term Action	First Steps for the Partnership	First Steps Start	First Steps End	Results
A.2	7	Change Shoreline Management Act statues and regulations to require a shoreline conditional use permit for: bulkheads and docks associated with all residential development; all new and replacement shoreline hardening; all seawall/bulkhead/revetment repair projects; and new docks and piers.	Reqest a moratorium on new shoreline hardening and over water structures in the vicinity of feeder bluffs and spawning areas. Work with partners to create legislation for 2010 legislative session. Encourage local jurisdictions to inlude in SMA program updates.	Q2-09 Moratorium; Q3-09 draft legislation	Q4-09	Moratorium and propopsed legislation.
A.4	5	Continue ongoing work to resolve conflicts between aquaculture and upland uses.	Collect and review best available science regarding aquaculture practice in Puget Sound. Meet with stakeholders including tribes, citizen groups focussed on aquaculture issues and industry representatives. Determine next steps.	Q3-09	Q4-09	Action plan for next steps.
B.1	1	Implement restoration projects in the salmon recovery three-year work plans and the Estuary and Salmon Restoration Program of the Nearshore Partnership.	3-year work plan Implement and ESRP-- after funds appropriated, complete contracts for work, through RCO, with watershed and community partners.	Q3-09	Q3-09	contracts to complete work are signed
B.1	2	Complete large-scale restoration projects at the mouths of major river systems in Puget Sound where there is a high likelihood of re-creating ecosystem function.	Identify projects from 3-year work plans and ESRP	Q3-09	Q3-09	contracts to complete work are signed
C.2	3	Assist cities and counties in incorporating LID requirements for development and redevelopment into all stormwater codes.	Propose a definition of low impact stormwater management and a definition for feasible to DOE. Work with DOE on guidance and support that will be needed by local juridictions to incorporate LID standards into local codes.	Q1-09	Q2-09	Agreed upon definitions and an outreach plan to local jurisdictions
C.2	5	Convene a group of regulating agencies, implementers with key funding responsibilities, and other stakeholders as appropriate to evaluate the technical and programmatic solutions for CSOs to meet overall program goals of improving water quality in fresh and marine water.	Convene a meeting(s) with the City of Seattle, King County and the EPA to develop an action plan for this item.	Q3-09	Q3-09	Action plan and assignements

Table 4-3 Partnership near-term action next steps.

		Near-Term Action	First Steps for the Partnership	First Steps Start	First Steps End	Results
C.2	6	Retrofit existing stormwater systems by: a) developing high-level criteria that can be used in 2009 to determine the highest priority areas around the Sound for stormwater retrofits; and b) implementing stormwater retrofit projects in the highest priority areas based upon these criteria to bring areas into compliance with current stormwater regulations.	Work with key stakeholders on criteria to prioritize stormwater retrofit projects that can be used to allocate retrofit funding in the 09-11 biennium.			
D.1	1	Coordinate implementation of existing plans and programs that support the Action Agenda, and realign or discontinue plans and programs that conflict with the strategies and actions set forth in the Action Agenda.	Inventory existing plans and programs and develop a work plan for this action that is phased to follow near term action A1.1	Q3-09	Q3-09	Inventory of plans and programs and an action plan
D.2	1	Once the recommendations of the Climate Change Study Groups are available, integrate and coordinate them with the Action Agenda.	Monitor work of Climate Change Study Group and incoroporate into on-going Action Agenda planning process.	ongoing	ongoing	updated items in future versions of the Action Agenda related to climate change
D.3	1	Integrate the work of PSNERP, including the Estuary and Salmon Restoration Program, into the Puget Sound Partnership to improve efficiency, coordination, and to avoid overlap and duplication of efforts, as well as focus sufficient state, federal, tribal, and nonprofit organizational resources on protecting and restoring sites identified as part of the General Investigation.	Convene a focus group to plan and schedule this process. Identify and appoint the most appropriate lead as part of that process.	Q1-09	Q1-09	Additional clarity, and possible MOU, among WDFW, Partnership, and RCO
D.3	2	Fund salmon recovery lead entities and other collaborative groups such as Regional Fisheries Enhancement Groups, marine resource committees, and RCW 90.82 watershed planning groups in the near term to continue existing work and address Action Agenda priorities.	Support funding at federal and state level. Decide on administrator for grants to watersheds from NEP grant (Q1-09). Negotiate new grant agreements with watersheds (Q2-09)	Q1-09	Q2-09	$50,000 grant to each watershed to implement action agenda, including salmon recovery core functions
D.3	3	Fund tribes to participate in the refinement and implementation of the Action Agenda, including salmon recovery plans.	Coordinate with tribes to determine level of funding needs and work plans for funding provided.	Q3-09	Q4-10	Action Agenda related work plans and budgets for each tribe

Table 4-3 Partnership near-term action next steps.

		Near-Term Action	First Steps for the Partnership	First Steps Start	First Steps End	Results
D.3	5	Consider the recommendations of the Partnership's Local Integration Task Force and implement appropriate follow up actions.	Review Task Force Final Report	Q1-09	Q2-09	Legislative or administrative recommendation s
D.3	7	Engage with stakeholders throughout the region to advance shared priorities.	Discuss role of caucuses with Leadership Council. Convene caucuses to discuss role and agenda for binennium. Further develop an outreach plan.	Q1-09	Q2-09	Meeting schedule for caucuses. Outreach plan.
D.4	1	Conduct an institutional analysis of local, state, and federal agencies with regulatory authority over upland terrestrial and aquatic habitats, species protection, and water quality.	Convene a follow-up meeting to the one held in 2008 including a broader spectum of intereted parties. Identify issues to address and develop a work program.	Q3-09	Q4-09	Meeting. Work plan for moving forward.
D.4	3	Convene a process for making recommendations to the Partnership about streamlining permitting processes for habitat restoration projects.	Prepare a proposal for actions needed to streamline restoration permitting porcesses. Convene initial meeting with key stakeholders. This could be the same meeting as D.4.1.	Q3-09	Q4-09	Draft approach and a meeting.
D.4	4	Convene a process with Corps, NMFS, USFWS, jurisdictions responsible for levee maintenance, and stakeholders to identify and describe conflicts between levee maintenance standards and healthy habitat.	Coordinate with COE. Convene coordination meeting to determine next steps.	Q3-09	Q4-09	Action plan for next steps.
D.4	6	Develop, fund, and implement a pilot in-lieu-fee mitigation program for aquatic habitats in one to three Puget Sound watersheds.	Submit prospectus to COE.	Q1-09	Q1-09	Draft prospectus submitted.
D.5	1	Convene a process with federal, state, and local jurisdictions and tribes to develop an ideal compliance assistance and inspection program that would leverage existing fragmented inspection programs into an integrated program without co-opting the regulatory and enforcement authority of any jurisdiction.	This item should be combined with near-term action D.4.1 for implementation.	Q3-09	Q4-09	Work plan
D.5	5	Develop and implement a training program for designers and contractors who work in nearshore areas.	Survey existing programs that have been implemented in other areas such as the Green Shores program.	Q4-09	Q1-10	Present recommended program to tribal, local, state and federal caucuses

Table 4-3 Partnership near-term action next steps.

		Near-Term Action	First Steps for the Partnership	First Steps Start	First Steps End	Results
A.2	1	Purchase high value habitat and land at immediate risk of conversion as identified through existing processes such as the salmon recovery plans and others.	Convene a work group with representatives from the Science Panel and staff with scientific expertise from tribes, non-profit organizations, watershed lead entities and relevant government agencies to develop the work plan for this effort. Once the work plan is complete, this effort should be completed within three months. PSP and the work group may appoint an alternative lead.	Q2-09	Q4-09	Set of criteria and guidelines for application.

Implementing Organizations

AGR	Washington State Department of Agriculture
CIG	Climate Impacts Group
CLC	Cascade Land Conservancy
Corps	Corps of Engineers
CTED	Washington State Department of Community Trade and Economic Development
DFW	Washington State Department of Fish and Wildlife
DNR	Washington State Department of Natural Resources
DOH	Washington State Department of Health
Ecology	Washington State Department of Ecology
ENVVEST	Puget Sound Naval Shipyard & Intermediate Maintenance Facility Project ENVironmental InVESTment
EPA	Environmental Protection Agency
HCCC	Hood Canal Coordinating Council
HCDOP	Hood Canal Dissolved Oxygen Project, Integrated Assessment and Modeling
MRC	Marine Resource Committees
NANOOS	Northwest Association of Networked Ocean Observing Systems
NFWF	National Fish and Wildlife Foundation
NGOs	Non-governmental Organizations
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
NOAAF	NOAA Fisheries

NSC	Northwest Straits Commission
NWFSC	Northwest Fisheries Science Center
NWIFC	Northwest Indian Fisheries Commission
ORA	Office of Regulatory Assistance
Parks	Washington State Parks and Recreation Commission
PSAMP	Puget Sound Assessment and Monitoring Program
PSCAA	Puget Sound Clean Air Agency
PSMEM-C	Puget Sound Marine Environmental Modeling Consortium
PSNERP	Puget Sound Nearshore Ecosystem Restoration Project
PSRC	Puget Sound Regional Council
PWTF	Public Works Trust Fund
RCFB	Recreation and Conservation Funding Board
RCO	Recreation and Conservation Office
SCC	Washington State Conservation Commission
TNC	The Nature Conservancy
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WCC	Washington Conservation Corps
WSG	Washington Sea Grant
WSDOT	Washington State Department of Transportation

Financing Strategy

Introduction

Puget Sound provides direct economic benefits of more than $3.5 billion per year to the regional economy, including $147 million per year in fishing and shellfish revenues, $3 billion per year from regional tourism, and $490 million per year from boating. The health of Puget Sound has a direct bearing on major economic sectors in the region, including tourism, a $9.5 billion industry in the region. The Sound is also an important attraction to 135,000 major businesses in the region that employ more than 2.2 million people. A recent analysis indicated that Puget Sound drives more than $20 billion in economic activity in Washington. Polls consistently show that the quality of the environment is an important factor in maintaining the region's economic growth, which outpaces three-fourths of the nation's metropolitan areas. The billions of dollars in property values for the 2,500 miles of Puget Sound shoreline attest to the real value people place on this resource.

Beyond the traditional economic measures of tourism, fishing, and recreation, Puget Sound also provides significant other benefits to the region. These ecosystem services include flood protection, clean drinking water, climate regulation, aesthetic value, and many more. A recent study found that these services provide at least $7.4 billion in annual benefits to the region.

Allowing the Sound to continue to deteriorate also costs us real money now in additional expenses, such as:

- Increased recovery and permitting costs from additional Endangered Species Act designations for imperiled species;
- Expensive cleanup and compliance requirements to address chronic water quality problems, such as untreated stormwater discharges; and
- Substantial cost increases for dwindling water supplies, and more expensive wastewater treatment, stormwater management, and flood protection facilities.

Clearly there is a lot at stake in maintaining and restoring the health of Puget Sound.

The economic benefit of restoring Puget Sound

A well-executed cleanup and restoration program will provide significant economic benefits. Over the long term, the economic sectors that profit from a healthy Puget Sound are likely to expand, potentially adding billions to the economy.

Puget Sound recovery can help lead the recovery of the region economically. Money invested in cleanup and restoration projects will flow directly to local communities, where it will support family-wage jobs in construction, restoration design, land management, and green farming and forestry practices. Studies show that each dollar spent on local construction projects has a ripple effect in local economies, driving $1.50 and $2.50 in secondary spending on materials and services.

Ecosystem restoration projects generally can be implemented far more quickly than most types of infrastructure projects. Watershed and salmon recovery planning in the Puget Sound region has created a large backlog of ready-to-go projects. The simplicity in design, permitting, and construction allows most

restoration projects to go from concept to completion in less than three years, far less than most other construction projects.

Ecosystem restoration projects also create a greater diversity of direct jobs than other types of projects. Restoration work requires extensive use of skilled and unskilled labor to demolish structures, construct habitat features, restore natural vegetation, and manage completed sites. Ecosystem restoration combines the most labor-intensive aspects of the construction, engineering, and nursery industries, meaning that more of the stimulus investment will flow directly into paychecks. Moreover, jobs in ecosystem restoration include an ideal blend of wage levels, including high-wage opportunities in engineering, construction management, heavy equipment operation, and monitoring, and entry-level jobs in construction and site management.

The secondary economic benefits for goods and services to support restoration projects is unusually diverse and substantial. A single restoration project can require specialized services of designers, scientists, engineers, permitting specialists, construction laborers and managers, and monitoring staff, as well as materials from many local producers and suppliers. The multiplier effect of Everglades restoration – the measure of secondary benefits – has been estimated at between two and three, meaning that each dollar invested results in at least two dollars in total economic benefits.

Finally, Puget Sound restoration will require that investments be made throughout the region, including rural areas that have lagged in employment and wages. This has the potential to spread economic benefits to many of the hardest economically hit communities and areas and not concentrate work just in the most populous counties of the region.

Action Agenda cost

The Action Agenda recommends several types of actions, including: capital projects; regulatory programs; incentives; scientific research; and education and outreach programs. Methods for calculating the costs for each of these actions vary. Some actions, such as estuary restoration projects, have detailed cost estimates already prepared. Similarly, if an action involves an adjustment to an existing program, such as the acceleration of shoreline planning, good cost estimates are available. Other actions, however, do not have detailed cost estimates prepared. In those cases, unit costs of similar work or other methods were used to provide an initial estimate.

The initial cost for implementing the Action Agenda in the 2009-2011 biennium is estimated at $601 million dollars. This includes $199 million in new funding, $222 million in ongoing capital expenditures (Puget Sound Acquisition and Recovery, Puget Sound Nearshore, SRFB, etc.), and continuation of $178 million in ongoing operating expenses. This estimate is primarily focused at the state level and includes state agency costs as well as the pass through of state dollars to assist local governments implement programs and projects identified in the Action Agenda (see Table 4-2 for specific cost estimates). This estimate of existing state spending is tied to specific actions in the Action Agenda and does not include all activities that impact Puget Sound.

The cost estimate does not include the full cost of the Action Agenda to local, federal, or tribal governments. These estimates were not finished because of the difficulty in generating a specific list of projects with full cost estimates and the difficulty in collecting cost information for the 12 counties and more

than 100 cities in the relatively short time to develop the Action Agenda. This will be an area of work for future versions of the Action Agenda.

A comprehensive estimate of the cost to implement the Action Agenda by 2020 cannot be made at this time. At a minimum, the costs identified for the 2009-2011 biennium should continue through the 2020 Action Agenda timeframe. The Partnership and the Science Panel are still in the process of establishing ecosystem indicators and benchmarks to track recovery. Until these benchmarks are established, calculating complete costs is not possible. Also, given that one of the core strategies of the Action Agenda is to continually evaluate program effectiveness and make needed adjustments, actions currently identified may be modified as the Action Agenda is implemented.

However, there are several categories of actions for which cost estimates have been made that can provide an insight in potential future costs. The Washington State Association of Counties has identified a cost of $48 million to implement currently planned stormwater and wastewater projects in Pierce, Thurston and San Juan counties alone. The cost of implementing regional salmon recovery plans as currently envisioned amounts to $120 million a year. Current funding is meeting 50 percent to 60 percent of this amount. Although specific cost estimates are not available, a survey by the Association of Washington Cities has found that 80 percent of responding cities across the state indicated that their stormwater system needs "major" or "some" replacement/enhancement to meet current demand, with 96 percent specifying that their stormwater system needs "major" or "some" replacement/enhancement to meet new capacity. Further updates to the Action Agenda will work to incorporate the costs of these and other critical projects and activities.

Existing spending on cleanup and recovery

The cost estimate for the Action Agenda is built upon a base of current state funding for programs and actions implementing or supporting the Action Agenda. Based upon capital appropriation made for the 2007-2009 biennium and an estimate of state funding projected to continue into the 2009-2011 biennium, it is estimated that a total of $400 million is spent by the state biennially on an ongoing basis related to Puget Sound. This includes $222 million in capital projects and grants and $178 million in operating funds.

Current federal spending directly relevant to Puget Sound protection and restoration is estimated at $171 million per year for regulatory compliance, technical assistance, and science. Of this amount, approximately $43 million is for grants for salmon recovery, as well as endangered species and watershed recovery. The federal government also spends $43 million a year on wastewater treatment, including state revolving fund grants, and an estimated $242 million on mitigation activities for federal highway, military, and Sound Transit capital projects.

Local governments play an important role in protecting water quality and habitat in Puget Sound. These efforts include: managing and/or participating in implementing watershed based salmon recovery and water quantity management plans; construction and operation of wastewater and stormwater facilities; science and technical assistance to landowners; and implementation of regulatory compliance programs through the Growth Management Act, Shoreline Management Act and local clearing and grading ordinances. Without these important efforts protection and recovery of the Sound would be significantly reduced.

Local funding directly related to Puget Sound is difficult to quantify. Based primarily upon the Washington State Auditors Local Government Financial Reporting System (LGFRS), it is estimated that the 12 Puget Sound counties and their cities spend approximately $246 million per year for protection and restoration activities primarily through storm drainage utilities and natural resource departments. Local governments spend an additional $611 million per year on managing and treating wastewater. (See Appendix for more details). It is critical that these efforts be maintained.

Addressing the short-term gap

There is both a short-term and long-term need for additional funding to implement the Action Agenda. The current economic downturn and projected budget deficit for the 2009-2011 biennium make fully funding the Action Agenda a challenge.

The current situation mandates the alignment of existing funding with Action Agenda priorities. Existing spending related to Puget Sound is not well coordinated and is often driven by the needs of a particular agency or local government rather than toward the overall recovery of the ecosystem. In the past Puget Sound recovery activities have essentially been an amalgamation of different requests without clear links to recovery of the overall ecosystem. What is proposed now is an inversion of the existing process by driving state, local, and federal dollars to actions and projects identified in the Action Agenda.

The Action Agenda also will act as a roadmap for local governments, volunteer groups, and others by providing direction on the priorities and types of projects that should be undertaken to restore Puget Sound. The Partnership will work with state agencies, the Governor's Office, the Legislature, local governments and federal agencies to identify and fund high priority activities and projects identified in or aligned with the Action Agenda.

Over time, as the Action Agenda is implemented, the Partnership will evaluate existing programs and actions to: identify those that should continue because they are producing results and aligned with the Action Agenda; identify those that should be modified to achieve greater results or better alignment; and recommend actions that could be halted because they are a lower priority or do not contribute significantly to the goals and outcomes of the Action Agenda.

The Partnership's enabling statutes (RCW 90.71.340(3)) also specifically direct the Partnership to work with state grant and loan programs to establish criteria to prohibit funding projects and activities that are in conflict with the Action Agenda. This will be a priority for the Partnership. However, to truly bring about alignment, this statute (RCW 90.71.340(4)) should be clarified to require that grant and loan programs related to Puget Sound be modified to require alignment and use of the Action Agenda in project selection.

The Partnership also will work to achieve more with existing funding by promoting the concept of targeted procurement in state grant and loan programs. Traditionally, state grant and loan programs ask local governments or other applicants to submit different types of projects for review and ranking. Another option would be to specify clearly the outcomes desired by the state (i.e. acres of wetlands protected or pounds of nitrogen reduced), and then ask project proponents to bid on the amount of money they would be willing to accept to complete the specified project. This system increases environmental benefits while reducing overall costs. Targeted procurement has been used successfully in a several other states and should be piloted in Puget Sound. (See Appendix.)

The Action Agenda also proposes an effort to spend existing mitigation dollars more effectively by establishing an in-lieu-fee mitigation program (see Question 3 D.4.2). This program has the potential to provide mitigation in a far more ecologically effective way than is currently possible. It also can provide supplemental income for private farm and forest businesses that helps them remain in business and prevents their land from being sold and divided up for more intensive, environmentally harmful uses.

2009-2011 biennium

The Partnership will focus on the following sources to address the $199 million short-term gap for the 2009-2011 biennium:

- Utilization of $30 million to $40 million in Model Toxics Control Account (MTCA)
- $20 million in 2010-11 from competitive state and federal grant sources
- $20 million per year from federal appropriations specifically to implement the Action Agenda
- $50 million in federal stimulus package to implement ready-to-go wastewater, stormwater, and habitat restoration projects
- $50 million from state general obligation bond appropriations to the Partnership or other state agencies

In addition, as allowed by statute (RCW.71.240) the Partnership has created and entered into a cooperative agreement with a nonprofit foundation to assist the Partnership in restoring Puget Sound. The Foundation for Puget Sound will help raise private funding to administer programs to engage and educate the public on Puget Sound restoration. It is hoped that this effort can generate $2 million to 3 million per biennium.

The Partnership is not proposing a new dedicated fund source for implementation of the Action Agenda in the 2009-2011 biennium. The current economic situation and lack of broad public understanding of the needs for restoring Puget Sound require that development of new revenue sources be delayed until at least the 2011-2013 biennium. We are, however, suggesting the creation of a Puget Sound improvement district in the 2009 legislative session.

Long-term finance approach

Over the long term, prioritizing and aligning current funding mechanisms will be significant. It is likely, however, that additional new resources will be needed to meet the 2020 restoration goals. For this reason the Action Agenda proposes three approaches to long-term financing of the Action Agenda: leveraging existing infrastructure funding; raising new revenue at the state, regional and federal level; and the use of financial incentives and ecosystem market-based mechanisms centered on protection and restoration of Puget Sound.

Doing more with infrastructure

The state provides significant funds for grants and loans for infrastructure improvements through the State Water Pollution Control Revolving Fund and the Public Works Trust Fund. The State Water Pollution Control Revolving Fund was capitalized through federal grants and state match. The Public Works Trust Fund is financed through portions of the Public Utility Tax, Real Estate Excise Tax, and Solid Waste Collection taxes. Both accounts also receive loan repayments that are then loaned out again. A recent

study by the U.S. EPA's Environmental Financial Advisory Board found that 27 of 50 states issued bonds against at least part of their clean water state revolving fund capital. This has allowed these states to lend from 35 percent to 160 percent more than states that do not issue bonds. This approach does have the drawback of requiring higher loan interest rates but it could provide additional capital to complete important near-term infrastructure projects. Given the current state of the financial markets this proposal should not be pursued at this time but examined for the 2011-2013 biennium.

Raising new revenues

Implementing the Action Agenda is a shared responsibility among state, federal, and local governments and requires that additional revenue be raised at all levels. Local jurisdictions have limited resources and ability to transfer resources across jurisdictions or even programmatic areas to focus on the highest priority projects and programs in the Sound. To address this concern, a regional Puget Sound improvement district should be created.

This district would be authorized by the Legislature and come into existence with an affirmative vote of counties in the district. As conceived, the Governor would appoint some members to the board of the district, but a majority would be county elected officials chosen by the participating counties. The district would be authorized to collect tax and fee revenue and allocate it to the highest priority actions and programs in the Action Agenda. District revenue would be earmarked for use in cleanup, restoration, and protection actions recommended in the Action Agenda. Specific tax and fee options would require approval by a public vote of the voters in the district. This proposal would spread costs among all benefiting local governments and allow priority projects to be implemented at a regional level. The district would contract with state agencies, counties, cities, nonprofits, and other jurisdictions and entities as appropriate to complete the necessary projects.

The exact revenue sources for the district would be determined by the district itself. In selecting revenue sources for the district, they should be evaluated based upon their ability to raise a significant amount of revenue, their link to the threats impacting Puget Sound, as well as their potential to influence actions that restore Puget Sound. Potential revenue sources that merit future investigation and would meet these criteria include: flush fee (household and business fee for sewer connection and on-site sewage systems); water use fee; and pollution discharge fees.

Puget Sound restoration is a shared responsibility, and the cost of implementation of infrastructure and other restoration projects will very likely exceed the ability of the local district authority. Additional state level sources will be needed, and potential revenue sources that merit future investigation and would meet the same criteria for local funds would include: hazardous substance tax; public utility taxes (water, sewer); flat-rate vehicle fee; and real estate excise tax.

Finally, the federal government should also play a role in contributing funding for the recovery of the nation's second largest estuary. Puget Sound is currently part of the Environmental Protection Agency's National Estuary Program. This entitles the state to approximately $600,000 each year in federal funding. In FFY 2008, Congress provided an additional $20 million critical for development and implementation of the Action Agenda. We are hopeful of receiving a similar amount in FFY 2009. Increasing federal support for cleanup and restoration can best be accomplished over the long term through a federal designation of Puget Sound under the Great Waters program. This designation would put Puget Sound on par with other

national restoration programs such as Chesapeake Bay, the California Bay Delta, and the Florida Everglades. This would be accompanied by a specific federal funding authorization for Puget Sound that would help provide a consistent level of funding for projects, science, and other Action Agenda activities. This bill was introduced during the last legislative session and securing its passage in 2009 is a major priority for the Partnership.

Expanding the use of financial incentives and ecosystem service markets

In addition to raising revenue, taxes and fees can provide economic incentives and disincentives for certain types of behavior. On a limited basis in the United States and more extensively in Europe, revenue neutral "green taxes" are being implemented to provide incentives for reducing the use of environmentally harmful materials or undertaking environmentally harmful practices while also raising revenue for environmental programs. Promising approaches related to Puget Sound include incorporating incentives into stormwater fees to encourage low impact development and/or reduce the amount of impervious surfaces, and incorporating toxicity into the assessment of water quality permit fees.

To accomplish this, the Partnership will work with the Department of Ecology and a willing city or county to develop and implement a model incentive program for stormwater fees. The first step would be to implement one to two pilots modeled on the successful city of Portland and King County incentives programs. Incentives are targeted to actions that produce improvements in stormwater source control or on-site treatment (e.g., LID, disconnection of downspouts, green streets). Incentives would be in the form of either direct payments, or pricing mechanisms, such as tiered rate structures combined with fee-bates or discounts for specified actions.

Based on the outcomes of the initial pilots, the Partnership should work with regional stakeholders to require implementation, through rule or legislation, of an incentives-based fee structure for stormwater management throughout the Puget Sound region.

Ecosystem service markets are institutions that allow the exchange of environmental credits among buyers and sellers. Most are driven by regulatory requirements, such as mitigation or water quality compliance, and most buyers are developers, industries, or utilities that need credits to address permitting requirements. Many are set up under "cap-and-trade" regulations, which cap pollutants but allow permittees to acquire credits to address their requirements. Sellers include mitigation bankers, conservation organizations, farmers, forest land owners, entrepreneurs, and government agencies that agree to produce credits through restoration or cleanup projects. While cap-and-trade programs do not work for all pollutants, particularly toxic substances, they can play a role in achieving policy objectives.

The financing strategy for the Action Agenda includes three market approaches: a) the creation of an in-lieu-fee mitigation program; b) development of a water quality trading framework; and c) implementation of a pilot program to evaluate a cap-and-trade proposal for impervious surface and shoreline armoring. Initial implementation steps for these programs involve the development of the trading platform, crediting protocols, and project implementation strategies.

There are three programs to move the use of ecosystem markets forward:

- Use the in-lieu-fee mitigation program as a way of to test ecosystem markets. This would include the creation, testing, and refinement of an umbrella banking or trading platform and institution with consistent standards for the region, to achieve better environmental results at lower cost. This

structure can then be expanded to include markets for additional resources linked to Action Agenda priorities. This approach would have the potential to create a revolving fund to meet future mitigation or restoration needs. This effort program should engage all relevant stakeholders, developers, farmers, forest land owners, and environmental organizations in order to develop a structure that works for all involved.

- Implement a pilot cap-and-trade program for removal of impervious surface and removal of shoreline armoring. The Partnership should work with Ecology and a willing city, county, or watershed group to implement two pilots – one for shoreline armoring, and one for impervious surface. An initial focus on markets that reward removal or disconnection of impervious surface and shoreline armoring will address two of the critical threats to Puget Sound health identified by the Action Agenda. These first pilots could be established in the near term, based largely on existing regulations and/or local watershed and land use planning efforts.

  Depending on how well the pilots function, similar cap-and-trade approaches would be developed in the future to provide cost-effective approaches for addressing other Action Agenda priorities, such as removal of overwater structures, derelict creosote pilings, structures in floodplains, or restoration of threatened habitats.
- Evaluate the feasibility of water quality crediting and trading. The Partnership should work with Ecology to determine the necessary components of a water quality trading program, develop a framework for defining credits, complete the evaluation of existing programs in other states to determine conditions for success, and develop a draft water quality trading model framework. The Partnership or Ecology should then work with a willing county or watershed to initiate a pilot project, which would invest in projects that generate water quality credits for purchase, in a manner similar to the in-lieu-fee mitigation program.

More details on the concept of ecosystem markets and their applicability to Puget Sound can be found in the Appendix.

Roles and responsibilities

The success of the funding strategy depends on the coordinated action of many individuals, agencies and organizations. The following is a description of the major roles for public and private partners:

Federal Government

- All agencies should identify budget priorities in consultation with the Partnership and highlight priority Action Agenda items in the annual appropriations process. Agencies should reduce funding requests for programs that are not effective in furthering Action Agenda priorities.
- The Environmental Protection Agency, in cooperation with the Partnership, should continue to allocate federal Puget Sound funds to Action Agenda priorities.
- Federal grant-making agencies, including the U.S. Fish and Wildlife Service and U.S. Army Corps of Engineers, should work with the Partnership on providing funds for Action Agenda priorities and should reduce funds that are not effective in furthering Action Agenda priorities.

- Federal agencies with capital project responsibilities, including the Federal Highway Administration, should use the Puget Sound in-lieu-fee mitigation program to fulfill mitigation needs.
- EPA should support and help fund the creation of water quality trading policy and programs in the Puget Sound region.
- The Corps of Engineers should support the creation of a Puget Sound in-lieu-fee mitigation program.

State Government

- Per existing law, all agencies should identify budget priorities in consultation with the Partnership and seek funding for priority Action Agenda items in the biannual appropriations process and reduce funding requests for programs that are not effective in implementing Action Agenda priorities.
- State grant-making agencies, including the Salmon Recovery Funding Board, the Department of Ecology and the Recreation and Conservation Office, should consult the Partnership and integrate Action Agenda priorities into grant funding.
- The Partnership should: take the lead in coordinating the implementation of the funding strategy; track progress on achieving funding goals; and modify the strategy as needed to improve performance.
- The Department of Ecology, working with the Partnership and other stakeholders, should create a water quality trading framework and policies, as well as develop the in-lieu-fee mitigation program.
- State agencies with capital project responsibilities, including the Department of Transportation, should use the Puget Sound in-lieu-fee mitigation program to fulfill mitigation needs.

Local Government

- County and city governments should support the design and establishment of a Puget Sound improvement district to collect and distribute funding for Action Agenda priorities.
- County and city governments, working with salmon and watershed recovery groups, should prioritize Action Agenda projects in local capital improvement and grant programs.
- County and city governments should modify policies and regulations as needed to support the regional in-lieu-fee and water quality trading programs.
- County and city governments should support Action Agenda priorities in state and federal budget processes.

Private Sector

- Environmental and community groups should support Action Agenda priorities in local, state, and federal appropriations processes.
- Environmental groups and land trusts should continue providing private funding for conservation and restoration projects consistent with the Action Agenda.

- Private landowners should continue to take actions on their property that are consistent with Action Agenda priorities.
- The private development community should help develop the in-lieu-fee and water quality trading programs and should participate actively in the programs once established.

Profiles of the Puget Sound Action Areas

Puget Sound is a vast and beautiful region that is also extremely diverse. The unique attributes of the Puget Sound ecosystem have created highly variable conditions in climate, habitat types, and species from alpine forests to the depths of the marine waters. Puget Sound's unique features also include diverse communities of people. This "profiles" section of the Action Agenda is focused on some of the differences across the Puget Sound region and descriptions of necessary actions that are tailored to local conditions and goals.

The action areas

The legislation that created the Puget Sound Partnership established seven geographic action areas around the Sound to address and tackle problems specific to those areas:

- Strait of Juan de Fuca
- Hood Canal
- North Central Puget Sound
- South Puget Sound
- South Central Puget Sound
- Whidbey
- San Juan/Whatcom (this region has two separate profiles)

Within each of the seven action areas there are many distinctive local features and communities. These differences are due to physical and biological conditions such as geology, rainfall, habitat for plants and animals, and the history of the people who have lived there. Each corner of Puget Sound also has its own set of issues and constraints. For example, the South Puget Sound and Hood Canal action areas are world-renowned shellfish growing areas. The areas are also subject to poor water circulation and high nutrient inputs that result in low dissolved oxygen conditions and can lead to massive fish kills. The Strait of Juan de Fuca Action Area, Whatcom County, and other rural areas struggle to retain working forests and productive agricultural lands in the face of increased development pressure. Water supply is a critical issue in the eastern Strait of Juan de Fuca and the San Juan Islands – in the Islands the resident population doubles in the summer and thousands of additional tourists visit during the season when water is the most scarce. The Whidbey Action Area contains three of the top five salmon-producing rivers in Puget Sound – the Skagit, Snohomish, and Stillaguamish; here the drastic modification to the river deltas and estuaries is particularly problematic for salmon recovery. Hood Canal and the eastern Strait of Juan de Fuca have a distinct population of chum salmon, listed as threatened, that returns in the late summer. The South Central Puget Sound Action Area contains the ports of Seattle and Tacoma, is home to approximately 3 million residents, and is the heart of the Puget Sound economy. In the South Central and North Central action areas, many ecosystem challenges result from shoreline armoring, transportation infrastructure, stormwater runoff, and other urban issues – yet these areas have important nearshore habitat for migrating salmon and other species.

The action areas all have dedicated watershed councils, local and tribal governments, communities and individuals who have already implemented many recovery projects, and have many more plans ready to go. Crafting answers to the threats facing Puget Sound must occur with the input and cooperation of the local people who have detailed knowledge of the problems and must implement the solutions.

Overview of the action area profiles

Each of the action area profiles has a narrative description and table that summarize unique ecosystem benefits and contributions, local threats to ecosystem health based on the threat categories identified in Question 2, and the strategies that move the region, as well as local areas, toward a healthy Puget Sound. The tables are not an exhaustive list of all threats or actions possible in an action area, but instead highlight key issues and actions linked to the Soundwide Action Agenda strategic priorities described in Action Agenda Question 3. Local areas have many concerns in common, such as the need for funding, technical capability, and monitoring. Although action areas have identified these as important, they may not appear in the narrative or tables in the profiles; instead, the profiles are concentrated on local issues.

How were the profiles developed?

The profiles were developed through a series of 23 community meetings and workshops held around Puget Sound in 2008. Individual citizens and local experts completed inventories of the status of the action area and what is currently being done. Local area liaisons worked with representatives of the Ecosystem Coordination Board, Leadership Council, and community leaders to refine the information in each action area profile.

All of the action areas identified needs that require Soundwide guidance and direction to improve efficiencies both locally and across the region. Implementation of the funding strategy, implementation of a coordinated monitoring program, results of Action Agenda-based watershed assessments to refine local protection and restoration strategies, more effective compliance, and common outreach messages will benefit all action areas.

Next steps for the action areas

The Partnership will work with local residents in the action areas to: better tie the local threats and strategies to Question 3 of the Action Agenda; refine the list of local threats; better link local strategies and actions to threats; set local priorities; identify effective ways to address local issues; and identify implementation responsibilities and timelines. Over time, the local priorities will be refined as we learn from these actions and better understand how they add up to ecosystem health in the Puget Sound region.

Strait of Juan de Fuca Action Area Profile

Physical description

Few rivers run north in the continental United States, but on the north Olympic Peninsula, the rivers and streams flow directly north into the Strait of Juan de Fuca. The Elwha and Dungeness are the largest river systems flowing into the Strait. The rivers and "feeder bluffs" along the Strait have contributed material to the large sand spits – Ediz Hook, which protects the Port Angeles harbor, and Dungeness Spit, the longest natural sand spit in the world. Significant streams east of the Dungeness include Jimmycomelately and Salmon/Snow creeks that flow into Sequim and Discovery bays respectively, the largest bays along the Strait. Sizeable streams west of the Elwha include the Sekiu, Hoko, and Pysht Rivers that flow primarily through public and private commercial forest. The "West End" rivers on the Peninsula receive no glacial input, little snowpack, and have a hydrology dominated by rainfall. The north Olympic Peninsula is known for its wide range of annual precipitation. Westerly portions of the Strait area receive as much as 130 inches, while the eastern "rainshadow" portion from Sequim to Port Townsend gets only 15 to 20 inches per year. High elevations in the Olympic Mountains receive 240 inches of precipitation annually, mostly as snow, and Mount Olympus at 7,965 feet has year-round glaciers. The mountainous landscape plummets to sea level on the Strait of Juan de Fuca coast, dropping from the 6,454-foot top of Mount Angeles, for example, to Ediz Hook at sea level in only 10 miles.

Providing an essential "bridge" between inner Puget Sound and the Pacific Ocean environment, the Strait of Juan de Fuca is the pathway for the exchange of incoming cool, dense, saltwater and the circulation of freshwater runoff from Puget Sound and Georgia Basin rivers. This exchange, assisted by strong ocean currents in the western Strait and intense tidal action in the eastern end, prevents the marine waters of Puget Sound from becoming stagnant. An underwater sill at Admiralty Head, near Port Townsend, inhibits some of the water circulation to Hood Canal and inner Puget Sound. Freshwater runoff makes up about 7 percent of the water volume in the Strait of Juan de Fuca and is primarily derived from the Fraser River in Canada. Surface flow in the Strait is primarily seaward, except for easterly flow along the shoreline between Port Angeles and Dungeness Spit. From Cape Flattery to Point Wilson, the Strait has a rugged and diverse shoreline of 217 linear miles.

Land use, population, and economy

The Strait Action Area is primarily forested, with most of the upper watersheds in federal, state and private parks, forest or timberland. Large upland portions of Olympic National Park are in this action area. The park is a World Heritage Site (designated in 1981 by the United Nations Educational Scientific and Cultural Organization, UNESCO, as a site "considered to be of outstanding value to humanity") and an international Biosphere Reserve (1976). Several state and local parks are popular recreational destinations; land for a new state park has been designated on the Miller Peninsula east of Sequim Bay. Elsewhere in the action area, commercial timber harvest, which was intensive from the 1920s to the 1980s, remains an important economic sector and lumber mills are actively operating in Port Angeles. More than three-quarters of the private land west of the Elwha watershed is zoned for commercial forest, and portions of the western Strait are in the third rotation for timber harvest. Agriculture is also part of the rural landscape along the Strait, with approximately 5,000 acres of irrigated farmland in the dry Sequim-Dungeness Valley. Smaller scale agriculture occurs in other scattered areas, particularly the Salt Creek area west of Port Angeles, and in the Discovery Bay watershed.

Many other economic activities in the Strait also depend directly on the Puget Sound ecosystem, and include ship-building/repair, marinas, shellfish culture and harvest, commercial and recreational fishing, and tourism. Marine transportation is hugely reliant on the Strait of Juan de Fuca, as almost all the vessels entering or leaving the seaports of Puget Sound and the Georgia Basin pass through the Strait. On an hourly basis, tankers, cargo ships, vessels loaded with grain and timber, and cruise ships transit the shipping lanes in either direction. The Port of Port Angeles is the first full-service port available to eastbound ships on the Strait, equipped for cargo and repair facilities. Ferry service from Port Angeles to Victoria operates year-round. A large retirement population, drawn by the relatively dry climate, scenic environment, and other community features, has shifted the eastern Strait economy toward more service-based activities.

The Strait region is the home of the Makah, Lower Elwha Klallam and Jamestown S'Klallam tribal reservations. The tribes utilize the area's natural resources for cultural and subsistence needs, and livelihood. Tribes with treaty-reserved harvest rights along the Strait: fish for salmon, shellfish, and other marine species; hunt; and gather berries, bark, and forest products for food, ceremonial clothing, art, and canoe-making. They also work in other area local economic sectors, including timber, health care, government services, construction, utilities, information technology, education, retail, finance, and tourism.

Unique ecosystem characteristics and assets

The Strait of Juan de Fuca is the migration and transportation corridor between Puget Sound and the Pacific Ocean for many species of fish, marine mammals, bird populations, and humans. The marine shoreline and nearshore contain the majority of Washington's coastal kelp resources. The Strait has 95 (linear) miles of floating kelp, 161 miles of non-floating kelp, and 75 miles of eelgrass. The kelp forests and eelgrass meadows provide food and cover for outbound and returning runs of salmon from all over Puget Sound, as well as birds, marine mammals, and the species they depend on. The connectivity of kelp and eelgrass habitat in the Strait is essential to the function of the Puget Sound ecosystem. Sheltered bays, beaches and more than 22 small "pocket" estuaries at the mouths of the many creeks entering the Strait also support salmon, bull trout, forage fish, and shellfish. Dungeness, Sequim, and Discovery bays are major shellfish growing areas, and other river delta areas and beaches along the Strait are popular harvesting sites. Timberland is viewed as a long-term economic and environmental asset by local residents, and timber companies have expressed their intent to continue long-term commercial forest management.

Unique populations of raptors, marine birds, Roosevelt elk, black-tailed deer, and other mammals, as well as anadromous and resident fish, are found throughout the Strait. Notable bird species include the federally protected northern spotted owl and marbled murrelet. The Strait Action Area is part of the Pacific flyway north-south migration route for many bird species. Protection Island, part of the Dungeness National Wildlife Refuge, is a critically important marine bird rookery. Approximately 70 percent of the nesting seabird population of Puget Sound and the Strait of Juan de Fuca nests on the island, which includes one of the largest nesting colonies of rhinoceros auklets in the world and the largest nesting colony of glaucous-winged gulls in Washington. The island contains one of the last two nesting colonies of tufted puffins in the Puget Sound area. About 1,000 harbor seals depend on the island for a pupping and rest area. The population of sea otters that migrates between the outer coast and the Strait has increased from the initial 59 animals reintroduced in 1969-1970 to 800 animals, but is still small enough to be highly vulnerable to a catastrophic event such as an oil spill. Olympic National Park recently reintroduced the fisher, a larger

relative of the weasel, into the uplands of the Strait Action Area. The fisher has been locally extinct for decades.

Salmon remain an important part of the economic and cultural identity of the Strait Action Area, and there are unique populations of Chinook, pink, and summer chum salmon, along with coho, steelhead, bull trout, and sea-run cutthroat trout. The rivers, nearshore, and pocket estuaries along the Strait are important areas for rearing and migration. Elwha Chinook are well-known in fishing lore for their unusually large size, and the Dungeness has two distinct pink runs that enter at different times to spawn. The summer chum populations in the eastern Strait are part of the threatened population of summer chum that spawn only in the rivers and creeks here and in the Hood Canal Action Area.

The people who live on the north Olympic Peninsula are closely linked to the natural features of the region. Committed watershed councils, marine resource committees in Clallam and Jefferson counties, and volunteer organizations such as Streamkeepers, Baywatchers, Beach Watchers, and others have been formed throughout the Strait Action Area. Numerous hands-on environmental education opportunities are present along the Strait, including the Fiero Marine Science Lab in Port Angeles, the Dungeness River Audubon Center, Olympic Park Institute, and visitor/information centers operated by Olympic National Park and Forest. The main campus of Peninsula College is located in Port Angeles, offering numerous degree and community education programs that take advantage of the college's proximity to some of the most spectacular forest, aquatic, and marine ecosystems in the world. The renowned Makah Museum in Neah Bay illustrates the traditional cultural connection between area tribes and the natural resources of Puget Sound. Olympic Discovery Trail is a popular hike/ bike/ horseback trail that also serves a growing number of bicycle commuters. The trail is the site of athletic events such as the Olympic Discovery Marathon, and will eventually extend from Port Townsend to Lake Crescent and points west. Many miles of hiking and biking trails are located in Olympic National Park and Forest, and other public lands serve as tourist destinations that bolster the local economy.

Action area status and threats

Loss of lowland fish and wildlife habitat and declining numbers of various species has occurred throughout Strait area watersheds and marine ecosystems. The status of many populations of marine birds in the Strait is poor and trends are generally downward. Many populations of salmonids, some listed as threatened under the Endangered Species Act, are declining along with populations of forage fish such as herring. The Elwha River contains two dams that completely block fish passage to more than 70 miles of pristine mainstem and tributary habitat (95 percent of the historic habitat for Elwha Chinook), and the dams have impeded water quality, quantity, and sediment transport. Disruption of the sediment supply from the Elwha (and adjacent marine bluffs) has depleted the replenishment of Ediz Hook, and major rock revetments and maintenance by the U.S. Army Corps of Engineers have been necessary to prevent the Hook from eroding. The Dungeness River and delta have been impacted from dikes, other channel modifications and extensive water withdrawals. The popularity of the Dungeness watershed for development has led to its identification as a high value, highly vulnerable area for fish and wildlife habitat protection. Many other regional rivers, streams, bays, and "pocket" estuaries have been altered by shoreline development, channelization, culverts and other changes. An estimated 14 percent of the Strait of Juan de Fuca shoreline has been modified by human activities. Marine shoreline development has also been a contributing factor to fecal coliform contamination.

Water quality problems have resulted in shellfish closures in Dungeness Bay, and a Clean Water District has been formed to implement the water quality cleanup plan. A recent inventory of farms in the Clallam County portion of the action area identified 96 horse farms that have medium to high potential impact to surface or groundwater quality. Throughout Clallam County, more than 50 percent of the medium- to high-priority farms (in need of water quality action) are 5 acres or less. Leaking septic systems or agricultural wastes were thought to be the cause of the first ever shellfish closure in Discovery Bay in 2007; although bacterial levels are improving in the bay, it remains at risk due to pollution in tributary creeks. Harmful algal blooms (HABs) create additional health risks such as Paralytic Shellfish Poisoning and Amnesic Shellfish Poisoning along the Strait, resulting in seasonal or occasional shellfish closures. Municipal systems that empty treated wastewater into the Strait of Juan de Fuca include Clallam Bay, Port Angeles, and Port Townsend. The city of Sequim has eliminated most of its marine discharge and treats wastewater to Class A levels for reuse to water park lands in Sequim. Concern has been expressed about the untreated wastewater discharged into the Strait by the city of Victoria, B.C. Several sites along the Strait contain toxic contaminants including the former Rayonier Mill site in Port Angeles, former military installations on the Makah Reservation, and municipal and tribal dumps/landfills.

As a major shipping transportation corridor for the West Coast of North America, and Washington state and British Columbia in particular, the Strait of Juan de Fuca is at risk of major damage from oil spills and other contaminants. It is estimated that more than 15 billion gallons of oil pass through the Strait annually on board tankers, barges, freighters, Navy vessels, and cruise ships. The western entrance of the Strait of Juan de Fuca from Cape Flattery to Port Angeles is the longest stretch of marine water in the nation in which tankers are not escorted by local ship pilots familiar with the waterway and the English language. Since 1999, a publicly funded response tug has been called out 40 times.

Despite the rainy reputation of the Olympic Peninsula, chronic water shortages occur throughout the Strait Action Area. The cities of Neah Bay and Port Angeles rely entirely on surface flows from area rivers for their domestic water supplies, and for mill operations in Port Angeles. The Makah Reservation has no snowpack for summer storage, and Neah Bay has had critical water shortages in recent years due to low instream flows in the Waatch River. Local residents of the action area cite the importance of the extensive forestland in keeping regional hydrology sustained. The eastern “rainshadow” end of the Strait Action Area is well-known as a water-short area. The city of Sequim relies primarily on groundwater sources that are linked to the Dungeness. An estimated 173 miles of irrigation ditches have delivered Dungeness surface waters to the Sequim-Dungeness valley for more than 100 years. The area was a pilot project for local water planning in the 1990s and voluntary water conservation by the agriculture community has substantially improved instream flows, but late summer flows remain well below the levels needed for salmon. Additionally, rising demand for residential water supply in the Sequim area and throughout the Strait region has led to the proliferation of permit-exempt wells, particularly in the eastern portion of the action area. Rules to establish minimum instream flow levels in area rivers are under discussion, but the over-appropriation of most of the surface water bodies in the eastern portion of the region has made water management strategies very challenging.

Population growth in the eastern portions of the Strait region has also resulted in significant conversion of farmland and woodlots to low-density residential development. Higher-density development is also occurring within urban growth areas driven by the same population increases. A growing voluntary “green building” program is actively being promoted, and there is increasing demand for these innovative building practices and associated products. Local governmental entities report challenges in meeting the need for

education, management and enforcement of environmental policies and regulations in the face of declining timber industry and fishing revenues, and the rural tax base.

Key strategies

The retention of working resource lands is an important environmental and economic strategy in the Strait of Juan de Fuca Action Area. Private and public entities continue the implementation and upgrading of forest management and agricultural stewardship practices. Large-scale restoration projects in the Strait include the removal of the Elwha dams within Olympic National Park, the restoration of the Dungeness River delta, continued water conservation implementation in the Dungeness, and a host of other salmon recovery projects throughout the Strait region by counties, tribes, cities, conservation districts, private landowners, and volunteer organizations. A major reconstruction of the river mouth of Jimmycomelately Creek occurred during the past decade in Sequim Bay, and another river delta restoration project is in progress in Discovery Bay. Multiple economic and environmental benefits are anticipated from the cleanup of the former mill site and re-development of the Port Angeles waterfront. Land conversion in the Strait Action Area remains a major challenge, and several priority action area strategies are intended to cope with stormwater, shoreline development, water use, roads, septic systems, solid waste disposal, aquifer protection and related developmental impacts. Funding and staff capacities in this largely rural action area have been limited, but the many committed public and private entities in the Strait have developed clean-up and restoration plans they are eager to implement.

Strait of Juan de Fuca Action Area						
Land (# acres)	**% impervious surface**	**Urban Growth Area Incorp. + Unincorp.**		**% of land that is publicly owned**	**Marine shoreline # linear feet**	**Marine shoreline % modified**
		# acres	%			
776,120	2%	19,058	2%	68%	1,089,319	14%

Projected population change for Strait of Juan de Fuca Action Area counties			
County	**2000 Census**	**2025 Projection**	**% change**
Clallam	64,179	78,884	23%
Jefferson	26,299	40,769	55%
Notes: Based on data from WA OFM, medium growth projection for 2025. Specific population data is not yet available by action area. Portions of Jefferson County are located in the Hood Canal Action Area. A small portion of Clallam County, consisting of federal government forestland and park land, is located in the Hood Canal Action Area.			

Strait of Juan de Fuca Action Area

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority action area strategies

Unique species
• Rare and unique upland species of birds, plants, and animals
• Summer chum salmon spawn only in eastern Strait of Juan de Fuca and Hood Canal tributaries
 	
Unique habitat type and ecosystem processes
• Marine/estuary: Exchange of fresh and marine waters helps keep Puget Sound from becoming stagnant
• Marine/estuary: Migration corridor for fish, bird and marine mammal species
• Marine/estuary: Protection Island is marine mammal haul-out area and Puget Sound's major marine bird rookery
• Upland: Intact forests in and around Olympic National Park, Forest, and Wilderness Areas
 	
Food and timber (harvest)
• Timber and pulp production
• Non-timber products (cultural and commercial materials for basketry, carving, and floral arrangements)
• Agricultural production with an extended growing season because of low precipitation conditions
• Shellfish production
• Commercial, recreational, and tribal fishing
• Hatcheries provide harvest opportunities and population stability while wild salmon stocks rebuild: Elwha spring Chinook, Dungeness spring Chinook, Dungeness pink salmon
 	
Recreation and tourism
• Olympic National Park and Forest, Dungeness National Wildlife Refuge, Olympic Discovery Trail, Highway 112 Scenic Byway
 	
Community and economy
• Rural communities
• Favorable climate conditions draws retirees to reside in area
• Marine vessel passage, shipping and marine trades
• Jamestown S'Klallam Tribe
• Lower Elwha Klallam Tribe
• Makah Tribe
	Habitat alteration
	• **Marine/estuary**: Loss of estuary habitat and pocket estuaries; derelict fishing gear
	• **Marine nearshore**: 14% of shoreline modified stretching from Point Wilson to Elwha; 1439 overwater structures; 1.8 miles of railroad along marine shoreline
	• **Freshwater**: Blocked habitat in over 70 miles of river mainstem and tributaries; 95% of historic Chinook habitat blocked by Elwha Dam system; disruption of river processes through dikes, loss of large woody debris and spawning gravels, riparian development, vegetation removal, and some forest practices
	• **Upland**: Loss of working farms and forests through conversion
	
	Pollution
	• **Toxics**: Port Angeles Harbor contamination, including Rayonier Mill site contamination; contamination from Warmhouse Beach Open Dump site threatens human health, water quality, and shellfish areas; threats from oil spills and other contaminants due to high marine transportation rates
	• **Bacterial pollution**: High levels of pathogen contamination in lower Dungeness River (including independent streams) and Dungeness and Discovery bays resulting in shellfish bed closures
	• **Surface water runoff impacts**: Combined Sewer Overflow events (69 in 2007); point and non-point sources of pollutants
	
	Freshwater resources
	• Limited water availability for people, farms, and fish: Low summer (and some year round) flows in WRIA 17, 18, 19; extreme high flows in WRIA 18 & 19; critical freshwater shortages in Neah Bay; many instream flow rules not established
	• Alteration of surface hydrology**:** Major alteration of flows in Elwha and Dungeness Rivers
	
	Invasive species
	• Potential negative ecological impacts on native populations: Japanese knotweed, European bittersweet, reed canary grass, and butterfly bush infestations along riparian corridors; Japanese oyster drill, tunicates, and green crab, Spartina in marine waters
	
	Artificial propagation
	• Fish hatcheries: Potential negative ecological and genetic impacts on natural salmon and other hatchery populations; Finfish aquaculture: Effects of existing and potential expansion of finfish aquaculture requires investigation; Shellfish production: Not identified as a local issue
	
	Harvest
	• Fishing and bycatch: Strait salmon runs are heavily impacted by Canadian harvest; Logging and hunting practices: Local pressures need to be identified
	
	Localized climate change impact
	• Sea level rise: Predicted loss of tidal flats, complete loss of Dungeness Spit, loss of 58% of estuarine and marine shoreline beaches
	• Changes in hydrology due to loss of permanent snowfields and glaciers
	• Ocean acidification: Proximity to ocean could impact local ecosystem
	
	Other
	• Population increase by 2025: 23% in Clallam County (more than 14,000 people) and 55% in Jefferson County (more than 14,000 people)
	• Harmful algae blooms: localized occurrences of seasonal or occasional shellfish area closures from paralytic shellfish poisoning and amnesic shellfish poisoning
		A: Protect intact ecosystem processes, structures, and functions
		• Protect high value habitat: Acquire priority habitats identified in the Salmon Recovery Plan
		• Update and implement regulatory programs: Critical Area Ordinance (Sequim); Shoreline Master Programs (Clallam County, Port Angeles, Sequim, Jefferson County)
		• Protect and conserve water flows: Establish and enforce instream flow rules for WRIA 17, 18, 19; complete and/or implement 2514 plans; improve aquifer resources in the Dungeness and other flow limited basins
		• Protect and support long-term stewardship of working farms, forests and shellfish farms
		
		B: Restore ecosystem processes, structures, and functions
		• Implement priority ecosystem restoration projects:
		  o Complete Elwha River Ecosystem Recovery efforts and associated projects
		  o Implement Salmon Recovery Plans and multi-species strategies through the three-year work plans, including: Puget Sound Chinook, Eastern Strait of Juan de Fuca/Hood Canal Summer Chum, bull trout
		  o Implement existing county Marine Resource Plans
		  o Implement Forest Practices Habitat Conservation Plans
		  o Implement Road Maintenance and Abandonment Plans on private and public lands
		  o Implement Conservation District Work Plans
		  o Implement Dungeness River management plans
		• Clean up and restore the Port Angeles Harbor and waterfront; update and implement the Harbor Resource Management Plan for ecosystem restoration, development and redevelopment; identify local lead
		
		C: Reduce the sources of water pollution
		• Prevent pollution: Implement Sequim-Dungeness and East Jefferson Clean Water District Strategies to address TMDLs and shellfish downgrades; enhance capacity to address and mitigate threats and impacts from marine vessel traffic including a permanent tug at Neah Bay and oil spill response capacity for the Makah tribe
		• Manage stormwater runoff: Implement NPDES permits; update and implement Stormwater Management Plans and Codes (Clallam County, Sequim); reduce CSO events (Port Angeles)
		• Upgrade and manage wastewater treatment plants: Implement Carlsborg Urban Growth Area Wastewater Treatment and Water Reuse strategy
		• Manage on-site sewage systems: Implement Clallam and Jefferson counties on-site sewage management programs
		• Prioritize and implement inwater and upland toxic cleanup sites: Clean up and restore Port Angeles Harbor Baywide toxic sites, including the Rayonier Mill site; close and remediate the Makah Tribe Warmhouse Beach Open Dump and develop a solid waste transfer and reuse facility; investigate and remediate where necessary the impact of contaminants leaching form the Port Angeles Landfill
		
		D: Work effectively and efficiently together on priority actions
		• Coordinated long-term strategy:
		  o Coordinate planning and implementation: Start with shorelines, land use, and water supply planning
		  o Coordinate protection and restoration actions identified in major plans: Start with salmon recovery, water supply (quantity and quality), and county Marine Resource Plans
		
		E: Implement the Action Agenda
		• Outreach and education: Implement stewardship and outreach programs and provide technical assistance focused on protection and prevention with residents and tourists

Hood Canal Action Area Profile

Physical description

Named for British Admiral Lord Samuel Hood in 1792[1], Hood Canal is a long, narrow, L-shaped fjord that separates the Olympic and Kitsap peninsulas. The marine water body, Hood Canal, extends southward from Foulweather Bluff, at the northern tip of the Kitsap Peninsula, and Tala Point to its southern terminus at Lynch Cove, and is approximately 68 miles long and 1.5 to 2 miles wide. The Hood Canal Action Area includes the Canal itself, the uplands and streams that enter into it from both sides, and extends north to Point Wilson in the city of Port Townsend. Although the average depth of Hood Canal is 177 feet, the underwater topography can be as deep as 600 feet. Marine water circulation in Hood Canal is naturally poor, particularly in the southern 20 miles. A relatively shallow, underwater sill south of the Hood Canal Bridge limits water exchange with incoming ocean water from the Strait of Juan de Fuca. Hood Canal also has poor vertical mixing as fresh water entering from rivers and streams can form a distinct layer at the surface. Dense algal blooms die off, sink, and decay – reducing the dissolved oxygen in deeper layers and degrading water quality for many marine species.

On the Olympic Peninsula side of the Hood Canal Action Area, major rivers including the Skokomish, Dosewallips, Duckabush, Hama Hama, and Big Quilcene drop rapidly from the Olympic Mountains, while smaller streams such as the Dewatto and Tahuya flow from the west side of the Kitsap Peninsula. Unlike the rivers are fed by snowpack in the Olympic Mountains, the east side streams are fed primarily by runoff. Because of the rainshadow of the Olympic Mountains, precipitation in the Hood Canal Action Area varies from 90 inches annually at Skokomish, to only 19 inches in Port Townsend. Snowpack in the eastern Olympics is highly variable and often much less than that on the west side of the Olympics, also because of the rainshadow.

Land use, population, and economy

The overall human population density of the Hood Canal Action Area is low, as the majority of the estimated 50,000 residents of the area live in a few populated centers and along portions of the shoreline. The bulk of the land base is managed as private and public forestland and sustainable timber harvest is expected to continue on commercial forest lands (public and private). From Quilcene south, the shorelines along the west side of Hood Canal are in close proximity to Olympic National Forest and Park, and the narrow fringe of land along the shoreline supports the major road network and population centers. This area is a popular destination for seasonal summer residents. The dry climate in the northern rainshadow portion of the action area near Port Townsend, Port Ludlow, and Chimacum has attracted a growing retirement population, along with service-oriented economic activities. The Port Townsend Paper Mill is the largest single employer in Jefferson County, with 315 employees; it has been operating since 1928. The mill made substantial investments into the facility between 2000 and 2006 to meet Maximum Achievable Control Technology pollution standards. Both the mill and the city of Port Townsend are supplied by the Big and Little Quilcene rivers. Marine services are another major employment sector in the action area. The Port of Port Townsend operates the marina, boatyard, and commercial and recreational haul out facilities.

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[1] Originally named Hood's Canal or Hood's Channel by Captain George Vancouver, the name was officially designated Hood Canal in 1932 by the U.S. Geographic Board. Hood himself never visited the region, serving in the West Indies, the American War for Independence (1781), and conflicts with France.

The U.S. Navy Submarine Base at Bangor is the largest industry and development on the east side of the Hood Canal shoreline. The Navy also operates a munitions-handling facility on Indian Island. Populated centers in west Kitsap County include Seabeck, Holly, and Port Gamble. Two tribal reservations are located in the Hood Canal Action Area – the Port Gamble S'Klallam Reservation in the north and the Skokomish Reservation in the south. These two tribes, as well as the Jamestown S'Klallam, Lower Elwha Klallam, and Suquamish tribes, retain treaty rights in the Hood Canal Action Area for hunting, fishing, and gathering. Tribal and non-tribal commercial, recreational, and subsistence fisheries occur for salmon, spot prawn, Dungeness crab, clams and oysters, and geoduck. Rockfish and flatfish are no longer fishable because of low dissolved oxygen problems. Though impacted by the dissolved oxygen problems and other modifications to rivers and shorelines, fisheries and aquaculture remain economically significant to the Hood Canal region.

The Hood Canal Bridge, the third-longest floating bridge in the world, is a critical transportation link between the Kitsap and Olympic peninsulas. The ferry link on state Route 20 between Port Townsend and Whidbey Island has been periodically disrupted in the last year because of vessel wear and the lack of alternate vessel availability. State Highway 101 is the only north-south transportation corridor along the west side of the Canal, crossing most of the major river deltas and connecting the population centers such as Quilcene, Brinnon, Hoodsport, and the Skokomish Valley. The proximity to Olympic National Park and Forest, cultural attractions in Port Townsend and Union, and hunting, fishing, and camping opportunities have generated a significant tourism industry, as well as the proliferation of recreational homes. The Hood Canal Action Area also has a number of commercial and recreational farms, and the movement toward more localized food production has created markets for local produce, flowers, and other agricultural products.

Unique ecosystem characteristics and assets

Hood Canal is famous for its shellfish. As you drive along the Canal, you pass taverns and restaurants named for oysters and geoduck – revealing the local identity that is associated with the prime growing conditions for shellfish species in Hood Canal. Rivers flowing from the Olympics mix with brackish waters at ideal temperature and water conditions that support some of the largest shellfish hatcheries in the world. The native Olympia oysters of Hood Canal were largely overharvested by 1870. Oyster growers introduced the larger, faster-growing Pacific oysters to compensate, and shellfish farms were staked out throughout Hood Canal. Today the oysters of Hood Canal are internationally famous, and connoisseurs identify them by place names including Quilcene, Dabob, and Hama Hama – much like fine wines from specific regions and vineyards. Oysters and other bivalve species are filter feeders, processing hundred of gallons of water daily, and are thus highly vulnerable to pollutants and toxic contaminants. Despite this vulnerability, shellfish populations in Hood Canal are healthy in most locations. Shellfish growers, tribes and the state of Washington cooperate to monitor water quality to ensure public health protection. Shellfish beds are closed to harvest when pollution or toxic algal blooms are present.

The Hood Canal Action Area is home to a number of other important and unique marine and upland species. An "evolutionarily significant unit" of chum salmon that return in the summer spawn only in the rivers and creeks of the Hood Canal and eastern Strait of Juan de Fuca action areas. Other populations of chum, coho, pink, and Chinook salmon spawn, rear, and migrate in the Hood Canal Action Area, along with steelhead trout, bull trout, and sea-run cutthroat trout. Many of these salmonid species spend a large part of their early lives in the estuary, and water quality conditions in the Canal itself are essential to their continued survival. Hatchery supplementation programs for several salmon species are operated in Hood

Canal tributaries by the U.S. Fish and Wildlife Service, area tribes, DFW, and private organizations. Hood Canal is also used by marine mammals, and orcas enter the Canal periodically in search of prey. Some of the seal species that are present in the Hood Canal Action Area have unusual timing periods for birthing and pupping. The close proximity of dense, contiguous forest areas to the marine shoreline provides unique habitats for many bird species and mammals. Herds of elk are present in the lowland areas of the eastern Olympics year-round.

The natural beauty and warm summer water conditions of the Canal draw many visitors for boating, sailing, water-skiing, swimming, and diving. Year-round and seasonal residents and visitors work hard to understand the physical and biological conditions that affect Hood Canal, and promote activities to restore Hood Canal's water quality, species, and other ecosystem features. The Hood Canal Coordinating Council, a consortium of tribal and local governments along the Canal, has been collaborating on regional policy and projects in the Canal since 1985. Several other organizations and individuals such as the Hood Canal Salmon Enhancement Group, watershed planning units, local health districts, Hood Canal Watershed Education Network, the port districts, state agency staff, and committed volunteers throughout the Canal monitor water quality, conduct salmon restoration projects, clean up marine debris, and work to eradicate invasive species. Many educational activities are coordinated by the Wooden Boat School, Northwest Maritime Association, Marine Science Center, and WSU Extension Service.

Action area status and threats

The combination of warm water, poor mixing, and limited flow in and out of the Canal spells trouble for many marine species. Seasonal weather effects, such as prolonged winds from the south, trigger upwelling that drives water with low dissolved oxygen to the surface, trapping and suffocating fish and invertebrate species. This low dissolved oxygen condition, known as "hypoxia," has killed rockfish, sharks, sculpins, sea stars, crab, octopi, perch, lingcod, prawns, anemones, and krill – and has impacted fishing and aquaculture operations. Although some of the hypoxia problem is due to the natural topography and circulation processes in the Canal, it has been exacerbated by human activities. Nutrient input from septic systems, forest conversion to nitrogen-fixing alder trees, and agricultural input increase the intensity, duration, and frequency of algal blooms and make conditions worse. The Hood Canal Dissolved Oxygen Program has been coordinated for several years by the University of Washington, the Hood Canal Salmon Enhancement Group, and others to monitor and analyze the causes of hypoxia, work on corrective actions, and inform the citizens living around and recreating in the Canal. Current findings are posted on its Web site.

Natural bacteria in Hood Canal associated with mudflats and warm water affect seasonal oyster edibility, but pathogens from human and animal waste, marine mammals, and birds are also considered to be contributing factors. Harmful algal blooms seasonally affect shellfish consumption in the northern portion of Hood Canal (north of Seabeck).

Throughout the Hood Canal Action Area, the shoreline has been developed for summer cabins and year-round residences with associated septic systems, docks, bulkheads, shoreline armoring and vegetation removal. Although only 2 percent of the action area is incorporated or included in an Urban Growth Area, an estimated 27 percent of the Hood Canal Action Area shoreline has been modified. Inland lakes also have significant shoreline residential development. Roadways along the Hood Canal marine shoreline traverse many creeks and river mouths, and bridges, culverts, and fill have removed or modified saltmarsh habitat and altered shoreline sediment dynamics. Approximately 22 percent of the Hood Canal Action Area marine shoreline is constrained by state highway right of way; there are 60 miles of state highway alone

that are located within 1,500 feet of the nearshore. In addition to roads, culverts, and bridges, levees and drainage systems were installed more than a century ago to convert some of the flat deltas to farmland. These structures have cut off rivers from floodway channels and estuary sloughs. Lowland areas of the Skokomish River valley are subjected to frequent and sometimes severe flood events as the river has limited pathways to discharge its flood waters.

Freshwater resources in the Hood Canal Action Area are limited, particularly in the northern portion of the action area where precipitation is low, and some of the major river systems have been dramatically altered. The north fork of the Skokomish River is entirely blocked to fish passage by the Cushman Dam, which generates power for the city of Tacoma. The south fork runs completely dry in the summer and early fall because of channel sedimentation, blocking all anadromous fish passage. Water diversions from Hood Canal Action Area rivers also supply power and/or water for the cities of Bremerton, Lilliwaup, and Port Townsend. Much of the action area population is supplied by water from wells and local aquifers are small, thin, discontinuous, and susceptible to saltwater intrusion, droughts, and impacts from development. The demand for water for residential development and small and commercial agriculture, as well as the need to sustain flow levels for fisheries, have been highly competitive; efforts to create new water management rules have been subject to controversy and delay in parts of the action area.

Historically, forest practices and the removal of large woody debris damaged stream habitat for salmon and increased sedimentation downstream. Logging and forest access roads remain problematic in some locations. Many forested and former agricultural areas in the Hood Canal Action Area are undergoing land conversion to residential development, and stepped-up efforts for wastewater treatment and stormwater management are frequently cited as an emerging need. Other impacts to the action area include major areas of gravel extraction (existing and proposed), and the ship traffic and ongoing operations of the Bangor submarine base and the naval facilities at Indian Island. Recent infestations of tunicates are being aggressively eradicated, as these invasive species have the potential to wreak havoc with the local shellfish industry as well as clog the surface areas of docks and vessels. Toxic algal blooms have also closed public access to some lakes in east Jefferson County.

Key strategies

The Hood Canal Action Area has some important large tracts of habitat that remain relatively intact and highly functional, and regulatory and acquisition programs are part of an overall protection strategy. The region is committed to finding and implementing solutions to the dissolved oxygen problem in Hood Canal by reducing nutrient and bacterial loads. Several plans such as the Kitsap Environmental Health Pollution Identification and Correction program, and Shellfish Protection District plans are ready or have already begun implementation. Sewage treatment system upgrades and facilities have been proposed for Belfair, Skokomish/Potlatch/ Hoodsport, Port Hadlock, Paradise Bay, Dosewallips State Park, and Brinnon. On-site septic programs are also proposed, as well as the establishment of no-discharge zones for vessels. Although freshwater resources are an ongoing pressure, rule-making efforts and watershed planning are continuing. Chimacum Creek and other area streams have been the focus of volunteer and cooperative restoration programs. Large scale restoration projects are under investigation for the Skokomish and Big Quilcene River deltas. The implementation of the Hood Canal Summer Chum recovery plan is a major focus of the Hood Canal Coordinating Council, cooperating governments, and volunteer organizations. Continued collaboration of local and tribal governments and the Coordinating Council is an essential component of the action area strategy.

Hood Canal Action Area						
Land (# acres)	% impervious surface	Urban Growth Area Incorp. + Unincorp.		% of land that is publicly owned	Marine shoreline # linear feet	Marine shoreline % modified
		# acres	%			
721,075	1%	13,320	2%	62%	1,669,669	27%

Projected population change for Hood Canal Action Area counties			
County	2000 Census	2025 Projection	% change
Jefferson	26,299	40,769	55%
Kitsap	231,969	299,073	29%
Mason	49,405	75,018	52%
Notes: Based on data from WA OFM, medium growth projection for 2025. Specific population data is not yet available by action area. Portions of all three counties are located in other action areas. A small portion of Clallam County, consisting of federal government forestland and park land, is located in this action area.			

Hood Canal Action Area

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority action area strategies

Unique species
• Unique summer chum salmon stock spawns only in Hood Canal and eastern Strait of Juan de Fuca
 	
Unique habitat type and ecosystem processes
• Skokomish River is largest salmon producing river in West Sound
• Marine/estuary: Migration corridor for fish, bird and marine mammal species along nearshore
• Marine/estuary: Exchange and mixing of fresh and marine waters, including Admiralty Inlet
• Upland: Intact forests in and around Olympic National Park, Forest, and Wilderness Areas
 	
Freshwater resources
• Water and/or hydropower supply for city of Bremerton, city of Port Townsend, city of Tacoma, eastern communities of Kitsap County
• Groundwater wells for upland communities
 	
Food and timber (harvest)
• Timber, pulp and secondary forest product production
• Internationally renowned oysters
• Agricultural production with an extended growing season, specialty farming
• Commercial, recreational and tribal fishing and shellfishing including salmon and trout, geoduck, oysters, clams, Dungeness crab and Spot Prawn
• Hatcheries provide harvest opportunities and population stability while wild salmon stocks rebuild (Summer chum salmon; reintroduction of spring Chinook and other species to North Fork Skokomish)
 	
Recreation and tourism
• Boating, sailing, water skiing, diving, hunting, birding, kayaking, sportfishing, Olympic National Park, state and local parks
• Seasonal residences
 	
Community and economy
• Hood Canal Bridge provides transportation linkage between Kitsap and Olympic peninsulas
• Rural communities
• Marine trades and marine vessel passage
• Homeland security: U.S. Navy Submarine Base at Bangor and Naval Munitions Center at Indian Island
• Ferry service links to eastern parts of Puget Sound
• Port Gamble S'Klallam Tribe
• Skokomish Tribe
	Habitat alteration
	• **Marine/estuary:** Loss of estuary habitat and pocket estuaries; loss of recreational, tribal, and commercial shellfish beds through habitat modifications; derelict fish gear in some locations
	• **Marine nearshore**: Disruption of marine shoreline processes from roads, homes, and shoreline armoring that have altered sediment supply, vegetation, water quality and freshwater inputs
	• **Freshwater**: Blocked habitat including North Fork of Skokomish blocked by Cushman dam, South Fork seasonally blocked by habitat degradation and multiple culverts; loss of floodplain processes and functions due to decreased flood storage capacity; sediment aggradation; loss of wetlands, altered floodplain connectivity, hydrology, channel network, and riparian area, loss of channel function by simplification and wood removal; increased sedimentation and altered hydrology from poorly maintained or abandoned logging roads
	• **Upland**: Loss of working farms and forests through conversion
	
	Pollution
	• **Toxics**: Industrial pollution from mill site in Port Gamble Bay
	• **Bacterial pollution and pathogens**: loadings from human and animal waste lead to shellfish and recreational swimming beach closures
	• **Nutrient loading**: significant low dissolved oxygen conditions
	• **Surface water runoff impacts**: Impervious surfaces and pollutants from stormwater and some agricultural and forestry practices
	
	Freshwater resources
	• Major alterations in flows: Union, Skokomish, Big and Little Quilcene rivers
	• Limited water availability for people, farms and fish: year round low flows, seasonal low flows, and extreme high flows in all Hood Canal WRIAs; many instream flows not established
	
	Invasive species
	• Negative ecological impacts on native populations, marine and riparian ecosystem processes: Invasive tunicates, Japanese knotweed, reed canary grass, giant hogweed, yellow flag iris, purple loosestrife and European bittersweet
	
	Artificial propagation
	• Fish hatcheries: Salmon production has potential negative ecological and genetic impacts on natural populations and other hatchery populations, replacement of indigenous populations by introduced strains from out of the basin may compromise ability to develop viable, locally adapted populations; Shellfish production: not identified as a local issue
	
	Harvest
	• Fishing and bycatch, logging and hunting practices: Local pressures need to be identified
	
	Localized climate change impacts
	• Sea level rise: loss of estuarine beaches, increased shoreline flooding
	• Reduction in glaciers and snowfields and associated hydrologic impacts
	
	Other
	• Harmful algal blooms, biotoxin and pathogen outbreaks
	• Conflicting use values of marine shorelines
	• Increase in population by 2025: 35% (more than 100,000 people) in Kitsap, Mason and Jefferson counties
		A: Protect intact ecosystem processes, structures and functions
		• Growth and development: Implement local portions of Puget Sound Regional Council Vision 2040 Plan
		• Protect high value habitat: Acquire high priority marine and freshwater habitat identified in salmon recovery and other local plans; develop local acquisition strategy
		• Update and implement regulatory programs: Shoreline Master Program (Mason, Jefferson and Kitsap counties); Critical Area Ordinance (Mason County)
		• Protect and conserve stream flows: Establish or update and implement instream flow rules for WRIA 14b, 15, 16, 17; complete and or implement Watershed Plans for WRIA 14b, 16, 17
		• Protect and support long-term stewardship of working farms, forests, and shellfish farms, notably on the Tahuya Peninsula and east Jefferson County
		
		B: Restore ecosystem processes, structures and functions
		• Implement priority ecosystem restoration projects:
		  ○ Implement species recovery plans including: Hood Canal Summer Chum, Skokomish Chinook, mid-Hood Canal Chinook and Bull Trout; implement in coordination with the Shoreline Master Program restoration plans and the three-year work plans
		  ○ Complete Skokomish River Ecosystem Restoration and Flood Damage Reduction Study; complete Skokomish River and Quilcene delta restoration projects
		  ○ Implement Forest Practices Habitat Conservation Plans; implement Road Maintenance and Abandonment Plans; decommission or maintain USFS roads; implement Conservation District work plans; implement county Marine Resource Plans
		  ○ Strategically remove derelict fishing gear
		
		C: Reduce sources of water pollution
		• Prevent pollution:
		  ○ Establish and implement a Pollution Identification and Correction Program in Jefferson and Mason counties, Port Gamble S'Klallam and Skokomish tribes; continue program in Kitsap county
		  ○ Develop and implement Watershed Management Plans and 303d category 4b plans
		  ○ Implement shellfish protection district plans: (East Jefferson, Annas Bay, Lower Hood Canal)
		  ○ Investigate, and if appropriate, implement Hood Canal as a No Discharge Zone for boats
		  ○ Investigate opportunities for water reuse at existing and future sewage treatment facilities
		• Manage stormwater runoff: Update and implement Stormwater Management Plans and Codes (Mason, Jefferson, Kitsap counties, Port Townsend, Port Gamble S'Klallam and Skokomish tribes); expand use of LID techniques; implement strategic retrofits
		• Upgrade and manage wastewater treatment plants: Complete planned sewer projects for Belfair, Skokomish/Potlach/Hoodsport, Port Hadlock, Paradise Bay, Dosewallips State Park, and Brinnon public facilities
		• Manage on-site sewage systems: Update and implement on-site sewage system management plans and regulations; address poorly functioning systems through the action area
		• Prioritize inwater and upland toxic cleanup sites: Clean up industrial pollution in Port Gamble bay
		
		D: Work effectively and efficiently together on priority actions
		• Coordinated long-term strategy:
		  ○ Hood Canal Coordinating Council and Hood Canal Dissolved Oxygen Program to work collaboratively to develop and implement actions to respond to research findings from the Hood Canal Dissolved Oxygen Program
		  ○ Improve coordination and collaboration of watershed and marine groups to improve implementation efficiency and effectiveness; synthesize existing recommendations
		  ○ Integrate and prioritize project needs for ecosystem processes, structure, and function
		
		E: Implement the Action Agenda
		• Science program: Continue Hood Canal dissolved oxygen research; establish ambient water quality and quantity monitoring programs for surface and ground water
		• Education and outreach: Develop a coordinated local education and outreach strategy

North Central Puget Sound Action Area Profile

Physical description

With more than 1 million linear feet of shoreline, and extensive bluffs, pocket estuaries, protected bays, harbors, and lagoons, the North Central Action Area has been the delight of beach dwellers and mariners for thousands of years. Steep bluffs along the coastline provide a supply of sediment that drifts along the shore, building beaches and forming spits, lagoons, deltas, and tideflats. The Gig Harbor Peninsula has steep bluffs along three sides, especially along the Tacoma Narrows. Although much of the North Central Action Area is relatively protected from wind and waves, the east side of Bainbridge Island, Port Madison, and (of course) Foulweather Bluff are exposed to high wind and wave energy.

Bainbridge Island, approximately 5 miles wide by 10 miles long, is one of the largest islands in Puget Sound and has 53 miles of shoreline. Agate Passage and Rich Passage are characterized by high currents due to the circulation of Puget Sound tides through these narrow openings. In the upland areas, a complex connected set of lakes, springs, streams, and swamp-like wetlands characterize the region's freshwater system and produce the insect populations enjoyed by salmon and other fish and wildlife species. Practically all of the precipitation in this region falls as rain. The northern tip of the Kitsap Peninsula is the driest area, with 30 annual inches, while Green and Gold mountains (elevation 1,700 ft.) receive approximately 70 inches. Temperatures rarely drop below freezing, thus the only water sources come from precipitation; and there is no water supply from snowpack as there is in the Olympic or Cascade mountain ranges.

Land use, population, and economy

In 1900, Port Blakely on the southern end of Bainbridge Island was the site of the largest lumber mill in the world. Founded by sea captain William Renton in 1864, the mill shipped lumber to California, Australia, Europe, and the eastern United States. The sawmill branched into shipbuilding in the early 1900s. By 1923 the mill was closed forever and the area became a ghost town. Today the mill site has scattered suburban cottages and some permanent homes. The transformation of Port Blakely is fairly typical of the environmental and social history of the North Central Puget Sound Action Area. Accessible forests were harvested in the late 19th century until natural resource and economic conditions necessitated a transition to other industries, and residential development spread along the marine shoreline.

North central Puget Sound's ports are important centers for commerce, military installations, and as critical hubs for marine transportation. Cross-sound commuting began centuries ago as canoes paddled by the Suquamish, Duwamish and Puyallup people travelled frequently between the Kitsap Peninsula and Elliott and Commencement bays. The "Mosquito Fleet" of small steamers in the early 20th century eventually gave way to modern auto ferries. Today more than half of the 25 million annual passengers on the Washington State Ferries system travel back and forth across Puget Sound from the east side of Kitsap County. Bainbridge Island hosts the ferry system's maintenance and repair facility. Recreational vessels are moored throughout the North Central Action Area; more than 2,000 permanent and transient slips are located at marinas at Kingston, Bainbridge Island, Bremerton, Poulsbo, Port Orchard, Brownsville, and the Gig Harbor area. Other recreational amenities of the region include several state and local parks suitable for boat launching, beach walking, kite flying, bird watching, picnicking and kayaking. Bridges at Agate Passage and the Tacoma Narrows link the North Central Action Area to other parts of Puget Sound.

The United States' military presence in north central Puget Sound began in the 1880s when Port Orchard was selected as a repair facility to support naval operations in the Pacific Ocean; and since then the region has played a pivotal role for military operations in several wars and conflicts. The Puget Sound Naval Shipyard in Bremerton was founded in 1891, and is currently the largest employer in the North Central Action Area. The Manchester refueling station was built in 1938. The Keyport Naval Undersea Warfare Center, located on Liberty Bay since 1914, actively supports undersea activities of the U.S. Naval fleet around the world.

The Port Madison Indian Reservation is the center of the Suquamish tribal community, and the houses within the reservation are clustered in the villages of Suquamish and Indianola. Incorporated cities in the North Central Action Area include Bainbridge Island (population 23,000), Port Orchard (8,500), Poulsbo (7,500), and Gig Harbor (6,800). Bremerton has a population of 36,000 and is the largest city in the action area. Incorporated cities and Urban Growth Areas make up 44 percent of the land base.

Unique ecosystem characteristics and assets

The east side of the Kitsap Peninsula constitutes almost half of the nearshore habitat in central and south Puget Sound marine waters. It is estimated that 50 or more pocket estuaries are present in the North Central Action Area, with 17 of them at Port Madison and Sinclair Inlet. Overhanging vegetation along 27 percent of the shoreline provides cover for many species and populations of salmon from around the central and southern basins of Puget Sound. The salmon use the North Central nearshore area for refuge, resting, and feeding on their way to and from the ocean. An assessment of freshwater habitat for Puget Sound salmon recommended the designation of 13 local watersheds as salmon refuges. Parts of two watersheds are currently protected – the Gorst Creek watershed for municipal water source and the Chico Creek watershed for old-growth forest habitat. North Central streams are used by chum, coho and pink salmon, steelhead, and cutthroat trout. Chinook salmon from south and central Puget Sound use the nearshore for a refuge and occasionally stray into local streams. Hatchery programs operated by the Suquamish Tribe provide some harvest opportunities for their fishers and other regional anglers.

Action area status and threats

Bacterial contamination of the fresh and marine waters in the North Central Action Area is a top pollution problem for the region, and 25 water bodies are considered to be "impaired" on the Washington State/Clean Water Act Section 303(d) list. Shellfish beds have been restricted or closed in Dyes Inlet, Liberty Bay, Port Orchard Bay, Burley Lagoon and other parts of the action area. The Kitsap County Health District–Environmental Health Program has conducted a Pollution Identification and Correction (PIC) analysis of several watersheds that have exhibited high counts of fecal coliform bacteria to identify sources and take corrective actions.

Portions of the North Central Puget Sound Action Area are undergoing rapid conversion from rural forest and agriculture to an urban/suburban landscape resulting in habitat that has become fragmented, paved, or degraded. Stormwater runoff and human and animal wastes threaten the quality of water, the patterns of streamflow, and the availability of groundwater for human use. In 2001, seven out of 19 of the larger sub-watersheds in the region had total impervious surface coverage exceeding 10 percent and one of them was almost 30 percent. The North Central Action Area is expected to grow by 30 percent in the next 20 to 25 years, adding an additional 100,000 people to the area's current population of an estimated 240,000. Eighty percent of drinking water presently comes from groundwater, requiring little treatment, but making the region highly dependent on groundwater recharge. The growing acres of pavement have raised concern

over recharge and sustainability of the aquifers throughout the area. Cumulative impacts of individual exempt wells and loss of recharge reduce local stream flows, many of which are closed to further water allocation. Impervious surfaces also result in flashy runoff and stormwater flooding.

Shoreline alteration and hardening is pervasive along the low- and medium-bank marine shorelines of the Kitsap Peninsula, Gig Harbor, Bainbridge Island and other parts of the region. Almost half of the Bainbridge Island shoreline has been modified; it has 291 piers and docks and 108 boat ramps. Throughout the North Central area, 49% of the shoreline has been armored or otherwise modified. Many of the sites are hardened by tidal construction, defined as a structure that blocks wave impact. The structures also block the natural flow of sand and gravel from marine bluffs that form regional beaches. Where overhanging vegetation is removed along shorelines, it eliminates nearshore shade and cover for juvenile fish, and overwater structures block the light for marine vegetation and the production of some fish species. The Nearshore Assessment of East Kitsap County (excluding Bainbridge Island) found 298 structures overhanging the ordinary high water mark. Decks accounted for approximately half of the structures. Houses, at 25 percent, were the next largest category.

The historic use of the ports of North Central Puget Sound left a toxic legacy from the lumber and shipbuilding industries. A Superfund site in Eagle Harbor on Bainbridge Island resulted primarily from the operation of the Wyckoff wood processing facility from 1903 to 1988. Sediment and groundwater were contaminated by creosote and other chemicals, and a 50-acre “cap” was put into place to isolate contaminated sediment on the floor of the harbor. Pollution from other port operations and small industrial and commercial activities in North Central Puget Sound are cited by local residents as a continuing threat to marine life and human health.

Key strategies

Low impact development methods; coordination of land use, water supply and wastewater treatment; revising development regulations to prioritize protection of ecosystems; and better mitigation are all needed to protect stream health, marine waters, and aquifers in the North Central Action Area. The Pollution Identification and Correction program has had some success in reducing bacterial contamination and delisting impaired water bodies and shellfish beds, and more work is planned. Other key strategies identified by the region: include water conservation programs; landowner education to remove bulkheads and protect or restore shoreline habitat; and the acquisition of critical habitat areas, such as the “1000 Acre Woods” north of Gig Harbor. Local watershed groups and the U.S. Navy have workplans to improve environmental quality that are ready for implementation.

North Central Puget Sound Action Area						
Land (# acres)	**% impervious surface**	**Urban Growth Area Incorp. + Unincorp.**		**% of land that is publicly owned**	**Marine shoreline # linear feet**	**Marine shoreline % modified**
		# acres	%			
149,536	12%	65,104	44%	17%	1,078,479	49%

Projected population change for North Central Action Area counties			
County	**2000 Census**	**2025 Projection**	**% change**
Kitsap	231,969	299,073	29%
Pierce	700,820	999,657	43%
Notes: Based on data from WA OFM, medium growth projection for 2025. Population data is not available by action area. Major portions of Pierce County, and some portions of Kitsap County, are not located within this action area. (See Hood Canal and South Central Puget Sound action area profiles.)			

North Central Action Area

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority action area strategies

Unique habitat type and ecosystem processes
• Freshwater: Lowland stream habitats in West Sound watersheds support chum, coho, cutthroat and steelhead
• Marine nearshore: Supports chum, pink, coho, and Chinook salmon and steelhead from throughout Puget Sound
 	
Food and Timber (harvest)
• Shellfish production and harvest
• Recreational and tribal fishing
 	
Recreation and tourism
• Boating, state parks, shoreline access
 	
Community and economy
• Water-oriented communities
• Commerce, military, and marine transportation hub
• Homeland security: Keyport Naval Undersea Warfare Center, Puget Sound Naval Shipyard; Manchester Fuel Depot
• Model program for water quality improvements via "pollution identification and correction"
• Port Gamble S'Klallam Tribe
• Suquamish Tribe
	Habitat alteration
	• **Marine nearshore:** 49% of shoreline modified, especially in south part of action area and Bainbridge Island; 291 piers and docks, 108 boat ramps on Bainbridge Island; loss of marine riparian habitat
	• **Freshwater:** Loss of fish passage, riparian habitat, large woody debris, substrate
	• **Upland:** Loss of working farms and forests through conversion for urban and suburban uses; 12% impervious surface overall with considerable variation by watershed
	
	Pollution
	• **Toxics:** Hundreds of acres of contaminated sediments, especially at Sinclair and Dyes inlets, Liberty Bay, and Eagle Harbor from a history of naval and industrial activities; groundwater contamination from Eagle Harbor superfund site
	• **Bacterial contamination**: threatened and closed shellfish growing areas and 7 local streams closed for human contact
	• **Nutrient loading**: low dissolved oxygen in bays, especially in areas of poor flushing
	• **Surface water runoff impacts**: CSO and SSO events
	
	Freshwater resources
	• **Limited water availability for people, farms and fish**: streamflows dependent on precipitation and groundwater; 80% of drinking water comes from groundwater; streams in urbanized watersheds are subject to low summer flows and peak storm flows.
	
	Invasive species
	• Potential negative ecological impacts on native populations: Knotweed and other non-native invasive species in some locations; invasive tunicates in Eagle Harbor
	
	Artificial propagation
	• Fish hatcheries: Salmon production has potential negative ecological and genetic impacts on natural salmon and other hatchery populations; Salmon net pens: commercial production of Atlantic salmon in Rich Passage; Shellfish production: not identified as a local issue;
	
	Harvest
	• Fishing and bycatch, logging, and hunting practices: Local pressures need to be identified
	
	Localized climate change impact
	• Sea level rise: Loss of beach land by 2050, converted to tidal flats; loss of marsh and pocket estuaries
	
	Other
	• Population increase by 2025: 29% in Kitsap County (more than 67,000 people) and 43% in Pierce County (nearly 300,000 people)
		A: Protect intact ecosystem processes, structures and functions
		• Growth and development: Implement local portions of Puget Sound Regional Council Vision 2040 Plan; coordinate with local transportation planning
		• Protect high value habitat: Acquire "1000 Acre Woods" critical habitat north of Gig Harbor; protect remaining intact nearshore habitat
		• Update and implement regulatory programs: Shoreline Master Program (Gig Harbor, Bremerton, Kitsap County, Bainbridge, Poulsbo, Port Orchard; Pierce County); Critical Area Ordinance (Port Orchard)
		• Protect and conserve water flows:
		  o Manage lands and runoff to ensure plentiful and clean groundwater recharge
		  o Implement water conservation and reclaimed water development and use
		
		B: Restore ecosystem processes, structures and functions
		• Implement priority ecosystem restoration projects:
		  o Implement Salmon Recovery three-year workplans
		  o Complete Chico Creek, Carpenter Creek and other salmon restoration priority projects
		  o Implement recommendations of Gig Harbor Basin Plan, and Crescent Valley Biodiversity Stewardship Plan in a coordinated way
		  o Adopt and implement Bainbridge Island Open Space Plan
		• Implement stewardship incentives to increase private landowner restoration projects: Remove hard shoreline armoring; restore native riparian vegetation; restore marsh habitat
		
		C: Reduce sources of water pollution
		• Prevent pollution:
		  o Reduce bacterial contamination in shellfish growing areas, other marine nearshore areas and streams
		  o Control sources of pollution that re-contaminate sediment cleanup sites; support Navy ENVVEST project and other opportunities to cooperate to reduce pollution
		  o Implement KGI Watershed Action Plan
		• Manage stormwater runoff:
		  o Use and increase site-appropriate LID techniques; encourage use of technologies and approaches that replicate natural ground water systems to manage for future planned growth
		  o Implement NPDES permits
		• Upgrade wastewater treatment plants: Enforce already required modifications to sewer systems to avoid further pollution
		• Manage on-site sewage systems: Implement Pierce and Kitsap counties onsite management plans; continue to implement Kitsap County's Pollution Identification and Correction program
		
		D: Work effectively and efficiently together on priority actions
		• Coordinated long term strategy:
		  o Continue to improve WRIA 15 salmon recovery coordination for implementation
		  o Continue coordination among West Sound Watersheds, KGI Watershed Council, and Shellfish Partners
		  o Integrate nearshore and marine efforts (e.g., Shoreline Master Program updates) with watershed recovery efforts (e.g., Critical Areas Ordinance updates, Salmon Recovery Plan)
		  o Continue coordination with the Navy and other key stakeholders
		
		E: Implement the Action Agenda
		  o Outreach and education: Focus education and outreach activities to reduce pollution from live-aboards, boating and water-based activities; conduct outreach and assist property owners with replacement of hard bulkheads with soft beach protection

South Puget Sound Action Area Profile

Physical description

South Puget Sound was carved by glaciers into a land of rolling hills and ridges divided by nine long "fingers" of marine water. The area contains four large islands, numerous small islands, and shallow inlets that go dry at extreme low tide. Extensive tidal forces are the major drivers of water circulation in south Puget Sound marine waters, with maximum ranges of 20 feet. Many short streams and two major river systems (the Nisqually and the Deschutes) drain the action area along approximately 450 miles of shoreline. South Sound is the farthest portion of Puget Sound from the cool waters entering from the ocean. An underwater sill at the Tacoma Narrows further impedes the exchange of water to the nine major inlets. The shallow configuration and slow circulation make up a marine environment that is highly susceptible to low oxygen and warm temperatures.

Land use, population and economy

The South Puget Sound Action Area is the home of the state capital of Olympia, and is one of the fastest-growing areas in the state. Population growth in this region has consistently exceeded the state growth rate since the 1960s and is expected to grow by an additional 30 percent in the next 20 to 30 years. The South Puget Sound Action Area is also the home of two major military facilities – Fort Lewis and McChord Air Force Base. Fort Lewis in particular is experiencing high levels of growth, with an estimated current population of 29,000 active duty soldiers, plus families and civilian personnel. Most of the population in the South Puget Sound Action Area is clustered along major transportation corridors and cities; outside of these urban areas the population is concentrated along the shorelines.

Historically, the South Puget Sound Action Area was the home of the ancestors of the Nisqually, Squaxin Island, and Puyallup tribes, who were supported by rich shellfish resources, salmon, and wildlife in the upland forests. Timber and shellfish still form the basis of important economic sectors in the area. Recreational use of the shorelines for swimming, kayaking, canoeing, fishing, and beach combing is popular. As in other portions of Puget Sound, the flat river delta areas were converted to agricultural farmland more than a century ago, and agriculture remains a substantial land use in the Nisqually watershed.

The South Puget Sound Action Area has a long-standing history of regional partnerships working to sustain and restore ecosystem health. Fort Lewis communicates regularly with local and tribal governments to discuss land use planning and environmental issues. The Nisqually Watershed Council has been operational for more than two decades, and the Key Peninsula-Gig Harbor-Islands and Chambers-Clover Creek watershed councils are also active. Public and private land managers, including timber companies with extensive holdings in the uplands, have worked on preservation and restoration of habitat to protect important upland and aquatic species.

Unique ecosystem characteristics and assets

The waters of south Puget Sound provide some of the finest shellfish habitat in the world. Commercial production of oysters, clams and mussels from these waters and tidelands contributes significantly to Washington's position as the nation's leading producer of farmed bivalve shellfish. South Puget Sound commercial shellfish harvest is estimated to generate approximately $50 million annually and is half of the statewide shellfish industry revenue. Abundant personal and recreational shellfish harvest occurs in addition to the commercial harvest. Clean water is the essential catalyst for the continued success of the

shellfish industry. Southern Puget Sound is also an important feeding area for salmon and trout originating throughout Puget Sound and British Columbia. The Nisqually River has the largest undeveloped delta area in Puget Sound and is among the 10 most important rivers in Puget Sound for salmon recovery. The Nisqually National Wildlife Refuge is a popular area for wildlife viewing. The Nisqually and Puyallup/White watersheds support threatened populations of Chinook, steelhead, and bull trout. These watersheds, along with the Deschutes and Kennedy-Goldsborough, support other unique populations of chum, pink and coho salmon, as well as coastal cutthroat trout. The South Puget Sound Action Area also includes portions of Mount Rainier National Park, and several state and local parks.

Unfortunately, the south Puget Sound's configuration of shallow bays and inlets – while ideal for growing clams and oysters – also make the region highly susceptible to water quality deterioration from the input of nutrients. These inputs come from a variety of sources including human and animal waste and stormwater runoff. The marine waters of the south Sound do not circulate well and the nutrient input promotes the growth of microscopic plankton. This cycle of input, bloom, and die-off consumes oxygen to levels that affect the health and survival of marine life.

Action area status and threats

Historically, the South Puget Sound Action Area was an important center for timber processing and paper production. The industrial use of the urban bays in Shelton, Chambers Bay and Olympia led to contamination of these inner bays with wood wastes and spent sulfite liquor from pulp and paper mills, which closed between the late 1950s and the 1990s, as well as more concentrated contaminants such as creosote. The shallow bays limit the passage of commercial vessels leaving and entering the Port of Olympia and Oakland Bay at Shelton, and maintenance dredging of channels is necessary for larger vessels. Other major historical modifications to the environment in the action area include the creation of Capitol Lake in the heart of Olympia in the early 1950s, which was formed as a result of damming the Deschutes River, and the construction of the railroad line along the shoreline from Nisqually to Point Defiance in the early 1900s.

In addition to these historical changes, a number of threats to the ecological health of the South Puget Sound Action Area have been identified by the residents and regional scientists. Many of these apply to the larger Puget Sound region, including climate change, population growth, stormwater/wastewater discharge, emerging contaminants from pharmaceuticals and household products, loss of forest cover, and the fragmentation and loss of habitat function. Models predict that because of geological subsidence and climate change, level rise in the south Puget Sound region will be the highest in Puget Sound, with an increase of 3 feet by the end of the century.

Other specific threats to the action area include the legacy contaminants in the sediments of Budd Inlet and Shelton Harbor, and the loss of estuary and nearshore habitat. Shoreline armoring and fill associated with bulkhead placement, ramps, overwater structures, and railroad maintenance are major ecosystem constraints in south Puget Sound, as these activities eliminate or disrupt the habitat for forage fish, salmon, and other nearshore species. It is estimated that 40 percent, or 180 miles, of shoreline has already been armored or otherwise modified in the South Puget Sound Action Area. Polluted runoff and shoreline modification have impacted native species and the shellfish industry in south Puget Sound. Harvest methods for geoduck and shellfish species that are artificially propagated have been flagged as an issue of concern by some area residents. Impacts vary depending on the site, species, and methods of operation.

Key strategies

The South Sound Action Area has numerous protection and restoration plans ready for implementation, including salmon recovery workplans, water conservation and reuse, stormwater retrofits, water quality cleanup plans prepared by the shellfish protection districts, and septic and wastewater upgrades. Priority actions for protection are to safeguard remaining undeveloped shorelines; several sites such as Gull Harbor and Devil's Head have been targeted for acquisition. Protection of unique prairie habitats and species is also a priority. Several industrial pollution sites are located in Budd Inlet, Oakland Bay, and Chambers Bay and these upland and in-water sites need to be prioritized for cleanup. Continued inter-jurisdictional collaboration and coordination is a key strategy for the action area.

South Puget Sound Action Area						
Land (# acres)	% impervious surface	Urban Growth Area Incorp. + Unincorp.		% of land that is publicly owned	Marine shoreline # linear feet	Marine shoreline % modified
		# acres	%			
1,059,495	6%	151,853	14%	29%	2,355,554	40%

Projected population change for South Sound Action Area counties			
County	2000 Census	2025 Projection	% change
Kitsap	231,969	299,073	29%
Mason	49,405	75,018	52%
Pierce	700,820	999,657	43%
Thurston	207,355	336,511	62%
Notes: Based on data from WA OFM, medium growth projection for 2025. Population data is not available by action area. Major portions of Pierce, Mason, and Kitsap counties are not located within this action area. A small portion of Lewis County is located within this action area.			

South Sound Action Area

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority Action Area strategies

Unique habitat types and ecosystem processes
• Marine/estuary: Nisqually River is largest undeveloped estuary in Puget Sound and largest National Wildlife Refuge in Puget Sound; important salmon, wildlife and bird habitat
• Marine/estuary: Nursery area for multiple Chinook populations
• Marine/estuary: Forage fish spawning areas
• Shoreline: Large areas of intact shoreline
• Upland: Unique prairie habitat with endemic species
 	
Food and timber (harvest)
• Nationally renowned shellfish; one of the largest shellfish producing areas in state
• Recreational and tribal clamming, crabbing and fishing
 	
Freshwater resources
• Hydropower for city of Centralia and city of Tacoma
• Leadership in reclaiming municipal wastewater
 	
Recreation and tourism
• Recreation: clamming, crabbing, Mount Rainier National Park, kayaking, boating
 	
Community and economy
• Numerous commercial and residential centers
• Center of state government
• Ports of Olympia and Shelton
• Homeland security: Fort Lewis & McCord Air Force Base
• Nisqually Tribe
• Puyallup Tribe
• Squaxin Tribe
	Habitat alteration
	• **Marine/estuary**: Loss of riparian and estuary habitat, some intertidal alterations
	• **Marine nearshore:** 40% of shoreline modified; BNSF rail along eastern shoreline
	• **Freshwater:** Blocked habitat including dams and culverts on Deschutes River; fill for I-5 on Nisqually River
	• **Upland**: Loss of prairie habitat through land conversion; loss of hydrologic function from existing and expanding impervious surface
	
	Pollution
	• **Toxics**: Industrial pollution in bays and contaminated sediments including Oakland Bay, Chambers Bay, Budd Inlet; military sewage treatment plant at Tatsolo Point
	• **Bacteria contamination**: Bacteria and pathogens from human and animal waste
	• **Nutrient loading**: Low dissolved oxygen in Budd Inlet, Case Inlet, and Carr Inlet
	• **Air quality**: Poor air quality due to particulate pollution (wood smoke, diesel emissions, etc.)
	
	Freshwater resources
	• Low flows in WRIAs 11, 12, 14; flow issues in WRIA 13
	
	Invasive species
	• Potential negative ecological impacts on native populations
	
	Artificial propagation
	• Fish hatcheries: Salmon production has potential negative ecological and genetic impacts on natural populations and other hatchery populations and may compromise ability to develop viable, locally adapted populations; Shellfish production: Potential ecosystem impacts related to some aquaculture practices
	
	Harvest
	• Fishing and bycatch, logging, and hunting practices: Local pressures need to be identified
	
	Localized climate change impact
	• Sea level rise: Significant loss of estuarine beaches; inundation of tidal flats; flooding at downtown Olympia
	• Flooding of urban and rural areas
	
	Other
	• Conflicting use values of marine shorelines
	• Harmful algal blooms in fresh and marine waters
	• Increase in population by 2025: 44%; more than 520,000 people, in Thurston, Pierce, Mason, Kitsap counties
		A: Protect intact ecosystem processes, structures and functions
		• Protect high value habitat:
		  o Protect undeveloped shoreline and support efforts to prevent development in floodplains
		  o Acquire high priority marine and fresh water habitat, including but not limited to: Gull Harbor in Budd Inlet; Lower Eld Inlet Shoreline Conservation; Twin River Ranch at Oakland Bay; Harstine Island Shoreline; Filucy Bay Farm and Shoreline; Devils Head; Lower Ohop Protection Project
		• Update and implement regulatory programs: Complete and implement Shoreline Master Program updates; complete and implement Critical Area Ordinances
		• Protect and conserve water flows: Continue and expand LOTT Alliance water reuse facilities and nutrient removal
		
		B: Restore ecosystem processes, structures and functions
		• Implement priority ecosystem restoration projects:
		  o Complete restoration of Nisqually estuary
		  o Implement Salmon Recovery three-year workplans (WRIAs 10/12, 11, 13/14, 15)
		  o Restore shorelines using WRIAs 11, 12, 13, 14, 15 nearshore assessments
		  o Implement existing basin protection and restoration plans in Key Peninsula, Clover/Chambers, and Nisqually basins; develop plans for other South Sound basins
		  o Develop and implement a multi-species recovery and management plan for salmonids and forage fish not addressed in Chinook Recovery Plans
		  o Support habitat and shoreline restoration efforts in Budd Inlet and Hammersley-Oakland Bay
		  o Develop and implement conservation and recovery plans for prairie-dependent species
		  o Restore estuaries and pocket estuaries throughout South Puget Sound
		• Revitalize waterfront communities: Support and encourage Port of Shelton and Port of Olympia strategic redevelopment plans, including stormwater retrofits; complete Deschutes Estuary Restoration
		
		C: Reduce sources of water pollution
		• Prevent pollution: Implement existing Watershed Action Plans, Shellfish Protection Districts, and other water pollution cleanup plans in a coordinated way; implement the Oakland Bay Sa-Heh-Wa-Mish Initiative and the Oakland Bay Clean Water District strategies; reopen key shellfish-producing areas in North Bay, Oakland Bay, Henderson Inlet, Burley Lagoon
		• Manage stormwater runoff: Develop and implement LID where feasible; retrofit outdated, existing legacy systems; support development of local surface water management utilities and associated fees
		• Upgrade and manage wastewater treatment plants: Shelton, LOTT, Chambers Bay, Solo Point and others
		• Manage on-site sewage systems: Implement on-site management plans for Pierce, Thurston, Mason and Kitsap counties, prioritize areas with shellfish production, low dissolved oxygen, and high nutrient and pathogen loading; implement Shellfish Partners, and enhance on-site grants and loans programs for repairs and connection to sewers
		• Prioritize inwater and upland toxic clean up sites: Clean up industrial pollution in Budd Inlet, Oakland Bay, and Chambers Bay
		
		D: Work together as a system on priority actions
		• Coordinated long-term strategy:
		  o Continue recent collaborative work in watershed coordination; investigate whether more formal collaboration is needed
		  o Maintain Nisqually hatchery operations to conserve Chinook species
		  o Integrate nearshore and marine efforts (e.g., Shoreline Master Program) with watershed recovery efforts (e.g., Critical Areas Ordinances, Salmon Recovery Plan)
		
		E: Implement the Action Agenda
		• Science and monitoring: Implement Ecology best management practices guidelines for geoduck aquaculture; resolve shoreline use conflicts

South Central Puget Sound Action Area Profile

Physical description

People are a major driver of change throughout the Puget Sound ecosystem, but none of the Puget Sound action areas illustrates this more dramatically than the South Central Puget Sound Action Area. In this area, people are the drivers – both in terms of their millions of daily car trips, and in the way they have reshaped the physical and biological structure of the region. The South Central Action Area is the most urbanized portion of Puget Sound, with commercial and residential buildings, huge areas of pavement, a heavily modified shoreline, and a pervasive road network. Although portions of the action area have been intensively developed, approximately 77 percent of the area is not considered urban, with vast tracts of agricultural lands in rural King and Pierce counties, and undeveloped wilderness in Mount Rainier National Park and the Mount Baker-Snoqualmie National Forest. The three major river systems originate in the Cascades near Snoqualmie Pass, Cascade Pass, and Mount Rainier, travel through forests and farms, and empty into Lake Washington and Puget Sound. Glacial melt from Mount Rainier feeds the Puyallup/White River system, while the Green/Duwamish and Cedar/Sammamish are supplied by snow melt and rainfall. Lowland areas receive an average rainfall of 40 inches per year. In highly urbanized portions, many streams or stream segments have been placed in drainage pipes and re-assert their presence during storms and flood events.

The two largest bays in the region are Seattle's Elliott Bay and Commencement Bay by Tacoma. Vashon and Maury are the largest regional islands. The major currents within the saltwater basin of central Puget Sound generally flow northward along the west side of Vashon Island, and southward through the East Passage. The marine waters of Puget Sound form warm layers at the surface during the summer months because of river input and solar heating. These layers are mixed during winter months by seasonal winds and cool weather. An underwater sill by the Tacoma Narrows also alters the pattern of marine water circulation.

Land use, population, and economy

South central Puget Sound is the economic driver of the region, and largely of the state of Washington. This action area generates approximately $165 billion in annual economic activity, comprising approximately 62 percent of the gross state product. Major commercial and industrial enterprises are concentrated here, including technology, aerospace, finance, insurance, health care, business and professional services, commercial fishing, recreation, and tourism. These industries are served by international port facilities in Seattle and Tacoma, along with Sea-Tac International Airport, Boeing Field, and passenger and freight railroad services. The region has 14,900 acres of designated manufacturing industrial centers in six locations: Ballard Interbay, Duwamish, North Tukwila, Auburn/Kent, Overlake, and the Port of Tacoma. Water supply for most of the population of the area is provided by the City of Seattle and the City of Tacoma, through their operations on the Cedar and Green rivers, respectively.

Historically, south central Puget Sound was the home of the ancestors of the Muckleshoot and Puyallup tribes, who were supported by rich shellfish resources, salmon, and wildlife in the upland forests. Today, the 2.5 million residents of the South Central Action Area live in three of Washington's largest cities – Seattle, Bellevue, and Tacoma, and in suburban and rural residential development that reaches across unincorporated King and Pierce counties. The northernmost portion of the action area is located in southwest Snohomish County. Following the adoption of the Growth Management Act in the 1990s, land use strategies have been effective in containing some of the sprawl, as 96 percent of the growth in King

County has been concentrated within the designated urban growth boundary. Significant tracts of commercial forest and agriculture remain in the eastern and southeastern portions of the area. Local government staff report challenges in trying to retain habitat features and natural amenities while trying to accommodate a projected 750,000 new residents in the next 20 to 25 years. Land use jurisdictions and the management of utilities and transportation systems are spread among hundreds of city and county governments and special purpose districts.

Unique ecosystem characteristics and assets

The many ports and waterways of south central Puget Sound have made it an international shipping center for regional and national industries, natural resource extraction (logging, fisheries, mining), and agricultural products. Urban estuaries support many small marine, ship-building/repair and industrial enterprises. Public transportation to Kitsap County and Vashon Island is provided by the Washington State Ferries system and other vessel traffic consists of passenger ferries, fishing boats, research vessels, small recreational craft, and cruise ships. Recreation spots include Lake Washington, Lake Sammamish, and Lake Tapps; Puget Sound beaches such as Alki Beach in West Seattle, Seahurst in Burien, and Point Defiance in Tacoma; and along Interstate 90's Mountain to Sound Greenway, the middle Green River, and the White River above Enumclaw. The headwaters of the major rivers are protected through their status as parklands managed by the National Park Service; wilderness areas managed by the USDA Forest Service, and the headwater source areas of the water supplies of Seattle and Tacoma.

The federal listing of Puget Sound Chinook was the first time a threatened species listing for salmon had occurred in such an urban environment. Despite the extensive urbanization of south central Puget Sound, six populations of Chinook salmon and other salmon species spawn in the major rivers and lakes. Unique salmon populations include the spring run of White River Chinook; Issaquah Creek and Cedar River summer and fall Chinook; Lake Sammamish kokanee; and Lake Washington sockeye. The White River early-run Chinook population is the last existing early-returning "spring" Chinook population in southern Puget Sound. The Green River is one of the top 10 steelhead rivers in Washington and supports substantial natural and hatchery populations of salmon. Bull trout, coho, rainbow, and coastal cutthroat trout as well as chum and pink salmon, are also present in some of the river systems. Strong community efforts and watershed partnerships are directed at salmon recovery throughout the area, and many restoration programs are regionally financed. While other fish, wildlife, and bird communities are abundant in undeveloped portions of the action area, those species that co-exist well with humans are generally present in the urban sectors. Interestingly, Elliott and Commencement bays contain six-gill sharks, which seem to prefer urban areas.

Action area status and threats

Historical modification of the ecosystem is at an entirely different magnitude in the South Central Action Area than in other parts of Puget Sound. This region was re-plumbed when the White, Cedar, and Black rivers were re-routed, and the Hiram M. Chittenden Locks were constructed. The locks and ship canal dropped the level of Lake Washington by nine feet, and eliminated the marshes along much of its shoreline. Several large dams or diversions are present in the action area on the Cedar (water supply), Green (flood management and water supply), and Puyallup and White rivers (hydroelectric and flow management). Attempts have been made to achieve improvements in altered flows associated with the dams and diversions but instream flows remain a severe challenge. Flows are also substantially modified in this action area because of the extent of development and impervious surface. Other major habitat alterations occurred when the lower Puyallup and other rivers were heavily diked and straightened, cutting off

meanders, side channels, flood plains, and wetlands that provided extensive habitat for salmon and birds. Industrial actions left toxic contamination in the lower Duwamish River (Seattle) and Commencement Bay in Tacoma, which became EPA-designated Superfund sites. Several hazardous waste facilities are present in the action area and are presently undergoing cleanup actions. Some toxic sites have become re-contaminated and repeated action has been necessary.

Saltmarsh habitat at the mouths of the major rivers is essentially gone, and riparian forest has been eliminated along many water courses. Armoring of the shoreline to create the port facilities, railroad corridors, and other facilities that have supported the regional economy has been extensive. Along south central Puget Sound, an estimated 75 percent of the marine shoreline has been modified. The interruption of sediment movement from shoreline armoring has led to erosion and deposition problems in some locations. Overwater structures on the larger lakes in the region have a high density per shoreline mile. Forestry and agriculture removed forest cover along many rivers and streams. A complex web of roads, bridges, and culverts support the human transportation system but have impacted the natural infrastructure of rivers and streams, and created barriers to the movement of fish and wildlife. In the marine areas, vessel traffic poses a risk of invasive species arriving from foreign ports, as well as major and minor oil and chemical spills.

Currently, polluted stormwater and industrial discharges that originate in South Central Puget Sound are some of the biggest threats to ecosystem health. Freshwater quality has been impaired in local streams from the metals and hydrocarbons that wash from roads and parking lots. “Endocrine disrupting compounds” from pharmaceuticals and personal care products have been found in water samples in King County. Industrial outfalls are concentrated in this region – 80 percent of the waste discharged from point sources comes from south central Puget Sound. Small communities in the South Central Action Area, such as Vashon Island, face substantial challenges in addressing wastewater treatment and water supply. Despite new wastewater treatment facilities, the size and capacity of current treatment plants is inadequate in parts of the action area.

The historical decline of ecosystem health has not been universal or irreversible in all parts of the South Central Action Area. Lake Washington was heavily polluted in the 1950s from sewage, but local residents funded a highly successful cleanup program. Local areas are greatly committed to salmon recovery programs and several restoration and protection projects have been implemented such as those in the upper White and tributaries, including Huckleberry Creek. Toxic sites are being cleaned up and land conservancies are working to maintain forest cover, wildlife corridors, recreational greenways, and rural farmlands. The South Central Action Area has developed low impact and “green” building programs and techniques that are national models. Restoration progress is difficult as the lack of staff capacity among local governmental entities is inhibiting implementation of salmon recovery and other plans, and budgetary cutbacks are becoming worse.

Key strategies

The South Central Action Area is expected to receive half of the projected growth in Puget Sound in the coming decades. Action strategies for this area are largely directed at preventing additional loss of ecosystem function related to growth, setting priorities for restoring degraded areas and contaminated sites, and improving the region’s capacity to implement recovery plans. Active stewardship and acquisition programs and other priority actions are designed to restrict additional shoreline armoring, conserve water, restore instream flows and fish passage in several rivers, and expand functional salmon habitat by setting

back levees and improving flood plains. Stormwater management and wastewater treatment are the major focus for protecting water quality in urban areas, along with on-site septic systems in rural areas. Many of the jurisdictions in the South Central Action Area have recently worked together to complete the Vision 2040 plan which lays out a strategy for regional growth in central Puget Sound, with policies related to planning, transportation, public services, housing, economy and the environment.

South Central Puget Sound Action Area						
Land (# acres)	**% impervious surface**	**Urban Growth Area Incorp. + Unincorp.**		**% of land that is publicly owned**	**Marine shoreline # linear feet**	**Marine shoreline % modified**
		# acres	%			
1,435,235	12%	443,577	31%	39%	944,167	75%

Projected population change for South Central Action Area counties			
County	**2000 Census**	**2025 Projection**	**% change**
King	1,737,034	2,192,868	26%
Pierce	700,820	999,657	43%
Snohomish	606,024	898,715	48%
Notes: Based on data from WA OFM, medium growth projection for 2025. Population data is not available by action area. Most of Snohomish County is not located within this action area.			

South Central Action Area

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority action area strategies

Unique species
• More than 17 unique populations of salmon, trout and steelhead
• Endemic species of beetles
• Remnant Margaritifera mussel populations
 	
Unique habitat types and ecosystem processes
• Freshwater: Core area for Bull Trout recovery (Puyallup/White)
• Upland: intact upland forest in and around Mount Rainer National Park
 	
Freshwater resources
• Water supply for city of Seattle, city of Tacoma, and surrounding metropolitan areas; many water supply watersheds are protected
 	
Food and timber (harvest)
• Recreational harvest: Lake Washington sockeye and Issaquah Creek Chinook
• Significant agriculture areas
• Commercial, recreational, and tribal fishing
• Hatcheries provide harvest opportunities and population stability while wild salmon stocks rebuild: White River spring Chinook, Puyallup steelhead
 	
Recreation and tourism
• Mount Rainer National Park, Mount Baker-Snoqualmie National Forest, Lake Washington, Lake Tapps, Lake Sammamish, Mountain to Sound Greenway, Alpine-Lakes Wilderness, boating, sport fishing, diving
 	
Community and economy
• Population center for Puget Sound with more than three million residents
• Commercial & industrial hub, generating 63% of the gross state product
• Significant rural areas
• Home of the North Pacific fishing fleet
• International port facilities and cruise ship terminal
• Largest wastewater treatment system in the state with innovative Brightwater Treatment Plant
• Marine trades
• Leadership on low impact development and green infrastructure approaches, including Built Green and Green Tools programs
• Muckelshoot Tribe
• Puyallup Tribe
	Habitat alteration
	• **Marine/estuary**: Major loss of estuary habitat in Duwamish and Puyallup River estuaries and creation of an artificial estuary created by the Ballard Locks
	• **Marine nearshore**: 75% of shoreline modified, including overwater structures, shoreline armoring, dredging, filling, and marine shoreline vegetation removal
	• **Freshwater**: Over 100 miles of blocked habitat with dams and diversions (Green, White, Puyallup); significant alteration of rivers, floodplains and shorelines; river straightening and channelization (Duwamish, Puyallup, Cedar, Sammamish); floodplain development; extensive alteration of surface hydrology, especially Lake Washington, Ballard Locks, White, Cedar, Puyallup, Duwamish and Black Rivers; significant diversion of water to drinking water supply and wastewater systems to Puget Sound, altering migration routes for salmon, modifying hydrology
	• **Upland**: Loss of working farms and forests through conversion; 34% impervious surface in urban growth area; increasing urban and rural development
	
	Pollution
	• **Toxics**: Duwamish and Commencement Bay Superfund sites; recontamination of previously cleaned up sites; risk of pollution from maritime activities
	• **Bacterial pollution**: Failing septic systems in nearshore areas and throughout watersheds; agricultural runoff
	• **Air pollution**: Significant source from automobile emissions
	• **Nutrient loading**: Especially in areas with limited flushing, (Shilshole Bay, Quartermaster Harbor, and Dumas)
	• **Surface water runoff impacts**: Major source of urban stormwater runoff and pollutants into Puget Sound
	
	Freshwater resources
	• Limited water availability for people, farms, and fish: Low summer flows and high peak stream flows in WRIAs 8,9,10/12; low mainstem winter flows
	• Increased future water demand for higher population
	• Localized areas of saltwater intrusion into groundwater
	
	Invasive species
	• Potential negative ecological impacts on native populations: Japanese knotweed, reed canary grass, and butterfly bush infestations along riparian corridors; non-native fish species in most lakes; nutria; marine invasive species including tunicates
	
	Artificial propagation
	• Fish hatcheries: Salmon production in Lake Washington/Sammamish, Green and White rivers have potentially negative ecological and genetic impacts on natural salmon; Shellfish production: not identified as a local issue
	
	Harvest
	• Fishing and bycatch, logging, and hunting practices: Local pressures need to be identified
	
	Localized climate change impact
	• Significant source of Puget Sound carbon emissions as 50% of carbon emissions are transportation related
	• Sea level rise: Risk of conversion of upland to shoreline; loss of estuarine beaches; limited sea level rise impacts in Tacoma
	
	Other
	• Population increase by 2025: 34% in King, Pierce, Snohomish counties (more than one million people)
		A: Protect intact ecosystem processes, structures, and functions
		• Growth and development: Implement Vision 2040 Plan
		• Protect high value habitat:
		  o Acquire high priority habitats (e.g., Lower Puyallup transition zone habitat, White River PSE properties, South Prairie Creek, Middle Puyallup forest lands, Middle Green River, Vashon Island, Upper Cedar River)
		  o Implement White River Biodiversity Stewardship Plan
		  o Implement Habitat Conservation Plans (forest & fish plans, Cedar, Green, Tacoma)
		  o Implement Pierce and King counties transfer of development rights programs, cluster development, and increase density in urban areas; utilize conservation easements and Public Benefit Rating System
		  o Update and implement regulatory programs: Shoreline Master Program updates (King and Pierce counties, all relevant cities); critical Area Ordinance updates (all relevant cities); restrict additional shoreline armoring
		• Protect and conserve water flows: Establish and implement instream flow agreements in Green, White, Lake Washington, Puyallup; promote water conservation and reclaimed water use
		• Protect and support long-term stewardship of working farms, forests and shellfish farms
		
		B: Restore ecosystem processes, structures, and functions
		• Implement priority ecosystem restoration projects:
		  o Implement Salmon Recovery three-year work plans for WRIAs 8, 9, 10/12
		  o Implement existing basin protection and restoration plans in King and Pierce counties
		  o Implement large-scale floodplain reconnection projects to restore habitat and protect public safety
		  o Provide fish passage at Howard Hanson Dam on Green River, Electron Dam on the Puyallup River and Buckley Diversion Dam on the White River
		  o Restore upper Green River riparian corridor, increase channel complexity, and decommission old logging roads
		  o Set levees back along the Cedar, Sammamish, Green, Puyallup, White and Carbon Rivers
		  o Protect and restore Duwamish and Puyallup estuary transition zone habitats
		
		C: Reduce sources of water pollution
		• Work with Puyallup Tribe, local public health departments, and homeowners to restore shellfish beds in Quartermaster Harbor and other areas
		• Prevent pollution: Coordinated implementation of existing clean water plans and Watershed Management Plans; implement Puyallup River Watershed Action Plans; maintain spill response efforts
		• Manage stormwater runoff: Implement significant stormwater retrofits; implement low impact development strategies; implement NPDES permits
		• Manage on-site sewage systems: Implement Pierce, King and Snohomish counties onsite management plans; expand Pierce County's onsite grant and loan program
		• Prioritize inwater and upland toxic cleanup sites: Continue to implement Superfund cleanup at Duwamish River, Commencement Bay, Lake Union
		
		D: Work effectively and efficiently together on priority actions
		• Coordinated long-term strategy:
		  o Continue to encourage tribal participation in recovery efforts
		  o Integrate resource and infrastructure planning for water quality, water quantity & salmon recovery
		  o Continue to advance regional cooperation in South Central Puget Sound
		  o Continue hatchery production for species conservation in White River; integrate hatchery production at Issaquah Creek and Soos Creek hatcheries with salmon recovery
		  o Continue Kokanee conservation planning and implementation
		
		E: Implement the Action Agenda
		• Education and outreach: Continue and build on STORM education and outreach program; continue pharmaceutical take-back programs

Whidbey Basin Action Area Profile

Physical description

With three out of the five largest river systems in Puget Sound and thousands of miles of river, stream and saltwater shorelines, the Whidbey Basin Action Area is a fertile center of productivity for high-profile members of the ecosystem's food web including salmon, whales, herring, eagles, and people. Foremost among Puget Sound rivers in volume and length is the Skagit system, with 2,989 identified streams totaling approximately 4,540 linear miles. Fed by glaciers on Mount Baker and Glacier Peak, the Skagit has a different seasonal flow pattern from the other major river systems in the area. Second only to the Skagit is the Snohomish River system, originating in the central Cascades and flowing through the Skykomish and Snoqualmie rivers before entering Puget Sound between Everett and Marysville. The fifth largest freshwater system in Puget Sound is the Stillaguamish River, which drops from an elevation of 6,854 feet on Three Fingers Mountain to sea level at Port Susan and Skagit Bay. The Samish River, a smaller drainage comprised of mostly lower elevation terrain, enters Samish Bay at the northern boundary of the Whidbey Basin.

The input of freshwater from all four river systems flows into the Puget Sound estuary along the east side of Whidbey Island. Skagit Bay, Saratoga Passage, Port Susan, and Possession Sound have constantly changing levels of salinity as the incoming freshwater from the rivers forms an upper layer and is mixed with saltwater by tidal action and variable winds. The Whidbey Basin has a range of shoreline and nearshore features, including eelgrass beds, vertical feeder bluffs, sand spits, and pocket estuaries. Whidbey, Fidalgo, Camano, and Guemes islands shelter the river mouths and bays from storms. Whidbey Island is approximately 40 miles in length from its northern tip at Deception Pass to Possession Point, and is connected via the Deception Pass Bridge to Fidalgo Island and the mainland portion of Skagit County. Anacortes is located on Fidalgo Island, and is the marine terminal for ferry access to the San Juan Islands. Although much of Whidbey Island is relatively dry, with only 20 inches of rain per year, the eastern portions of the action area are much wetter and have average annual precipitation exceeding 100 inches. The basin experiences the seasonal weather phenomenon known as the "Puget Sound convergence zone" – where air flowing in from the Strait of Juan de Fuca and up from south Puget Sound come together creating unusual, localized rain and snow events.

Land use, population, and economy

Once dependent on traditional Northwest economic sectors such as agriculture, fishing, and wood products, Skagit and Snohomish counties have diversified – adding jobs in industrial development for aerospace, international trade, specialized manufacturing, and tourism. Island County employment is primarily associated with the Naval Air Station Whidbey Island, which employs around 10,000 workers and constitutes approximately 88 percent of all economic activity in Island County. About 5 percent of the economic activity in Snohomish County is linked to the naval base in Everett. Revenues from activity at the Port of Everett have expanded rapidly in the past few years. Fishing for salmon, crab, and shellfish remains an important commercial and recreational activity. Fishing is also a cultural focus and important source of food for the tribes who have fishing rights in the Whidbey Action Area. The Tulalip Tribes, Swinomish, Sauk-Suiattle, Upper Skagit, Stillaguamish and Snoqualmie all have reservation lands in the region. Major cities in the Whidbey Action Area include Everett, Mount Vernon, Anacortes, Mukilteo, and Oak Harbor which is located near the Naval Air Station Whidbey Island.

Agriculture is still a major land use in the river delta areas of Skagit and Snohomish counties; 58 percent of the Stillaguamish floodplain is in agricultural use. The renowned annual tulip festival in Skagit County provides tourism as well as farm revenues. Community supported agriculture (where city dwellers purchase regular weekly shipments of produce) and local and organic markets are increasing in the Snoqualmie valley, Whidbey Island, and other areas. This represents a shift within the agriculture sector during the past 100 years, as the dairy industry that once dominated agricultural land use in the region is all but gone. Active farmland protection programs are utilizing programs to reduce or preclude conversion, such as the purchase or transfer of development rights and outright farmland purchase by regional food co-ops, land trusts, and other organizations.

Forestland dominates the upper mountainous portions of the Whidbey Action Area, with more than half in the Mount Baker-Snoqualmie National Forest or in state-owned forests managed by Washington Department of Natural Resources. The Stillaguamish and upper Snohomish watersheds have close to 75 percent forestland use. Although much of the land is protected from residential development, there is still a significant risk of conversion to residential development in certain locations. In the Snoqualmie watershed, for example, there are more than 500 forested parcels totaling more than 20,000 acres in the rural area at risk of being subdivided and developed.

Recreation and tourism are also important economic sectors, with opportunities for float trips, eagle watching, kayaking, camping, hunting, and backpacking. There are seven designated wilderness areas. The North Cascades National Park, and Ross Lake National Recreation Area protect the headwaters of the Whidbey basin, and extensive areas of public and private forest, as well as several popular state parks, provide habitat protection and allow for low impact outdoor recreation.

Unique ecosystem characteristics and assets

The rivers and streams of the Whidbey Action Area are major producers of salmon, and support Chinook, chum, coho, bull trout, pink and steelhead. Producing more salmon than any other river system in Puget Sound, the Skagit is home to six distinct populations of Chinook out of the 22 threatened populations in Puget Sound. Approximately 10,000 to 20,000 Chinook return annually to the Skagit River system, and it is estimated that returning runs were historically in excess of 70,000. Chinook populations in the Cascade, Sauk, and the Suiattle rivers in the Skagit system have unique early timing characteristics and return to the river as early as April. The Baker River has the only sockeye population in the Whidbey Basin. The Skagit system also supports 26 out of the 52 local populations of threatened bull trout, and has the largest pink salmon run in Washington. The Snohomish River basin has the most returning coho spawners between the Columbia River and the Canadian border, and produces 25 percent to 50 percent of all coho in Puget Sound. Juvenile salmon from many rivers in Puget Sound use the pocket estuaries and nearshore areas of the Whidbey Basin to forage and rear as they adapt to saltwater conditions. The region is also a major producer of forage fish such as herring, sand lance, and surf smelt. Eelgrass beds in Padilla and Fidalgo bays and in the Snohomish River delta area are among the largest found in Puget Sound, providing important spawning and forage habitat for forage fish, salmon, and other species.

Other important fish species in the Whidbey Basin include Pacific hake, rockfish, Pacific cod, and herring. It is also an important migratory area for marine mammals. A small group of six to 10 gray whales spend spring and summer feeding on ghost shrimp and tubeworms on beaches on southern Whidbey and Camano islands and the east side of Port Susan. The giant Pacific octopus is also found in the Whidbey Basin (as well as other portions of Puget Sound); these animals attain an average length of 16 feet and

weight of 110 pounds. Active shellfish culture takes place throughout the inside of Whidbey Island and Samish Bay for mussels, clams, and oysters. Commercial and recreational fisheries occur for shrimp and Dungeness crab throughout the basin. Important marine bird populations reside on area islands, including a population of 900 pigeon guillemots on Whidbey Island. The deltas and flood plain farmlands of the three major rivers support overwintering populations of tens of thousands of snow geese and ducks, thousands of swans, and many raptors and passerines. Upper reaches of the Skagit, Stillaguamish and Snohomish systems support numerous resident and overwintering populations of eagles and other raptors. Approximately 158.5 miles of the Skagit River and its tributaries are designated as wild and scenic river.

Several collaborative efforts have been made to protect some of the critical nearshore habitat. The Tulalip Tribes, Port of Everett and city of Everett, Washington Department of Fish and Wildlife, and Snohomish County have acquired more than 2,500 acres in the estuary. The northern portion of Port Susan is owned by The Nature Conservancy and is one of the largest privately owned marine nature preserves in the world. Several other land trusts and conservancy organizations are working to protect habitat and farmland in the action area. Island County has designated the entire western portion of Port Susan as a marine stewardship area. Island County also has 57 publicly owned beaches and 22 privately owned beaches that allow some public use.

Action area status and threats

The first dike in the LaConner flats was constructed in 1863 by pioneers who recognized the enormous potential in the fertile soil of the Skagit River delta. Extensive drainage and levee systems transformed the Skagit, Stillaguamish, Samish, and Snohomish, along with other river deltas throughout Puget Sound and created valuable farmland, but at the expense of lost saltmarsh and wetland habitat. An estimated 80 percent to 90 percent of the Snohomish and Skagit estuaries were diked and ditched, cutting off tidal marshes and channels that supported salmon, marine birds and other species. In some agricultural areas of the Snohomish Basin, the land has subsided more than 1 meter in the past century, resulting in drainage problems that constrain the economic viability of the farms. Restoring the floodplains and river deltas of the Whidbey area while pursuing goals for maintaining agriculture is a major challenge for the region.

Dam construction began early in the Skagit system as well. Two dams were constructed on the Baker River in the 1890s and led to the construction of the first hatchery in western Washington in 1896. The Baker Lake dam caused a loss of approximately 60 miles of Chinook habitat. Other dam-related issues such as the de-watering of Chinook redds (nests) have been improved in the past decade thanks to better dam operations. Three other major dams in the mainstem Skagit River are located at and upstream of Gorge Falls. The dams provide an important portion of the power to Seattle and other cities in Puget Sound.

Another limiting factor for salmon is the loss of forest cover, which has affected slope stability, temperature, sedimentation, stream structure, and the frequency and magnitude of high stream flows. River gage records for the North Fork of the Stillaguamish River show that peak flows have increased sharply in the past 27 years. It is expected that climate change and continued development in the region will result in higher peak flows, less snow pack, early spring runoff, and lower summer flows. Other water quantity challenges include saltwater intrusion in island and low-lying communities as a result of water withdrawals from aquifers, and sea level rise. The location of several towns along the rivers and the configuration of the deltas have increased flood hazard.

Many of the streams and tributaries in the Skagit, Snohomish, and Stillaguamish River systems do not meet standards for fecal coliform, dissolved oxygen, temperature, ammonia, nutrients, or other measures. In Island County, creeks and bays, including Penn Cove and Holmes Harbor, have failed to meet standards, resulting in closures of beaches to recreational swimming and the harvest of shellfish. Several shoreline communities in Island County have old and inadequate on-site sewage systems. Poorly sited and designed development is considered to be a major threat throughout the Whidbey Action Area. Complaints from longstanding rural property owners over stormwater impacts from adjacent or uphill developments have increased in the past two years in the Stillaguamish Basin. The Whidbey Basin has 16 sites that exhibit low dissolved oxygen, including Penn Cove, Allen Creek, Edison Slough, and Nookachamps Creek; the region is the third-highest problem area for low levels of dissolved oxygen in Puget Sound after Hood Canal and south Puget Sound.

Despite several protected areas, marine shorelines have been substantially modified by development. An inventory on Whidbey Island indicated that 22 percent of the shoreline had been altered; about 38 percent of the action area shoreline overall has been modified to some extent. There are approximately 5,000 overwater structures, consisting of ramps, piers and docks, small slips, and large slips. As with other areas of Puget Sound, the construction of bulkheads, docks, overwater structures and other shoreline development constrain the processes that form and sustain habitat in nearshore areas. Numerous residential developments have been constructed on sand spits and 80 percent of the parcels along the Island County shoreline have been developed or are slated for development, primarily for single family residences. The average density in platted sites is about two units per acre. The BNSF railroad occupies the shoreline and riparian area for 3.8 miles between Everett and Mukilteo.

In addition to habitat fragmentation, land conversion, water quality degradation and shoreline modification, the Whidbey Action Area is impacted by potential and legacy toxic deposits and threats from invasive species. One of the invasive species found in the Whidbey Action Area is the Bamboo Worm, which burrows into firm sand bottoms, softening the substrate and rendering the site unsuitable for oyster production. Two oil refineries located at Anacortes and the tankers that supply them are potential risks to the eelgrass beds and aquatic resources in Fidalgo and Padilla bays. One of the pipelines from oil tankers runs adjacent to the Fidalgo Bay Aquatic Reserve along most of its eastern boundary. Technologies and procedures are in place to reduce or minimize spills, and oil spills have been minimal, with the last occurring in 1991.

Key strategies

Although the Whidbey Action Area has several urban centers, the character of the action area is largely rural and there are several areas where ecosystem processes and functions are relatively intact. Top strategies in the area are thus focused on protecting habitat by acquiring important areas along streams and nearshore areas, improving enforcement, utilizing alternatives to bulkhead construction and implementing low impact development, and providing education, outreach and technical assistance to landowners. The unique nearshore habitats of Smith Island and Padilla and Fidalgo bays are particularly important to fish and bird populations. Implementation of existing cleanup plans to restore water quality at swimming beaches and shellfish beds is another key strategy. The action area is highly committed to the implementation of salmon recovery plans, and working toward collaborative efforts for improving both farms and fish.

Whidbey Action Area						
Land (# acres)	% impervious surface	Urban Growth Area Incorp. + Unincorp.		% of land that is publicly owned	Marine shoreline # linear feet	Marine shoreline % modified
		# acres	%			
3,713,582	2%	133,943	4%	70%	2,941,012	38%

Projected population change for Whidbey Action Area counties			
County	2000 Census	2025 Projection	% change
Island	71,558	100,985	41%
Skagit	102,979	164,643	60%
Snohomish	606,024	898,715	48%
Notes: Based on data from WA OFM, medium growth projection for 2025. Population data is not available by action area. Portions of Snohomish County are located within the South Central Action Area.			

Whidbey Action Area

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority action area strategies

Unique species
• Numerous salmonids; core bull trout populations
• Gray whales in Saratoga Passage
 	
Unique habitat types and ecosystem processes
• Marine/estuary: Important hake spawning area
• Marine/estuary: Three large estuaries provide migratory cross-roads for many salmon populations, significant bird habitat, some of the largest eelgrass beds in Puget Sound, significant kelp beds (west coast of Island County)
• Freshwater: Major Chinook producing rivers (Skagit, Stillaguamish, Snohomish systems); major producer of coho in Puget Sound and on West Coast
• Upland: Intact upland forests in and around North Cascades National Park, Alpine Lakes, Wild Sky, Glacier Peak Wilderness
 	
Freshwater resources
• Significant freshwater input from large rivers
• Hydropower for Western Washington power grid
• Sultan River provides water supply for Everett
 	
Food and timber (harvest)
• Strong agriculture base: dairy, flowers, vegetables, berries, nursery
• Shellfish production and Dungeness crab fishery
• Commercial, tribal, and recreational fishing
• Some hatcheries provide harvest opportunities and population stability while wild salmon stocks rebuild
• Timber, pulp production
 	
Recreation and tourism
• North Cascades National Park and Wilderness Areas, Boulder River and Henry M. Jackson Wildernesses sport fishing, boating, whale watching, skiing
• Tourist attractions at small waterfront communities
 	
Community and economy
• Significant employment and population centers, including rural water-connected communities (Camano and Whidbey islands)
• Deepwater ports that support shipping and industry, including Port of Everett
• Homeland security: Whidbey Island Naval Air Station; Naval Station Everett
• Swinomish Tribe
• Tulalip Tribes
• Stillaguamish Tribe
• Sauk-Suiattle Tribe
• Upper Skagit Tribe
• Snoqualmie Tribe
• Samish Tribe
	Habitat alteration
	• **Marine/estuary**: Loss of estuary tidal marsh and habitat connectivity, with more than 80% of the Snohomish, approximately 75% of the Skagit, and 85% of the Stillaguamish estuaries diked, cutting off tidal marshes and blind tidal channels; only 18% of historic wetlands remain; potential future impacts from tidal power generation
	• **Shorelines**: Development along lake shorelines, reducing habitat availability and heterogeneity, increasing nitrification, increases in invasive species and toxic algal blooms
	• **Marine nearshore**: 38% of marine shoreline armored; over 5,000 overwater structures; 5.6 miles of railroad grade; disconnected feeder bluffs and pocket estuaries, development in sensitive areas
	• **Freshwater**: Loss of large river habitat complexity and floodplain connectivity from diking, riparian clearing, and floodplain development, reducing wood debris jams, side-channels, forested islands and pools
	• **Uplands**: Loss of working farms and forests through conversion resulting in altered basin hydrology and degraded habitat; 16% increase in impervious surface in Snohomish watershed from 1991-2001; potential future development pressure in nearshore, river valley and upland areas
	
	Pollution
	• **Toxics**: Groundwater contamination leaching from past industrial development
	• **Bacterial pollution**: 48% of impaired waters listings due to bacterial pollution; shellfish harvest closures in Holmes Harbor, Penn Cove, Samish Bay, Similk Bay, and Port Susan Bay
	• **Nutrient loading**: Contributes to eutrophication and naturally occurring low dissolved oxygen concentrations in Penn Cove, Saratoga Passage, Possession Sound; dissolved oxygen and temperate concerns found in streams
	• **Surface water runoff impacts**: Pollutant loading from urban stormwater and agricultural runoff; emerging pre-spawn fish mortality concern
	
	Freshwater resources
	• Limited water availability for people, farms, and fish: Low summer flows in WRIAs 5 & 7;
	• Altered magnitude, frequency and duration of peak flow events in WRIAs 3, 4, 5 & 7
	• Alteration of surface hydrology: Major alterations for flows in Skagit and Sultan rivers below dams
	• Increased freshwater demand from more people, resulting in decreased aquifer levels, saltwater intrusion, and decreased groundwater discharge
	
	Invasive species
	• Potential negative ecological impacts on native populations: Japanese knotweed, Spartina
	
	Artificial propagation
	• Salmon production has potential negative ecological and genetic impacts on natural populations and other hatchery populations; Shellfish production: not identified as a local issue
	
	Harvest
	• Fishing and bycatch, logging, and hunting practices: Fishing and poaching; other local pressures need to be identified
	
	Localized climate change impacts
	• Sea level rise: significant change and loss of estuarine habitat in Snohomish, Stillaguamish, and Skagit estuaries; significant loss of Whidbey Island beaches; risk of salt water intrusion; potential loss of floodplain capacity from diking
	• Changes in hydrology due to reduced snow pack and forest cover
	
	Other
	• Increase in population by 2025: 49% in Skagit, Island, Snohomish counties (over 380,000 people)
	• Toxic algal blooms in lake systems
		A: Protect intact ecosystem processes, structures and functions
		• Protect high value habitat: Examples include Northern Smith Island kelp, Padilla, Skagit and Fidalgo bays eelgrass beds, intact mainstem rivers, and unique spawning areas and bird habitat; evaluate need to protect ecosystem processes and quality of life needs when considering tidal energy projects
		• Update and implement regulatory programs: Complete and implement Shoreline Master Program updates on schedule; adopt clearing and grading ordinances throughout Whidbey Basin
		• Protect and conserve water flows: Implement flow rules and programs in all basins; upgrade flow rules in Snohomish, Skagit, and Stillaguamish basins
		• Protect and support long-term working farms, forests, and shellfish farms: Support TDR/PDR programs; provide technical assistance to landowners
		• Invasive species: Continue local efforts to identify and eradicate invasive species impairing habitat
		
		B: Restore ecosystem processes, structures and functions
		• Implement priority restoration projects: Implement Salmon Recovery three-year work plan (WRIAs 3, 4, 5, 6, 7), and restoration components of shoreline management plans
		• Complete large scale estuary restoration projects in the Skagit, Snohomish, and Stillaguamish rivers and meet restoration targets set in the salmon recovery plans
		• Implement large-scale floodplain projects to remove bank armoring, re-connect side channels and provide mainstem rivers with ability to migrate and create diverse instream habitat
		• Prioritize and strategically remove derelict gear removal
		
		C: Reduce sources of water pollution
		• Prevent pollution:
		  o Implement Watershed Management Plans addressing temperature, dissolved oxygen, mercury, and bacteria impairments
		  o Evaluate low dissolved oxygen levels in Penn Cove, Holmes Harbor, Saratoga Passage, and Possession Sound, and develop and implement strategy to address low dissolved oxygen levels if necessary (using lessons learned in Hood Canal)
		  o Provide support for technical assistance and cost-share programs for small farms and commercial agriculture to improve and integrate agricultural nutrient management; integrate small farms into current programs; and keep livestock out of streams
		  o Implement shellfish protection plans
		• Manage stormwater runoff: Implement NPDES permits; use and increase site-appropriate LID techniques to manage for future planned growth; begin stormwater retrofits in dense urban areas
		• Manage on-site sewage systems: Support local efforts to identify and control sources of pollution
		
		D: Work effectively and efficiently together on priority actions
		• Coordinated long-term strategy:
		  o Support integration of species recovery, water quality, aquatic reserve and natural resource management plans, shoreline master programs, and Marine Resource Committee strategies; start with salmon recovery, MRC, and water management plans
		  o Continue to work cooperatively with farming community to develop a coordinated restoration strategy that balances the needs of agriculture and fish; support engagement of salmon recovery watershed groups with the Snohomish and Skagit County Agricultural Advisory Boards and other farming groups; support collaborative efforts to negotiate the Skagit Delta Tidegates and Fish Initiative
		  o Sustain recent collaborative efforts to identify protection and restoration opportunities in the Skagit watershed; maintain ongoing efforts in the Snohomish and Stillaguamish basins
		  o Investigate a permit coordination pilot project in the Snohomish Basin
		  o Implement Skagit Alternatives Futures Project results; expand project as warranted; integrate and coordinate project with other Skagit community efforts
		
		E: Implement the Action Agenda
		• Outreach and education: Implement STORM group recommendations

Whatcom County Profile

Physical description

Anchoring the northeast corner of Puget Sound is the Whatcom portion of the San Juan/ Whatcom Action Area, encompassing 1,400 square miles and bounded on three sides by Canada, the Cascade Mountains, and Puget Sound. Mount Baker, towering above the area at 10,778 feet, is an active volcano and one of the snowiest places on earth. In 1999 the Mount Baker Ski Area set a world record with 95 feet of snow in a single season. The many glaciers of Mount Baker have expanded and contracted in the past century, but have generally been in rapid retreat since the 1980s. Glacial melt feeds two branches of the Nooksack River, the largest system in the area, and direct runoff and groundwater feed other tributaries. Other major river systems include the Lummi River, independent coastal streams, and tributaries to the Fraser River in Canada. Portions of the Nooksack watershed originate in British Columbia. There are more than 3,000 total miles of freshwater courses, including streams, rivers, lakes, ponds and wetlands, as well as 155 miles of marine shoreline.

Land use, population, and economy

The extensive flat landscape around Lynden and Ferndale has been farmed for well over a century. Whatcom County's dairy industry ranks second out of 34 dairy-producing counties in the state, and is in the top 5 percent of dairy production nationwide. Half of the 103,000 milk cows in Puget Sound are in Whatcom County. The county also produces more than 65 percent of the nation's raspberries. Other major crops include strawberries, blueberries, greenhouse/nursery items, poultry and eggs, and seed potatoes.

Approximately 9 percent of Whatcom County land use is agricultural, while 82 percent of the land is considered forest and rural. Bellingham is the largest city in Whatcom County with almost half of the present County population. Incorporated and urban lands make up 3 percent to 7 percent of the county, and other land uses consist of mining, industrial, and commercial development. Two refineries, an aluminum smelter, Western Washington University (WWU), the Port of Bellingham, and traditional commercial forestry and fishing also contribute to the region's economy. The former pulp mill site in Bellingham Bay is in the process of evolving from a heavy industrial site to a mixed use waterfront with parks, businesses, and public moorage that will be linked to downtown Bellingham, while portions of the Whatcom Waterway are reserved for deepwater commercial use.

The reservation lands of the Nooksack Tribe are located primarily along and in the vicinity of the Nooksack River and its tributaries. The Lummi Indian Nation lands include the Lummi and Sandy Point peninsulas, Portage Island, and associated tidelands. Both tribes exercise treaty rights to fish, hunt, and gather throughout the Nooksack watershed area. Shellfish harvest is an important activity for local tribes and a major commercial industry for the region. Recreational shellfish harvest is an active recreational pursuit by area residents at Semiahmoo Spit, Birch Bay, and Chuckanut Bay.

The relatively shallow depths of Birch Bay result in warm water temperatures and increased recreational activities in the summer. Lake Whatcom is another popular recreational and residential area. Winter recreation enthusiasts rely on the proximity to the Mount Baker Ski Area for easy access to snow sports. Residents and visitors to Whatcom County, WWU students, tribal citizens, and pioneer descendents place a high value on the diverse environment and economy of Whatcom County. There is active participation in marine resource committees, watershed councils, and education and restoration programs related to the continued health of the ecosystem.

Unique ecosystem characteristics and assets

Mount Baker has been a landmark since humans first began to navigate and explore this corner of Puget Sound, and the abundant snowfields provide water and electricity for communities in Puget Sound. In addition to the striking natural beauty of Whatcom County, the region supports habitat types from alpine headwaters to tidal bays, along with farming, fishing, and forestry operations. This area sustains every native Pacific salmonid species, and includes unusual types such as riverine sockeye salmon. The Chinook populations in the North/Middle and South Forks of the Nooksack River have distinct genetic and timing traits that are considered to be crucial in retaining the diversity and viability of threatened Puget Sound Chinook salmon overall. All of the salmon species depend on the nearshore habitats for food and shelter as they adjust between freshwater and saltwater. The marine shorelines of Whatcom County produce surf smelt, sand lance, and anchovy, along with other fish and shellfish species. Alden Bank offers shallow offshore habitat for isolated populations of geoduck, sea urchins, and clams. Cherry Point was historically the most highly productive area for herring in Puget Sound, producing an estimated 32 percent of all the known herring spawning in the Sound, prior to a precipitous decline of 94 percent from 1973 to 2000.

Natural features and human activities have made Whatcom County an important area for migratory waterfowl, raptors, and other birds. The nearshore areas have abundant food sources for marine birds; and the floodplains, wetlands, and agricultural fields provide forage areas. Greater Bellingham Bay, including Chuckanut and Portage bays, Drayton Harbor, Semiahmoo Spit, and Birch Bay are stopovers for the migratory birds' flight path between the Fraser River estuary and Skagit Bay.

Action area status and threats

Past, present and future stresses to the ecosystem affect the plant, animal and human communities of the Whatcom area. Historically, 65 percent of the wetland area of the greater Nooksack/Lummi river delta, once inundated by tidal channels, was converted to agriculture. Some of that habitat is now reverting to wetlands. Diking and ditching activities in the Nooksack River valley from 1880 to 1998 led to the loss of 95 percent to 99 percent of seasonally inundated freshwater wetlands, loss of side channels, and an overall reduction of habitat diversity. Vegetation removal along creeks, rivers, and marine shorelines has reduced shade, increased temperatures, eliminated the delivery of wood for stream structure, and decreased the filtration of pollutants before they enter the water. The agriculture industry is under substantial pressure from land conversion, and local farmers are concerned that many commercial farm services for transportation, supply, and processing are disappearing. An increasing number of "recreational farmers" raise berries, dairy cattle, or maintain horses, llamas, or other livestock on small parcels, and are a complex and growing challenge to upgrading habitat conditions and maintaining flows. Many of these newer small farmers have little familiarity with appropriate pasture and livestock management practices, thus the learning curve for good stewardship is high and the educational needs are significant. Animal waste disposal has been a considerable challenge as Whatcom County has an estimated 105,000 head of cattle (including dairy cows) and 2,500 horses, along with hundreds of sheep, goats, and llamas/alpacas. More than 40 percent of all Puget Sound cattle are located in Whatcom County. Nutrient loads to freshwater bodies impact aquatic life, and fecal coliform bacteria counts in Drayton Harbor, Portage Bay, and Chuckanut Bay have resulted in shellfish harvest closures. Drayton Harbor, a major shellfish growing area, has been the top-ranked area in Puget Sound on the Washington Department of Health's Fecal Pollution Index since 2002. Shellfish protection districts have been declared at Drayton Harbor and Portage Bay. Nutrient loading and threats from bacterial contamination also result from the estimated 30,000 on-site septic systems in Whatcom County, some of which are old and failing.

Although the Nooksack River system supports many species of salmon, their unique early-timed populations of Chinook are of particular concern, as the average number of spawners from 1996 to 2000 fell to 120 and 200 for the North and South Forks respectively. Steelhead and bull trout are also listed as threatened. Threats to the Nooksack Chinook and other salmon species in the action area result from low flows, habitat loss, poaching, and overharvest. Dikes, roads, and tidegates removed freshwater and estuarine channels. Extensive water withdrawals and sediment loads have raised stream temperatures, and create passage problems and heat barriers to salmon migration in some sections. Instream flow changes, both from low flows and high peak flows, are an ongoing issue affecting salmon in the watershed, and several small watersheds are closed to future water withdrawals. Historical logging practices in the upper watershed left a legacy of instability – in the upper South Fork Nooksack, more than 900 shallow, rapid landslides have contributed sediment to streams and altered the channel structure. Most of the landslides were associated with forest management practices such as clear cuts, railroads, and forest roads. Nooksack Chinook are especially vulnerable to Canadian harvest because of their location and migratory patterns; an estimated 73 percent of Nooksack River early-timed Chinook harvest occurred in Canadian fisheries prior to 2004. Tribal and state fisheries managers were forced to make difficult decisions to place the Nooksack Chinook on hatchery "life-support" while habitat and harvest conditions improve. The decline of Nooksack spring-timed Chinook salmon has had ecological and economic ramifications, and has been a cultural wound to area tribes and other fishers.

Estuary loss has been documented in Bellingham, Lummi and Samish bays due to industrial and urban development as well as agricultural modification. Some eelgrass meadows, such as portions of the former delta of Whatcom Creek and Samish Bay, have been substantially reduced by shoreline modification, dredging, and displacement for oyster aquaculture. An estimated 36 percent of the Whatcom County shoreline has been modified. Whatcom County is faced with the challenge of having industrial land uses, such as the Cherry Point and Ferndale oil refineries and aluminum smelter, adjacent to high-value marine areas – the overwater transfer of oil at the refineries is a particular concern. The former pulp mill site and shipyards in Bellingham Bay represent major sources of legacy toxic contamination in the region. Other issues identified in the Whatcom portion of the Action Area include the threat of oil spills and pipeline ruptures, airborne pollution in North Cascade National Park, and low levels of dissolved oxygen and pollutants in Lake Whatcom. The Lake Whatcom watershed supplies freshwater to half of the county population.

Key strategies

Retention of working resource lands for forestry and agriculture is a high priority in Whatcom County for sustaining regional hydrology, open space and habitat, and rural lifestyles. Conversion of resource lands to development increases stormwater runoff, further impacting flow regimes. With more than 1,300 landowners with livestock, education and stewardship are essential in Whatcom County to prepare and implement dairy nutrient management plans, watercourse buffers, and best management practices for large and small farm operations. Other priority strategies include protection of intact marine and nearshore habitat, improved forest management, restoration of shorelines and river systems, and the implementation of water quality cleanup plans for Drayton Harbor, Birch Bay, Lake Whatcom, and other impaired areas. Cleanup of toxic contamination of Bellingham Bay and the redevelopment of the waterfront is expected to promote economic development while improving ecosystem health.

As a trans-boundary area, Whatcom County will experience the impact of population growth from both the Puget Sound region and Canada's Georgia Basin/Fraser River Valley. The county's population is projected to increase by an estimated 80,000 people in the next two decades. Without careful management, growth will exacerbate the fragmentation of sensitive habitat and strain water supplies. Freshwater resources for people, fish, and agriculture are already inadequate in this region to meet irrigation, municipal, industrial, and ecological needs. And the rapidly retreating glaciers of Mount Baker attest to the coming challenge of climate change.

Whatcom County						
Land (# acres)	**% impervious surface**	**Urban Growth Area Incorp. + Unincorp.**		**% of land that is publicly owned**	**Marine shoreline # linear feet**	**Marine shoreline % modified**
		# acres	%			
810,456	n/a	54,872	7%	51%	818,653	36%

Projected Population Change for Whatcom County			
County	**2000 Census**	**2025 Projection**	**% change**
Whatcom	166,814	246,406	48%
Notes: Based on data from WA OFM, medium growth projection for 2025.			

Whatcom County

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority action area strategies

Unique species
• Two unique spring run Chinook populations in Nooksack River
• Historically significant Cherry Point herring spawning area
• ESA listed bull trout distinct population segments
 	
Unique habitat type and ecosystem processes
• Marine/estuary: Forage fish habitat
• Upland: Migratory bird habitat
• Upland: Intact forests in and around Cascades National Park
• Cherry Point Aquatic Reserve
 	
Freshwater resources
• Lake Whatcom watershed, including water diverted from the Middle Fork Nooksack River, provides water for half of Whatcom County
• Shared rivers and streams with Canada
 	
Food and timber (harvest)
• Large agriculture: Significant dairy industry (ranks in top 5 dairy regions nationally), 75% of U.S. raspberry production, blueberries.
• Shellfish aquaculture and Dungeness crab fishery (tribal, commercial and recreational)
• Commercial, tribal, and recreational fishing
• Commercial timber production
• Hatcheries to provide harvest opportunities and population stability while wild salmon stocks rebuild (South Fork Nooksack spring Chinook, North Fork Nooksack spring Chinook)
 	
Recreation and tourism
• Mount Baker, North Cascades, rafting, hiking, kayaking, skiing, birding, Birch Bay, Nooksack River, Lake Whatcom
 	
Community and economy
• Rural communities
• Proximity to recreation draws outdoor enthusiasts to reside in area
• Lummi Nation
• Nooksack Tribe
	Habitat alteration
	• **Marine**: 3,000+ derelict crab pots and multiple fishing nets in Cherry Point reach and other areas
	• **Marine/estuary:** Loss of native eelgrass meadows due to shoreline modification and dredging in inner Bellingham Bay
	• **Marine nearshore:** 36% of shoreline modified; degradation of marine riparian vegetation and function
	• **Freshwater:** Loss of mainstem and floodplain river habitat; culverts and dams disrupt hydrology and/or block habitat; loss of riparian function and straightening of stream channels
	• **Upland**: Loss of forest cover and extensive forest road drainage resulting in landslides and adding to high water temperatures that cause pre-spawn mortality
	
	Pollution
	• **Toxics**: Industrial pollution in Bellingham Bay include metals, PAHs, nutrients; large refinery and aluminum smelter at Cherry Point
	• **Bacterial pollution:** nutrients and pathogens from human and animal waste lead to shellfish closures in Drayton Harbor, Portage Bay, Chuckanut (Mud) Bay, Birch Bay
	• Low dissolved oxygen, mercury and phosphorous in Lake Whatcom
	• **Surface water runoff impacts**: Bellingham Bay, Birch Bay, Drayton Harbor
	
	Freshwater resources
	• Low instream flows and many established instream flows not being met
	
	Invasive species
	• Potential negative ecological impacts on native populations: tunicates in Blaine Marina, Drayton Harbor, Chuckanut Bay, Birch Bay; rock snot in Chuckanut area; knotweed in Nooksack estuary; *Spartina* in Birch Bay
	
	Artificial propagation
	• Salmon production has potential negative ecological and genetic impacts on natural populations and other hatchery populations; Fall Chinook hatchery production has potential negative impacts on native spring-run Chinook
	
	Harvest
	• Fishing and bycatch: Nooksack Chinook salmon runs heavily impacted by Canadian harvest and fish poaching; Logging and hunting practices: Local pressures need to be identified
	
	Localized climate change impact
	• Sea level rise: loss of swamp, marsh and estuarine beach in Nooksack Delta; possible conversion of habitat types
	• Potential hydrologic changes in Middle and North Forks of the Nooksack due to loss of glaciers and earlier snow melt
	
	Other
	• Increase in population by 2025: 48%, more than 79,000 people
		A: Protect intact ecosystem processes, structures, and functions
		• Protect high value habitat: Develop strategy to protect large intact marine and nearshore habitat; implement protection strategies in salmon recovery plans and Shoreline Master Program; complete management plan for Cherry Point Aquatic Reserve
		• Update and implement regulatory programs: Implement Critical Area Ordinance updates and the county's and cities' Shoreline Master Programs; implement new land use measures and mitigation alternatives through implementation of the Birch Bay Watershed characterization Pilot Study
		• Protect and conserve water flows: Implement Instream Flow Action Plan for WRIA 1; address illegal water withdrawals
		• Protect and support long-term stewardship of working farms, forests and shellfish farms: Limit forest and farm conversions; ensure that forest practices are enforced
		
		B: Restore ecosystem processes, structures, and functions
		• Implement priority ecosystem restoration projects in existing plans:
		  o Implement Salmon Recovery three-year work plan for WRIA 1
		  o Implement the Shoreline Master Program restoration plan coordinated with salmon recovery efforts and nearshore and marine resource programs and projects
		• Quantify impacts from derelict fishing and strategically remove starting with Cherry Point
		• Enhance habitat on forested and resource lands
		
		C: Reduce sources of water pollution
		• Prevent pollution: Implement Watershed Management Plans in Drayton Harbor, Whatcom Creek, Lower Nooksack Basin, Lake Whatcom; clean up Drayton Harbor, Birch Bay, and Portage Bay by implementing Shellfish Protection Plans and completing and implementing other water quality plans in a coordinated way; continue efforts to manage refinery at Cherry Point to minimize pollution
		• Manage stormwater runoff: Implement NPDES permits; implement Lake Whatcom, Birch Bay and Bellingham Bay Comprehensive Stormwater Management Plans; use and increase site-appropriate LID techniques; implement stormwater retrofits in Bellingham; prioritize local stormwater actions across existing plans; improve regulatory compliance for discharges
		• Manage on-site sewage systems: Implement O&M plans with initial focus on marine recovery areas, shellfish protection districts, and Lake Whatcom; improve regulatory enforcement and compliance for reduction of nutrient and pathogen loading
		• Prioritize inwater and toxic cleanup sites: Continue to implement Bellingham Bay Pilot Program
		
		D: Work effectively and efficiently together on priority actions
		• Coordinated long-term strategy:
		  o Continue to work cooperatively with farming community to enhance habitat on farm land and maintain the agricultural land base
		  o Improve cooperative cross-agency (local, regional, state, federal, tribal) coordination, implementation, and enforcement
		  o Integrate and coordinate nearshore and marine protection and restoration efforts (e.g., pollution clean up, Shoreline Master Program, Cherry Point Marine Managed Area) with watershed recovery efforts (e.g., Critical Areas Ordinances, Instream Flow Action Plan, Watershed Management Plan, Salmon Recovery Plan, MRC plans, Shellfish District Protection Plans); coordinate development of Cherry Point Aquatic Reserve Management Plan with County Shoreline Management Program requirements
		  o Continue to support South Fork Chinook Supplementation plan
		• Continue to work cooperatively with Canadian neighbors on transboundary water quality, water quantity, fish habitat, and flooding issues
		• Recover Cherry Point herring stock

San Juan County Profile

Physical description

Located at the nexus of the Strait of Juan de Fuca, the Georgia Straits, and Puget Sound, the 428 separate islands that make up San Juan County are considered by many to be the crown jewels of Puget Sound. San Juan County has the smallest land mass of any county in Washington state, but with 408 miles of marine shoreline, has more than almost any other county in the nation. Geologically, the San Juans are distinctly different from mainland Washington and Vancouver Island, and are dominated by bedrock and thinner glacial deposits relative to other parts of Puget Sound. Their unique location in the Puget Sound marine crossroads gives the San Juans a wide diversity of flora and fauna. San Juan County is affected by the "rainshadow" of the Olympic Mountains, and receives 20 inches to 30 inches of annual rainfall. There are no major rivers on the San Juan Islands, but several small creeks flow on a year-round basis. Additionally, the Fraser River in British Columbia influences the temperature and sedimentation in San Juan County waters. Only 1 percent of the land is paved, and 70 percent is forested. Lakes and freshwater wetlands cover an estimated 4 percent of the landscape.

Land use, population, and economy

The San Juans are an extremely popular summer destination, and the number of residents swells from 15,804 who live there year-round to 33,460 in the summer. Thousands of additional tourists camp, moor, or stay in area lodging. Most of the county is rural, with 75 percent of the population living outside the "urban" areas of Friday Harbor, Eastsound, and Lopez Village. Population growth in the islands is very high, with a growth rate of 40 percent from 1990 to 2000. There are 5,700 shoreline parcels in San Juan County, and approximately 50 percent have already been developed. Some islands have no public access and few accommodate automobiles. Of the 20 inhabited islands, only four have ferry system connections.

The economy is driven by residential and commercial construction, tourism and government (including schools). Tourism is highly dependent on the clean marine water and freshwater, spectacular views, and opportunities for boating, bird watching, whale watching, and cycling. There is significant marine-oriented commerce including marinas, fishing, boat building and repair, and education and research from organizations such as the UW Friday Harbor Labs, SeaDoc Society, and Seattle Pacific University marine labs. High quality shellfish farming occurs in San Juan County and there is a growing sustainable agricultural movement. Several tribes from the Point-No-Point and Point Elliott treaty areas exercise fishing rights in the San Juan Islands region.

Unique ecosystem characteristics and assets

Public involvement in the stewardship of the San Juan Islands is considered by area residents to be one of their foremost ecosystem assets. There are many government and non-governmental efforts devoted to protecting the San Juan Islands. The San Juan Preservation Trust is the oldest private land trust in the state. The San Juan County Land Bank protects natural areas and is the only county-based land bank in the state. In 2007, the San Juan County Council adopted the San Juan County Marine Stewardship Area Plan, the culmination of three years of effort by the San Juan Marine Resources Committee, with contributions from numerous scientists, technical advisors, resource managers, community leaders, business owners, and citizens. The Marine Stewardship Area Plan is intended to sustain the many services that the ecosystem provides for county citizens, fish and wildlife, and the county's economy. Examples of these benefits include sustainable tourism, commercial and recreational fisheries for clams, crab and spot prawns, and clean beaches and waters. There are currently no beaches in the San Juan Islands that are

closed to swimming or to shellfish harvest for health reasons. Protected upland areas are located at Moran State Park, San Juan Historical National Park, Turtleback Mountain, and Lopez Hill. Yellow Island contains an intact prairie.

The location of the San Juans at the juncture of the central Puget Sound basin, Strait of Juan de Fuca, and the Georgia Straits makes them a way-station for all 22 migrating populations of Puget Sound Chinook salmon, as both juveniles and adults. Additionally, sockeye, pink, chum and coho salmon; Kokanee, steelhead, rainbow, and coastal cutthroat trout; and native char have been documented in the county's marine waters. Although most of the streams in San Juan County are small and do not support salmon, a small number of coho have recently been reported spawning in Cascade Creek and possibly other streams on Orcas Island, and a few creeks support introduced runs of chum. San Juan County provides excellent habitat for juvenile and adult salmon with at least 27 tidal marshes, inter- and sub-tidal flats, eelgrass meadows along the shorelines and in the bays, and kelp beds. At least 80 miles of potential forage fish spawning beaches are present. Eelgrass is found on 20 percent of all shorelines, and the San Juans contain one-third of all of the kelp in Puget Sound. The geology has created habitat conditions for rockfish that are not replicated anywhere else in Puget Sound. Approximately 74 percent of the shallow dominant rocky reef habitat in Puget Sound, comprised of boulder fields, rocky ledges and outcroppings, is found in the San Juan archipelago.

Action area status and threats

Approximately 5 percent of the shoreline in San Juan County has been modified – far less than the 33 percent average for Puget Sound, but several factors make this a highly vulnerable portion of the Puget Sound ecosystem. The projected influx of over 8,000 new residents in the next two decades is an increase of 60 percent, making it one of the fastest-growing areas of Puget Sound. The resident population is only a portion of the potential strain, as the summer tourist population quadruples in portions of the islands, and creates demand for marinas, roads, parking, water, and wastewater treatment. Growth and climate change are expected to create additional stress on the limited supplies of fresh water in the islands. There are no rivers and no snowpack to replenish groundwater supplies, and few aquifer recharge areas are present given the bedrock geology. Saltwater intrusion and drinking water contamination are already a significant problem in some areas of the county. A rainwater collection regional permit is in process and will be available for Shaw and Lopez islands in the fall of 2008. The county is also sensitive to other growth-related impacts, including stormwater, ferry vessels, ferry parking, and vessel traffic disturbance to wildlife (especially in the summer). Alteration and loss of nearshore habitat due to over-water structures and shoreline development such as loss of riparian buffers and shoreline armoring is a major threat. San Juan County is also ranked as the highest priority area for removing harmful derelict fishing gear in Puget Sound as determined by physical surveys of nets and pots – and because the county has a significant amount of highly valued species and habitats damaged by the gear.

Based on monitoring information of mussels and harbor seals, contaminants within the food chain of the Northwest Straits region, including San Juan County, are lower than in other regions of Puget Sound. However, the impacts to marine species that reside in or transit the waters of the San Juans indicate that species abundance and health are a serious concern. The location of the San Juan Islands at the intersection of major vessel transit lanes and the quantity of commercial and recreational vessel traffic pose a risk of chronic and catastrophic oil spills. The overwater transfer of oil at nearby refineries at Cherry Point and Ferndale is also a potential source of contamination to San Juan County marine waters and shorelines.

The San Juan Islands provide core summer habitat for the ESA-listed Southern Resident Killer Whale population.

Other important species and habitats – including eelgrass, herring, rockfish, and marine birds – are in decline, and fishing opportunities have decreased. Rockfish species once commonly caught in San Juan County are no longer abundant. Recreational and commercial salmon harvest and opportunities to harvest have declined substantially in recent years. Northern abalone, harvested recreationally before 1994, are now in danger of extinction. Scientific data also suggest some non-native species found in San Juan County such as the Pacific oysters, tunicates, Japanese seaweed, and purple varnish clams could limit habitat for native species

Key strategies

Strategies identified in the Puget Sound Salmon Recovery Plan, San Juan Salmon Recovery Plan, Southern Resident Killer Whale Recovery Plan, and the San Juan County Marine Stewardship Area Plan have been developed to address many of the identified threats in the San Juan Islands, but remain to be implemented. Local priority actions focus on protecting remaining valuable habitat through acquisition and regulatory programs, and ensuring that human activities minimize disruption of key species such as orcas and prevent contamination of habitat. Preventive measures include the maintenance of oil spill response equipment and programs, and the implementation of low impact development and water conservation techniques. Protecting the San Juan ecosystem will require strong citizen participation and support. The top-ranked strategy from the MSA plan is to foster a marine stewardship ethic in residents and visitors.

San Juan County						
Land (# acres)	**% impervious surface**	**Urban Growth Area Incorp. + Unincorp.**		**% of land that is publicly owned**	**Marine shoreline # linear feet**	**Marine shoreline % modified**
		# acres	%			
112,074	n/a	2,334	2%	16%	2,155,074	5%

Projected population change for San Juan County			
County	**2000 Census**	**2025 Projection**	**% change**
San Juan	14,077	22,513	60%
Notes: Based on data from WA OFM, medium growth projection for 2025.			

San Juan County

Ecosystem benefits provided by action area	Local threats to ecosystem benefits	Priority action area strategies

Unique species
• Pinto abalone at risk of extinction
 	
Unique habitat type and ecosystem processes
• Marine nearshore: Habitat for 22 populations of migrating Chinook salmon, supporting orca populations and marine birds
• Marine nearshore: Extensive forage fish spawning habitat
• Marine nearshore: 70% of rocky reef habitat in Puget Sound
• Marine nearshore: One-third of kelp in Puget Sound
• Marine: Rich diversity of habitats and marine life
 	
Food and timber (harvest)
• Boutique agriculture industry
• Shellfish industry and crab fishery
• Recreational, commercial, and tribal fishing and crabbing
 	
Recreation and tourism
• Moran State Park, American & English Camp, Lime Kiln Park, Turtleback Mountain, Lopez Hill
• Local & international tourist destination (whale watching, kayaking, biking, boating)
 	
Community and economy
• Vacation residences
• Lummi Tribe
	Habitat alteration
	• **Marine:** Habitat degradation from derelict gear
	• **Marine/estuary**: Loss of eelgrass habitat; 11 of 27 historical pocket estuaries at risk of degradation; loss of eelgrass habitat
	• **Marine nearshore:** Limited soft shoreline sensitive to modification; loss of high value beach habitat including potential forage fish habitat
	• **Upland:** Loss of working farms through conversion
	
	Pollution
	• **Toxics:** Potential for localized oil spills; potential for significant pollution from a major oil spill in the Strait
	• **Bacterial pollution**: Inadequate waste management to handle summer influx of visitors; boater pollution in bays and marinas; potential problems from poorly treated wastewater from Victoria B.C. outfall that reaches islands
	• **Surface water runoff impacts**: Localized pollutant loading from stormwater runoff (e.g., Friday Harbor, ferry landings)
	
	Freshwater resources
	• **Limited water availability for people, farms and fish:** Groundwater dependent system is vulnerable to groundwater pollution from septic systems and alterations to surface flow; increased future water demand
	• Saltwater intrusion into drinking water supply (San Juan Island, Lopez)
	
	Invasive species
	• Potential negative ecological impacts on native populations: Tunicates, Japanese seaweed, purple varnish clams
	
	Artificial propagation
	• Salmon production has potential negative ecological impacts on natural populations and other hatchery populations; Shellfish production: specific local issues not yet identified
	
	Harvest
	• Fishing and bycatch: commercial and recreational harvest rates of salmon and groundfish (e.g., rockfish and forage fish) may reduce recovery potential
	
	Localized climate change impact
	• Sea level rise and ocean acidification: immediate and longer-term impacts are not well understood
	
	Other
	• Population doubles in summer months resulting in stresses to local infrastructure
	• Increase in year-round population by 2025: 60%, more than 8,000 people
	• Local orca population threatened by pollution, loss of food sources, and disturbance
		A: Protect intact ecosystem processes, structures, and functions
		• Protect high value habitat:
		  ○ Acquire priority habitats identified in the Salmon Recovery Plan
		  ○ Implement San Juan Marine Stewardship Area Plan
		  ○ Implement the San Juan Marine Stewardship Area Monitoring Plan
		  ○ Implement San Juan Initiative recommendations
		  ○ Protect rock fish habitat
		  ○ Limit alterations to shorelines sensitive to modification
		• Update and implement regulatory programs: Critical Area Ordinance and Shoreline Master Program (San Juan County)
		• Protect and conserve water flows: Protect existing surface and ground water
		
		B: Restore ecosystem processes, structures, and functions
		• Implement priority ecosystem restoration projects:
		  ○ Implement Salmon Recovery three-year work plan for WRIA 2
		  ○ Strategically remove derelict fishing gear
		
		C: Reduce sources of water pollution
		• Prevent pollution: Maintain local oil spill response programs; work with Partnership on oil spill protection programs within Puget Sound and with Canada
		• Manage stormwater runoff: Update and implement Stormwater Management Plans and Codes (San Juan County); implement low impact development for new development and retrofits
		• Manage rural stormwater runoff
		
		D: Work effectively and efficiently together on priority actions
		• Coordinated long-term strategy:
		  ○ Integrate the objectives of San Juan Marine Stewardship Plan, the Shoreline Master Program and Critical Areas Ordinances so they are consistent
		  ○ Work with the Canadian organizations to identify shared priority actions
		  ○ Implement local aspects of Orca Recovery Plan
		  ○ Implement the results of the San Juan Initiative to improve effectiveness of protection efforts; coordinate implementation with regulatory updates
		
		E: Implement the Action Agenda
		• Science program: Investigate causes of marine bird declines
		• Communication, outreach, and education: Implement stewardship and outreach programs and provide technical assistance focused on protection and prevention with residents and tourists

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Acronyms and Abbreviations

AKART	All Known and Reasonable Technology
ASP	Amnesic Shellfish Poisoning (also known as Domoic Acid Poisoning)
CAA	Clean Air Act
CSO	Combined Sewer Overflow
CWA	Clean Water Act
DPSIR	Conceptual model reflecting the drivers (D), pressures (P), states (S), impacts (I), and responses (R) of factors effecting valued components of the ecosystem
ESA	Endangered Species Act
ESU	Evolutionarily Significant Unit
FPA	Forest Practices Act
GMA	Growth Management Act
HAB	Harmful Algal Bloom
HCP	Habitat Conservation Plan
HPA	Hydraulic Project Approval program
IEA	Integrated Ecosystem Assessment
IM	Information management
MPA	Marine Protected Area
NPDES	National Pollutant Discharge Elimination System
PAH	Polycyclic aromatic hydrocarbons
PBT	Persistent, Bioaccumulative Toxins
PCB	Polychlorinated biphenyl

PDBE	Polybrominated diphenyl ethers
PSP	Paralytic Shellfish Poisoning (also known as “red tide”)
RFP	Request for proposal
SARC	Shellfish Aquaculture Regulatory Committee
SEPA	State Environmental Policy Act
SMA	Shoreline Management Act
SRFB	Salmon Recovery Funding Board
SSO	Sanitary Sewer Overflow
TMDL	Total Maximum Daily Load
TPL	Trust for Public Lands
UGA	Urban Growth Area
WRIA	Water Resource Inventory Area

General Terms and Definitions

Action	A project, program or activity designed to achieve a healthy Puget Sound.
Action area	One of seven geographic areas of the Sound delineated by ESSB 5372 to facilitate development and implementation of the Action Agenda.
Adaptive management	1. A management process involving step-wise evolution of a flexible management system in response to feedback information actively collected to check or test its performance (in biological, social, and economic terms). It may involve deliberate intervention to test the fishery system's response 2. The process of improving management effectiveness by learning from the results of carefully designed decisions or experiments.
Artificial propagation	Spawning, incubating, and/or rearing of fish or shellfish by a human for sale, release or other uses.
Benchmark	Measurable interim milestones or achievements established to demonstrate progress towards a goal, objective, or outcome.
Biodiversity	The full range of life in all its forms, includes the ecosystems in which life occurs, the way species and their habitats interact with each other, and the physical environment and processes necessary for those interactions. Includes all species found within the Sound, the interactions that sustain each species, such as predator-prey relationships, and the physical processes on which life depends, including chemical and nutrient cycling, water filtration, and climate regulation.
Bycatch	Fish other than the primary target species that are caught incidental to the harvest of the primary species. Bycatch may be retained or discarded.
Cultured species	Any species raised by humans for human use, including hatchery fish, cultivated shellfish, managed timber, and all agricultural species.
Derelict gear and vessels	Long-lasting marine debris that poses many problems to people and marine animals, including: nets, lines, crab and shrimp traps/pots, and other recreational or commercial harvest equipment and boats that has been lost or abandoned in the marine environment.
Diversity	The distribution and abundance of different plant and animal communities and species within a given area. When referring to particular species, the distribution of traits within and among populations, ranging in scale from DNA sequence variation at single genes to complex life-history traits.
Driver	An external factor that amplifies pressures. Can be natural (climate, volcano, etc.) and can include population growth.
Ecosystem	A group of interrelated plants, animals and people together with their inanimate surroundings. Includes environmental, social, cultural, and economic systems.
Ecosystem-based management	An approach that takes major ecosystem components and services into account in managing natural resources. It values habitat, embraces a multispecies perspective,

	and is committed to understanding ecosystem processes. Its goal is to rebuild and sustain populations, species, biological communities, and marine ecosystems at high levels of productivity and biological diversity so as not to jeopardize a wide range of goods and services from marine ecosystems while providing food, revenue, and recreation for humans.
Ecosystem services	Benefits people obtain from ecosystems, examples include food and water, flood and disease control, spiritual and cultural benefits, and nutrient cycling, that maintains the conditions for life on earth.
Endocrine disruptor	Chemical having potential to cause effects within the endocrine system and thereby alter physiology, including development and reproduction. Such compounds as xenoestrogens, anti-androgens, and thyroid hormone mimics may include some pesticides and industrial substances, among others.
Indicator	A physical, biological, or chemical measurement, statistic, or value that provides a gauge, or evidence of, the status of the environment including social and economic values.
Estuary	A semi-enclosed body of water which has free connection to the open ocean and within which water is measurably diluted with fresh water derived from land drainage.
Exempt wells	Wells that do not require a permit from the Washington State Department of Ecology and are generally used for domestic purposes, including stock water and small-scale irrigation.
Food chain	A series of organisms connected by their feeding habits; each link in the food chain is consumed by a larger one, which is consumed by a still larger one.
Food web	Multiple food chains connected within and among ecosystems (see food chain).
Forage fish	Species used as prey by a larger predator for its food, includes small schooling fishes such as anchovies, sardines, herrings, capelin, smelts, and menhaden, and invertebrates such as squid.
Goal	In the Action Agenda, refers to the six goals established by the legislature in Section 12 of ESSB 5372. These goals express a vision for a healthy ecosystem, which includes humans as a prominent part of the picture.
Hypoxia	Deficiency of available oxygen.
Indicator target	The measurable point at which each environmental indicator will be considered to be a healthy and functioning component of the Puget Sound ecosystem.
In-lieu-fee mitigation	An agreement between a regulatory agency (state, federal or local) and a single sponsor, generally a public agency or non-profit organization. The mitigation sponsor collects funds from an individual or a number of individuals who are required to conduct compensatory mitigation. The sponsor may use the funds pooled from multiple permittees to create one or a number of sites to satisfy mitigation requirements.
Introduced species	With respect to a particular ecosystem, any species, including its seeds, eggs,

	spores, or other biological material capable of propagating that species, that is not native to that ecosystem. Introduced species are also called exotic, nonnative, and alien species. (see *Invasive Species*)
Invasive species	An introduced species that out-competes native species for space and resources. (see *Introduced Species*, *Native Species*)
Native species	A local species that has not been introduced. (see *Introduced Species, Invasive Species*)
Nearshore	Shallow waters at a small distance from the marine or freshwater shore.
Near-term actions	In the Action Agenda, actions that should begin or be completed with the next two years.
Nutrient	Chemical elements and compounds found in the environment that plants and animals use to survive and grow. In water quality investigations, the major nutrients of interest are forms of nitrogen and phosphorus. High concentrations of nutrients in water bodies can cause eutrophication and hypoxia.
On-site sewage system	Decentralized wastewater treatment system used to collect, treat, and disperse or reclaim wastewater from individual dwellings, businesses, or small communities or service areas (commonly referred to as septic system, individual sewage treatment system, onsite sewage disposal system, or "package" plant).
Outcome	Qualitative statements of what a healthy ecosystem should look like.
Pathogen	Any disease-producing agent, especially virus, bacteria or fungi.
Pelagic	That part of the ocean that comprises the water column; open water.
Principles	In the Agenda Agenda, the ecological principles set the direction for identifying near and long-term actions.
Status	The existing condition of each component of the Puget Sound ecosystem. Status may be depicted at a "snapshot in time", as a trend, or both. Example: fecal coliform concentrations in a specific water body at a given time.
Strategic priority	In the Action Agenda, refers to five specific priorities: protect intact ecosystem processes, restore ecosystem processes, prevent water pollution at its source, work together as a system, and build an implementation, monitoring, and accountability management system.
Threat	Human activities or influences that have or are causing the degradation of components or functions of the Puget Sound ecosystem. A threat may influence one or more indicators and one or more goal.
Topic forum	For the Action Agenda, small group with an accompanying workshop of science and policy experts who synthesized the Puget Sound region's current understanding of each of the Partnership goals and identifying strategies needed to achieve a healthy Sound. There were five topic forums: habitat and land use, human health, species and biodiversity, water quality, and water quantity).