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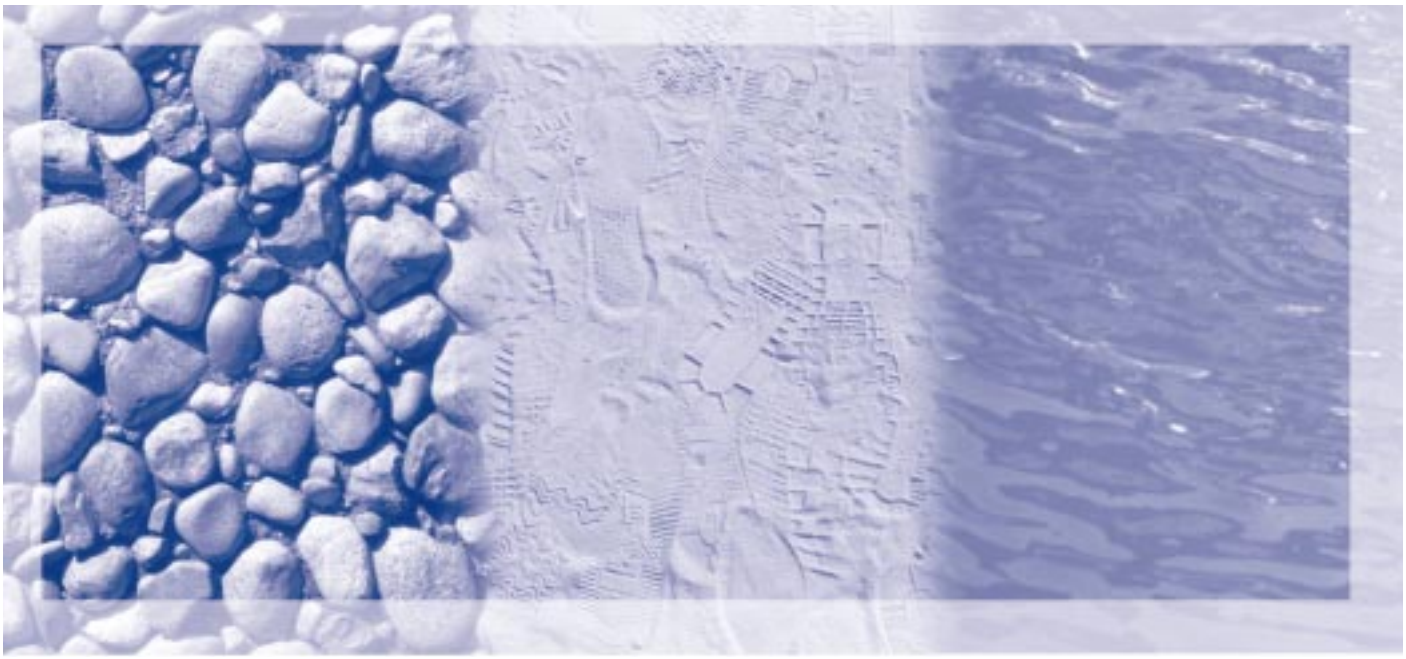

Puget Sound Water Quality Management Plan

Adopted December 14, 2000

2000

Puget Sound Water Quality Management Plan

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PUGET SOUND WATER QUALITY ACTION TEAM
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Acknowledgement
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PUGET SOUND WATER QUALITY ACTION TEAM
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January 2001

To Governor Locke, the Legislature and the Citizens of Washington State:

On behalf of the Puget Sound Water Quality Action Team and Puget Sound Council, I am pleased to present you with the *2000 Puget Sound Water Quality Management Plan*. This plan, adopted in December 2000 in accordance with state and federal law, lays out a coordinated set of local, state, tribal and federal actions to restore and protect the health of Puget Sound.

The first Puget Sound management plan was adopted in 1987. Subsequent revisions in 1989, 1991, 1994 and 1996 updated the state's approaches to the wide variety of issues facing the Sound.

In 1999, the Action Team and Council began another review of the management plan and decided to include two new programs and revise three others in this edition of the plan. We also decided to update and streamline information in all plan programs.

The 2000 management plan includes new programs to control and prevent invasions by aquatic nuisance species and to coordinate issues and programs that affect the shared waters of Puget Sound and the Georgia Basin. The stormwater management, habitat protection, and wetlands protection programs of the 1996 management plan have been substantially revised.

The Action Team and Puget Sound Council represent diverse perspectives, and our unanimous support for this 2000 management plan is an important indication of the spirit of cooperation that went into its development. We applaud the ongoing and important work of local governments, tribal governments, federal and state agencies, businesses, organizations and individuals who have carried out actions called for in the 1996 management plan.

Implementing the *2000 Puget Sound Water Quality Management Plan* will require renewed commitment to improvements in funding, policies and operations. We urge you to continue your strong support for the actions necessary to achieve our common goal of a diverse and healthy Puget Sound.

Nancy McKay
Chair

Puget Sound Water Quality Action Team Members

Nancy McKay
Chair

Chuck Booth
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Chair

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Washington State House of Representatives

Kirk Anderson
Fisher Companies, Inc. *(Representing Business)*

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Washington State Senate

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Tom Putnam
Puget Soundkeeper Alliance *(Representing the Environmental Community)*

Pam Roach*
(R-Auburn)
Washington State Senate

Jerry Van der Veen
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Fran Wilshusen
Northwest Indian Fisheries Commission *(Representing Tribes)*

* Indicates non-voting member

Puget Sound Water Quality Management Plan 2000

Table of Contents

Introduction

The legislature finds that:

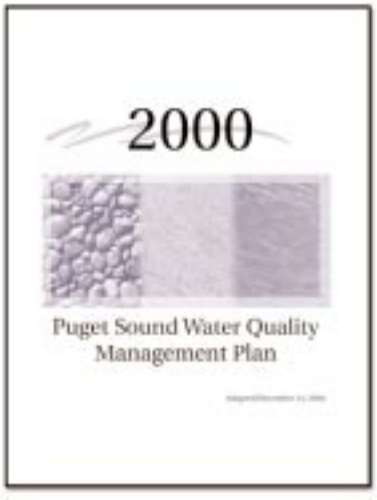
> **Puget Sound** and related inland marine waterways of Washington state represent a unique and unparalleled resource. A rich and varied range of marine organisms, comprising an interdependent, sensitive communal ecosystem reside in these sheltered waters. Residents of this region enjoy a way of life centered around the waters of Puget Sound, featuring accessible recreational opportunities, world-class port facilities and water transportation systems, harvest of marine food resources, shoreline-oriented life styles, water-dependent industries, tourism, irreplaceable aesthetics, and other activities, all of which to some degree depend upon a clean and healthy marine resource.
>
> *~ Puget Sound Water Quality Protection Act 1996 (Chapter 90.71 RCW)*

What is the *Puget Sound Water Quality Management Plan*?

The ***Puget Sound Water Quality Management Plan*** is Washington State's long-term strategy for protecting and restoring Puget Sound. The management plan provides the framework for managing and protecting the Sound and coordinating the roles and responsibilities of federal, state, tribal and local governments.

To coordinate government actions for protecting and restoring the Sound, the 1996 legislature established the Puget Sound Water Quality Action Team, the Puget Sound Council and a governor-appointed chair who manages both of these. Together, the Action Team and Council periodically review and update the management plan to reflect changing issues, advances in technology, public expectations, and political and budgetary concerns.

The management plan also serves as the federally approved Comprehensive Conservation and Management Plan (CCMP) for Puget Sound under Section 320 of the federal Clean Water Act, which established the National Estuary Program.



What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

It is...the policy of the state to implement the Puget Sound water quality management plan to the maximum extent possible.

~ RCW 90.71.005

The Goal

The goal of the *Puget Sound Management Plan* is to restore and protect the biological health and diversity of Puget Sound by:

- preserving and restoring wetlands and aquatic habitats and the natural processes and functions that created them;
- preventing increases in the introduction of pollutants to the Sound and its watersheds; and
- reducing and ultimately eliminating harm from the entry of pollutants to the waters, sediments and shorelines of Puget Sound.

The management plan's emphasis on prevention recognizes that it will cost us far more to clean up pollution later than to prevent it now. The management plan recognizes that we all share responsibility for the Puget Sound region and that fish, wildlife, water and pollutants cross jurisdictional lines. It establishes a framework based on a partnership among levels of government, each having a defined set of responsibilities in different program areas. And it recognizes and includes actions of federal, state, local and tribal governments, the private sector and citizens.

The Approach

This management plan guides the efforts of federal and state agencies as well as tribal and local governments in Clallam, Island, Jefferson, King, Kitsap, Mason, Pierce, San Juan, Skagit, Snohomish, Thurston and Whatcom counties. In total, 122 cities and counties and hundreds of special districts are involved in implementing the management plan. Federal, provincial and municipal agencies and First Nations in British Columbia are also active in protecting the shared inland marine waters associated with Puget Sound—the Strait of Juan de Fuca and the Strait of Georgia.

The management plan gives governmental entities specific assignments based on the nature of their missions and authority. These governments work with businesses, community organizations and citizen groups to achieve the goals of reducing pollution and protecting biological resources in Puget Sound.

The work plan shall be implemented consistent with the legislative provisos of the biennial appropriation acts.

~ RCW 90.71.050

Every two years, the Action Team and Council develop a *Puget Sound Water Quality Work Plan* to identify actions to maintain and improve Puget Sound's health during the next two-year state funding cycle. Work plan actions are guided by the management plan's long-term goals for restoring and protecting the Sound.

This management plan takes a strategic approach to improving and adding programs to protect and restore Puget Sound. This plan acknowledges existing programs and calls for necessary enhancements and additions. Throughout the years the following considerations guided development of enhanced or new programs:

- What is the magnitude of harm for the environment and human health?
- What is the persistence of the threats to the health of the Sound and the difficulty of mitigating or resolving them?
- Is there a loss that could be construed as irreversible?
- Are all threats to the Sound being addressed?
- Are the significant threats in each portion of the Sound being addressed adequately?

Local governments are required to implement local elements of the work plan subject to the availability of appropriated funds or other funding sources.

~ RCW 90.71.070

- How adequate are existing management programs?
- What is the most cost-effective approach to address a problem?
- Which programs have long start-up periods, and have these programs begun yet?
- What funding sources exist to implement programs and are they being fully used?

Geographic Scope of This Plan

This management plan addresses the waters of Puget Sound, the Strait of Juan de Fuca and all waters flowing into them. For convenience in this management plan, marine waters will be referenced as "Puget Sound" and the total land area that drains into Puget Sound as the "Puget Sound basin."

Figure 1 also shows the Puget Sound basin and waters in the Province of British Columbia that are considered "shared waters." The jurisdiction of this management plan covers only the Puget Sound basin. However, implementation of this management plan is coordinated with various entities within British Columbia to address the integrity of the entire shared waters ecosystem.

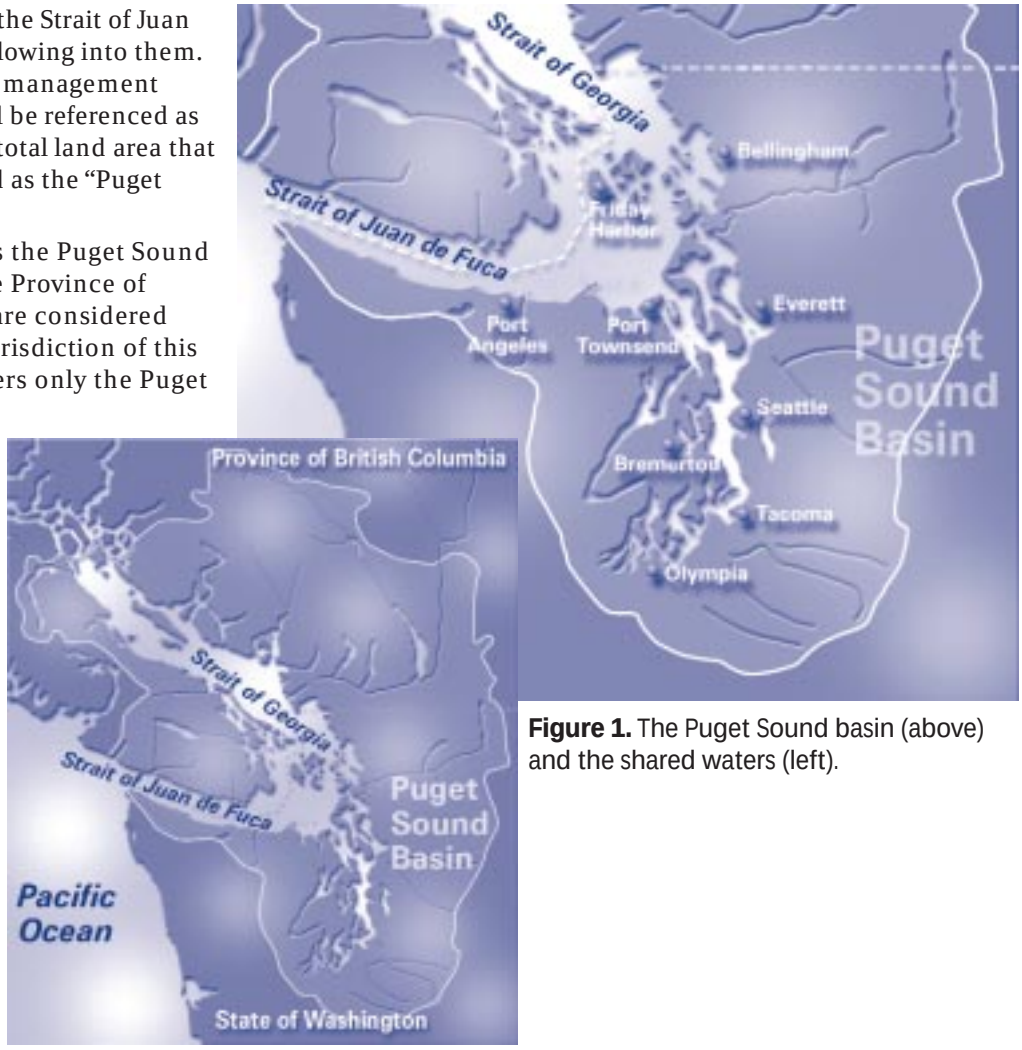


Figure 1. The Puget Sound basin (above) and the shared waters (left).

The Puget Sound basin covers more than 16,000 square miles of which 80 percent is land and 20 percent is water. Two-thirds (3,915,000) of Washington State's population lives in this area.

As an ecosystem, the Puget Sound basin boasts a diverse collection of habitats and species. The local marine environment alone supports more than 220 species of fish; 26 species of marine mammals; 100 species of seabirds, shorebirds, and waterfowl; and numerous invertebrate and plant species.

History of the Management Plan

During the 1960s and 1970s, there was increasing concern that the health of Puget Sound was deteriorating. This came in spite of many efforts to protect the Sound at every level of government. By 1985, there was general agreement that better coordination among programs would improve program effectiveness and efficiency—and ultimately improve the health of Puget Sound. That year, the Washington State Legislature created the Puget Sound Water Quality Authority to develop and oversee implementation of a management plan for the Puget Sound basin and Puget Sound. (RCW 90.70).

The Authority developed the first *Puget Sound Water Quality Management Plan* in 1987. Updates were prepared in 1989, 1991, 1994 and 1996. During this time, the management plan evolved along with the issues. Some plan elements (actions) were completed, some were revised and new programs and elements were added.

Responding to similar concerns at the national level, Congress established the National Estuary Program as Section 320 of the Clean Water Act in 1987. The Environmental Protection Agency approved the *Puget Sound Management Plan* as the federal Comprehensive Conservation and Management Plan for the basin in 1991.

In July 1996, the authorizing legislation for the Puget Sound Water Quality Authority expired. That year, the Washington State Legislature enacted the Puget Sound Water Quality Protection Act (RCW 90.71). Under this law, the Puget Sound Water Quality Action Team and Puget Sound Council assumed the Authority's responsibilities, including review and adoption of the *Puget Sound Management Plan*.

Benefits of Puget Sound

Citizens of Washington depend on the Sound for a variety of benefits.

Culture—The natural beauty and abundant wildlife of Puget Sound are essential to the northwest experience. Puget Sound environmental values are fundamental to the culture of tribal communities.

Ecosystem Functions—The natural functions of the Puget Sound ecosystem are vital to the welfare of animals, plants and humans. Forests and wetlands provide wildlife habitat, and they reduce flooding and sedimentation by slowing down surface runoff and helping water soak into the ground. They also return water to the atmosphere through evaporation and transpiration. Erosion of sediments and woody debris from marine bluffs help maintain the habitat for nearshore fish and other species. The turbulent marine waters support rich plankton communities that feed hundreds of species through a complex food web from geoducks to whales.

Shipping and Transportation—In 1998, Puget Sound ports imported and exported almost 96 percent of the total value of all commodities moved through Washington ports—totaling more than $50 billion. The Port of Seattle ranked fifth out of the top 10 U.S. ports in total dollar value for waterborne trade. The Sound's waterways are also important transportation links among the coastal communities. Ferries carry nine million

vehicles across the Sound each year.

Fishing and Shellfish Harvesting—The fish and shellfish of Puget Sound are important parts of the region's heritage and valuable economic resources. The state's fishing and aquaculture industries rely on salmon, clams and oysters. Cod, halibut, perch, smelt, sole, dogfish and flounder are also harvested from the Sound. In 1998, total revenue from commercial fish harvesting in Puget Sound was more than $12 million, and the industry employed nearly 900 people. Revenues from commercial shellfishing that year hit the $40-million mark, and that industry employed approximately 1,800 people. Many tribes in the region rely on harvest of fish and shellfish as an important part of their food supplies and economies.

Recreational Fishing and Shellfish Gathering—Recreational activities also benefit the state's economy. The Puget Sound region accounts for well over 50 percent of the state's recreational salmon catch. Annually, recreational clam diggers collect about three million pounds of hard-shell clams from around the Sound.

Boating—Thousands of residents and tourists enjoy the Puget Sound waters through various boating activities. Puget Sounders own more than 165,000 powerboats, 21,000 sailboats, and 43,000 canoes and kayaks. Almost 80 percent of the state's 350 marinas and more than 85 percent of the state's 39,400 moorage slips are located along the shores of Puget Sound.

Tourism—In 1998, spending on travel in the Puget Sound basin exceeded $7 billion (80 percent of statewide expenditures) and the number goes up every year. The Puget Sound region accounts for 75 percent of the state's tourism-related jobs.

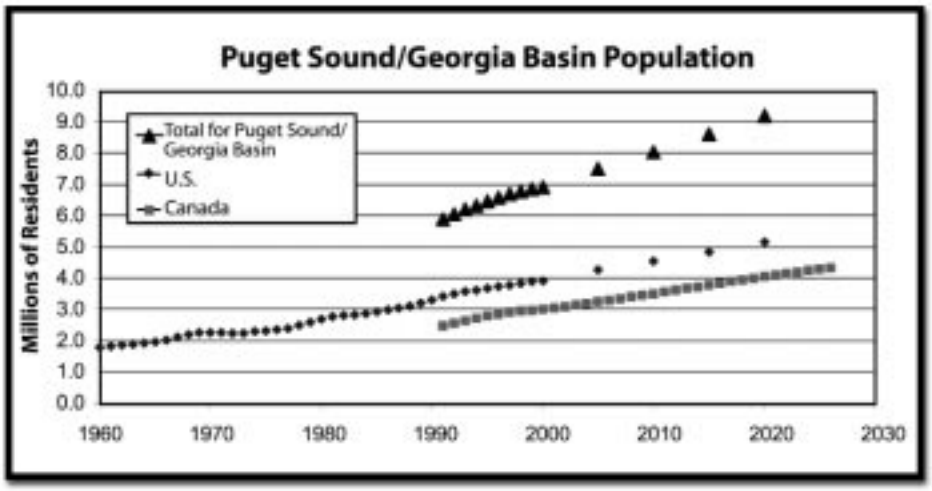
Status and Trends

We can't take the benefits of Puget Sound for granted. Some of Puget Sound's resources are already in trouble and there are signs that the future will be even more challenging.

- Puget Sound chinook, Hood Canal summer chum and bull trout are listed as threatened under the Endangered Species Act.
- Numerous other species that live in Puget Sound are declining, including Pacific herring, rockfish, coho salmon, scoters, Western grebes and great blue herons.
- An estimated 70 percent of tidally influenced wetlands in Puget Sound have been lost in the past century and 33 percent of marine shorelines have been modified.
- Since 1980, roughly one-quarter of the area classified for commercial shellfish harvesting has been downgraded and taken out of production.
- Of 15,300 surveyed acres of tidelands and submerged marine beds in the urban portion of Puget Sound, 38 percent of sediments failed to meet state standards for acceptable levels of contamination.

For more information about the health of Puget Sound, refer to the Puget Sound Action Team's report *Puget Sound's Health 2000* at http://www.wa.gov/puget_sound/Publications/Pub_Master.htm.

Figure 2. Puget Sound's population, 1991-2020
What changes will we see in the future? The population of the Puget Sound and the Georgia Basin is expected to grow by two million in the next 20 years. This is equivalent to adding more than 20 new cities the size of Everett or more than 10 Tacomas, with all the houses, businesses, roads, water supplies, sewer discharges, industries and recreation areas this growth will demand.



British Columbia Stats (tabulated for the Georgia Basin Ecosystem Initiative) and Washington State Office of Financial Management (tabulated by Puget Sound Water Quality Action Team staff.)

Accomplishments

During the 13-year history of the *Puget Sound Management Plan*, we've seen significant improvements in programs to protect and restore the Sound. Here are some examples:

Managing stormwater and protecting habitat: Almost half of the local governments in the Puget Sound basin have developed stormwater programs that are called out in the *Puget Sound Management Plan*, and many have created utilities to fund those programs. Local programs to enhance wetlands have been developed and incorporated into critical areas ordinances required under the state's Growth Management Act. Marine reserves and marine protected areas have been designated.

Preventing sewage pollution from homes and boats: All 12 Puget Sound counties are developing or enhancing programs to ensure proper operation and maintenance of on-site sewage systems. Puget Sound boaters now have access to sewage disposal facilities around the Sound.

Restoring shellfish beds: Together, state agencies, tribal and local governments, and community and industry groups have restored a number of commercial shellfish growing areas around the Sound. In addition, nearly 150 recreational shellfish areas have been classified as either open or closed for public harvest.

Reducing toxic pollutants: During the past decade, progress has been made to decrease the discharge of toxic chemicals to Puget Sound. Issued or re-issued permits require enhanced treatment levels and monitoring. Facility inspectors and permit writers are better trained. Permit backlogs have been reduced or eliminated. Dischargers receive technical assistance, and pollution prevention programs have been improved.

Cleaning up contaminated sediments: Washington was the first state to adopt standards for sediment quality and, in some areas of the Sound, contaminated sediments have been cleaned up.

Tracking the vital signs of Puget Sound: The Puget Sound Ambient Monitoring Program, coordinated by the Action Team, has measured trends in water quality, habitat and biological resources for the last 10 years. Monitoring results are a key consideration in developing actions to protect the Sound.

Building new partnerships: Groups that may not have worked together in the past have cooperated on finding and implementing solutions. These include businesses, environmentalists, farmers shellfish growers, and others.

Getting people involved: The Action Team has funded more than 250 projects to educate and involve the public in taking action to enhance Puget Sound. Five field agents (from both University of Washington Sea Grant and Washington State University Cooperative Extension Service) provide direct education to community groups, schools and business groups.

Working with Canada to protect the Shared Marine Waters: Since 1992, the Puget Sound/Georgia Basin International Task Force has worked to protect the shared marine waters between the two countries. Washington State produced and implements forage and ground fish management plans for the area and has established marine reserves.

Working in the watershed: With help from the Action Team's local liaisons and technical assistance from Action Team agencies, 44 watershed plans have been developed.

Preventing spills of oil and hazardous substances: The number and volume of oil spills greater than 10,000 gallons has remained relatively low since 1992 with the exception of a 277,000 gallon spill in Bellingham in June 1999.

What's New in the 2000 Management Plan?

The Action Team and Council decided to update the management plan in order to address new issues and improve existing programs. In recent years, new issues have come to the forefront, such as threats to wild salmon stocks and invasions of aquatic nuisance species. The Environmental Protection Agency is developing new federal guidance for stormwater programs. Researchers are emphasizing the importance of land-use decisions to protect water quality. The new Northwest Straits Commission is working to protect waters of the Strait of Juan de Fuca and northern Puget Sound. Existing programs for coordinating management of shared waters with British Columbia are being strengthened.

For the 2000 management plan update, the Action Team decided to add two new programs, to review and amend three existing programs, and to edit the balance of the 1994 management plan. This decision balanced the need to update the plan with available resources and time.

The two programs added for 2000 are the Puget Sound/Georgia Basin Shared Waters Program and the Aquatic Nuisance Species Program. The Shared Waters Program embraces the work already underway by the Puget Sound/Georgia Basin International Task Force. The new program promotes and coordinates efforts in Washington and British Columbia to ensure the protection, conservation and enhancement of the shared marine waters and resources. The Aquatic Nuisance Species Program

enhances the efforts of state and local governments to prevent nonnative aquatic species from entering Puget Sound and to control those already present. The new program identifies gaps in existing management programs and recommends steps to correct them.

Three programs in the 1994 management plan were reviewed and updated: **S**tormwater and Combined Sewer Overflows; Wetlands Protection; and Fish and Wildlife Habitat Protection

Changes to the stormwater program recognize our improved understanding about the critical effect that stormwater has on water quality, as well as habitat. The Wetlands Protection and the Fish and Wildlife Habitat Protection programs from the 1994 management plan are updated and combined into one comprehensive Marine and Freshwater Habitat Protection Program. This combination acknowledges that wetlands need to be managed in the overall context of habitat protection. New measures are added to provide for establishment of marine protected areas and to improve knowledge about habitat gains and losses in the basin.

The remaining programs from the 1994 management plan have been edited to streamline language, update some target dates, and correct outdated references to programs and agencies. However, there was no intent to substantively change the policy approaches in these programs. The Action Team decided not to include budget estimates in the management plan, believing this function is better served through development of the biennial work plans to implement the management plan. The Action Team and Council will consider the need for future updates to this management plan as time and resources allow.

The 21 programs in this management plan address major concerns about Puget Sound and its resources. The first program in the management plan—Estuary Management—discusses the overall framework of the management plan. This includes the management structure, funding sources and interaction of the management plan and biennial work plans.

Other programs address pollution sources, resources that need special attention and techniques and tools. Each program provides a brief description of the issues and institutional structure in place to address and presents the goal, strategy and elements (actions) necessary to protect and restore Puget Sound.

The 15-year history of the *Puget Sound Water Quality Management Plan* demonstrates that governments, in cooperation with business, interest groups and citizens can make a difference to the health of Puget Sound. The future will present us with even greater challenges. This management plan provides a flexible road map for dealing with current problems and learning from experience. If we all do our part, we can have a productive, healthy Puget Sound.

Estuary Management and Plan Implementation Program

Directory of Program Elements

Problem Definition

Puget Sound is the nation's second largest estuary. Its shorelines stretch for more than 2,000 miles and comprise 16,000 square miles of land and water in the basin. More than 10,000 rivers and streams flow into its waters. As an ecosystem, Puget Sound includes a diverse collection of habitats. The local marine environment is home to more than 220 species of fish; 26 species of marine mammals; 100 species of seabirds, shore birds and waterfowl; and numerous invertebrate and plant species.

Managing and protecting Puget Sound, along with the rapid proliferation of human activities, is a challenge. What makes the task most daunting is the sheer number of government bodies that can potentially affect Puget Sound and its resources. There are 108 cities, 12 counties, 12 conservation districts, 12 local health jurisdictions, 28 local port districts, 3 regional governmental bodies, 22 tribes, 14 state agencies and 9 federal agencies involved in the process. In addition, there are hundreds of special purpose districts for water, sewer, groundwater protection, drainage and irrigation.

All of these government bodies have their own set of responsibilities. Each has a unique constituency and ability to raise money and make policy. As a result, protecting Puget Sound can often take a back seat to other priorities.

The Washington Legislature acknowledged this in the Puget Sound Water Quality Protection Act of 1996.

> *The large number of governmental entities that now have regulatory programs affecting the water quality of Puget Sound have diverse interests and limited jurisdictions that cannot adequately address the cumulative, wide-ranging impacts that contribute to the degradation of Puget Sound…Coordination of the regulatory programs, at the state and local level, is best accomplished through the development of interagency mechanisms that allow these entities to transcend their diverse interests and limited jurisdictions. (RCW 90.71.005(c)).* ~ See Appendix A

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

The *Puget Sound Management Plan* provides a comprehensive, long-term approach to protecting Puget Sound by improving coordination among government groups. It lays the foundation for managing Puget Sound in a cost-effective manner.

Institutional Framework

The current structure for protecting Puget Sound consists of the Puget Sound Water Quality Action Team and the Puget Sound Council. A governor-appointed chair leads and supports both groups. The Action Team and Council were created by the state legislature to coordinate and integrate the diverse efforts among all levels of government to protect Puget Sound and its resources.

The Action Team, representing state and federal agencies and tribal and local governments, is responsible for amending the management plan. The management plan represents a comprehensive, long-term, strategic effort for protecting the Sound. Additionally, the Action Team adopts work plans that define specific actions government entities will take to protect and restore Puget Sound each state biennium. The work plans are short-term steps towards implementing the long-range management plan.

The Council represents certain groups that have an interest in Puget Sound, including shellfish growers, agriculture, business, cities, counties, tribal governments, the environmental community and the legislature. The Council advises the Action Team on developing the management plan, coordinates efforts to implement the management plan and the work plan, and tracks plan implementation.

The Action Team and Council base their management plan and work plan on results of selected environmental indicators that monitor and assess long-term effectiveness of efforts to protect Puget Sound. This process of assessment, called "adaptive management," is used to both focus the next biennium's work plan and to consider amendments to the management plan. This approach helps ensure optimum success in protecting the Sound, given the limited resources available for these efforts. The figure on Page 12 illustrates this process.

Appropriate programs in this management plan include evaluation elements identifying program measures (implementation monitoring) and ways to evaluate program effectiveness. Future amendments to the Monitoring or Estuary Management programs may be made to improve coordination of implementation and effective monitoring. Similarly, future amendments to the Monitoring or Research programs may be needed to develop and articulate an approach to validation monitoring.

The management plan also serves as a Comprehensive Conservation and Management Plan under the federal National Estuary Program (NEP). Puget Sound is recognized as an estuary of national significance under the NEP (Section 320 of the federal Clean Water Act). Federal endorsement of the management plan provides access to federal funding and cooperation and provides policy that federal programs be consistent with the management plan.

Adopting a comprehensive management plan is only the first step toward protecting Puget Sound. As noted earlier, many competing priorities and divergent interests can make implementation of the management plan and work plan a challenge. The Action Team and Council work together to coordinate and focus government effort to ensure limited resources are used most effectively.

Program Goal

To protect and restore Puget Sound through effective coordination among governments and private interests, and through use of an adaptive management approach.

Program Strategy

The strategy for achieving this goal is to:

a. maintain, evaluate and update the *Puget Sound Water Quality Management Plan* as needed;

b. develop and implement Puget Sound work plans each biennium;

c. require accountability by implementing agencies.

d. evaluate the effectiveness of the biennial work plans in meeting the goals of the management plan;

e. obtain adequate funding to implement the management plan and work plans;

f. provide technical assistance for implementers;

g. provide strong enforcement of all relevant environmental laws; and

h. ensure that federal activities are consistent with the intentions of the management plan.

EM-1. Institutional Structure

The Puget Sound Water Quality Action Team and Council are established in state law to coordinate programs for protecting and restoring Puget Sound (Chapter 90.71 RCW). Action Team members include the heads of 10 state agencies; a city, a county and a federally recognized tribal government representative, each appointed by the governor; and ex-officio non-voting representatives of three federal agencies. The Puget Sound Council comprises governor-appointed representatives of business, the environmental community, agriculture, the shellfish industry, counties, cities and tribal governments, and four members of the state legislature. A governor-appointed chair guides the work of the Action Team and Council and leads a support staff in the governor's office.

The Puget Sound Action Team is responsible for:

a. periodically amending the *Puget Sound Water Quality Management Plan;*
b. developing a biennial work plan and budget;
c. coordinating implementation among agencies; and
d. ensuring implementation and coordination of the monitoring and research programs.

The Puget Sound Council is responsible for:

a. recommending to the Action Team projects and activities for inclusion in the biennial work plan;
b. recommending to the Action Team proposed amendments to the management plan; and
c. reviewing progress on implementation of the biennial work plans.

EM-2. Planning for Puget Sound

The *Puget Sound Management Plan* provides the long-range vision for protecting and enhancing Puget Sound. The Action Team, with advice from the Council, periodically amends the management plan to address new threats to the Sound and to take advantage of new opportunities. Each biennium, the Council and Action Team prepare a two-year work plan for consideration by the governor and legislature. The work plan prescribes federal, state, tribal and local actions to implement the management plan. Local governments are to implement local elements of the work plans subject to the availability of appropriated funds or other funding sources (Chapter 90.71 RCW).

Programs in the *Puget Sound Management Plan* are designed according to the following principles:

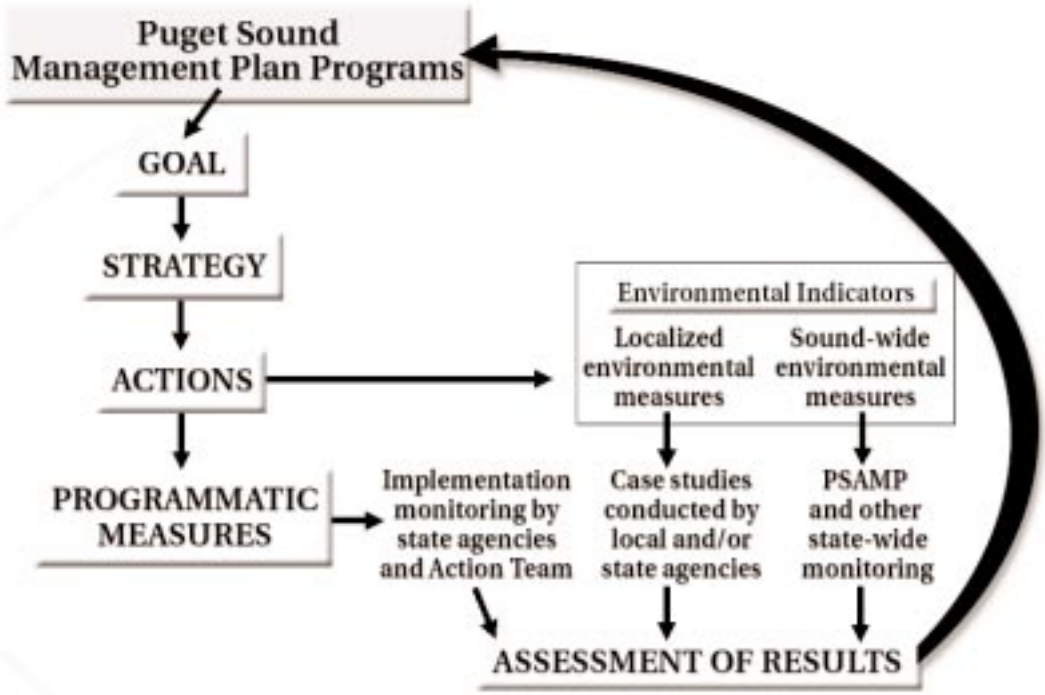
a. Rely on existing government programs where possible. Call for program enhancements or establishment of new programs when necessary.
b. Encourage governments to plan at the watershed level.
c. Call on local governments to implement the management plan through their countywide policies, comprehensive land-use plans, capital facilities plans and development regulations. Provide technical support to aid in this effort.
d. Encourage education and involvement of the public in government decisions and as personal stewards of Puget Sound resources.
e. Design processes to continually improve the scientific basis for plan programs.
f. Improve the management plan over time by monitoring and evaluating the success of plan programs.
g. Call on implementers of the management plan to monitor, evaluate and improve their individual programs over time.

EM-3. Adaptive Management

The Action Team, in consultation with the Council, adapts and improves plans and programs to incorporate changes in scientific knowledge, environmental conditions and program experience and to capitalize on new opportunities. The Council is specifically charged by the legislature to periodically review progress on implementing the two-year work plans. Each biennium, the Action Team submits a report to the legislature describing and evaluating the successes and shortcomings of the current work plan (Chapter 90.71 RCW). Information needed to monitor and adapt plans and programs is obtained from several sources including: the Puget Sound Ambient Monitoring Program (PSAMP); tracking of environmental and program performance measures; and case studies on specific performance issues.

PSAMP, described in the Monitoring Program section of this plan, collects information about trends in the ambient environment. This interagency program has been operating since 1989. *Puget Sound Update* reports are produced every biennium to summarize current findings. The PSAMP and other complementary monitoring

Figure 3. Relationship of environmental and program performance measures to programs in the management plan.



efforts provide information about environmental problems, patterns and trends, allowing evaluation of the effectiveness of management strategies and actions.

The Action Team adopts and tracks environmental and program performance measures to "take the pulse" of key environmental results. This is consistent with the Action Team's legislative mandate (RCW 90.71.060). Environmental performance measures include cumulative measures that reflect the effects of several programs, as well as more narrow measures that are tied directly to the results of individual programs. Program performance measures track progress on certain critical actions within a program. Figure 3 above shows how environmental and program performance measures relate to individual programs in the management plan. The Action Team produces Puget Sound's Health reports every biennium to provide information on the status and trends of environmental concerns in Puget Sound.

Starting with the *2000 Puget Sound Management Plan*, an evaluation element is included in each program. These evaluation elements specify performance measures and target levels, where appropriate. However, the program and environmental measures adopted by the Action Team are not sufficient to diagnose problems. If a measure shows that environmental or program results are not being achieved, the Action Team will determine whether to initiate any of the following actions:

a. Additional investigation of the causes of program shortcomings;
b. Improvements in program implementation through the biennial work plans; and/or
c. Amendment of the management plan.

EM-4. Increased Funding

Implementing the *Puget Sound Management Plan* will require a significant investment by federal, state, tribal and local governments. However, investing money upfront to prevent further pollution and degradation of the Sound will save money in the long run by avoiding costly pollution cleanup. Action Team agencies and other implementers of the management plan shall pursue funding for implementation of the management plan and related activities from all available federal, state and local government and private sources.

The Environmental Protection Agency (EPA) shall encourage federal programs, including related tribal government programs, to fund implementation of the management plan and work plans.

Federal and state agencies that provide water quality funding to local and tribal governments are encouraged to participate in a forum, such as the Infrastructure Assistance Coordinating Council (IACC), that allows them to coordinate their efforts and target assistance to ensure maximum benefit from their efforts. State agencies shall implement the management plan through the biennial work plans and budget requests. Local and tribal governments shall use their authorities to generate funding needed to implement the management plan. Non-governmental organizations, associations, businesses and other private parties are encouraged to participate in funding efforts to protect Puget Sound.

EM-5. Puget Sound Grants Program

The Action Team shall pursue new funding sources through legislation or federal cooperative agreements. These revenues should be used to implement the *Puget Sound Management Plan* and other water quality activities. Action Team support staff would administer a grant funding program similar in concept to the Public Involvement and Education Fund (PIE Fund) to assist local and tribal governments and other entities in implementing their responsibilities under the management plan.

The Action Team shall work with the B.C./States Task Force to encourage a higher and uniform marine fuels tax in all U.S. and Canadian west coast ports.

Target Date for EM-5: Action Team efforts to develop legislation or cooperative agreements to establish a funding source for these grants will be ongoing.

EM-6. Federal, State and Local Enforcement

Federal, state, local and tribal entities should work to achieve compliance with the *Puget Sound Management Plan* through education for voluntary action and through enforcement, where necessary, of relevant policies, laws and regulations for which they have jurisdiction.

The EPA shall initiate federal enforcement actions when necessary to ensure effective implementation of the management plan and protection of Puget Sound. If situations arise where another federal agency has enforcement authority, the EPA shall request appropriate action by that agency.

State enforcement agencies shall initiate state enforcement actions when necessary to ensure effective implementation of the management plan and protection of Puget Sound.

Local governments are encouraged to strengthen the enforcement and wording of existing laws, and develop and implement new ordinances that protect the water quality and habitat functions of wetlands and control specific sources of nonpoint pollution, including stormwater. The state will provide matching funds to counties, cities or local health agencies to assist in the development or revision of programs and to augment investigations and prosecutions under those laws.

Wetlands protection may be implemented through comprehensive plans, shoreline master programs and critical areas ordinances. Enforcement of measures to reduce nonpoint source pollution that are eligible for state grants include on-site sewage systems, pumpout facilities at marinas, farm practices and other sources identified through local watershed plans. Local governments or health agencies are encouraged to use existing legal authority (including general police power, state health authority, or other legal tools) to adopt such ordinances or regulations as may be necessary to address nonpoint pollution. Development and enforcement of stormwater regulatory programs are also eligible for funding, as are those activities related to local government compliance with the 1990 Growth Management Act.

Funds will be made available for development and revision of ordinances, as well as for investigation and prosecution of violations. Efficient and innovative approaches to enforcement, such as civil penalties, dedicated fines and community service, shall be encouraged. Funds made available for enforcement through the Centennial Clean Water Fund (CCWF) will be used for start-up costs or seed monies to develop enforcement programs and not for ongoing staff needs.

EM-7. Attorney General Support

The Attorney General shall make every effort to support the *Puget Sound Management Plan* by providing enough attorneys to assist in agency rulemaking, permit writing and enforcement. Legal expertise shall be provided at all stages of environmental protection activities when a request is made to the Attorney General's office by one of the implementing agencies. Agency personnel shall report difficulties they might have in securing legal sup-

port to the Action Team after they have first reported this problem to their management and to the Attorney General's office.

Target Date for EM-7**:** Ongoing.

EM-8. Memoranda of Understanding with the Department of Defense

The Region 10 office of the EPA, as a representative of the Puget Sound Action Team, shall work with Department of Defense facilities in Puget Sound to evaluate the need for specific Memoranda of Agreement that address consistency with the Puget Sound Management Plan.

The EPA shall also use other regulatory opportunities to achieve the same goals with these facilities. These opportunities include: ensuring that multimedia inspections cover consistency with the management plan as the Comprehensive Conservation and Management Plan (CCMP) for Puget Sound, and evaluating projects that support the goals of the CCMP as potential candidates for designation as supplementary environmental projects during enforcement settlements.

Target Date for EM-8: Ongoing

EM-9. Review of Plan by Federal Agencies

Federal activities that directly or indirectly affect the quality of Puget Sound shall further the goals of the management plan. Each federal agency is requested to take action on any management plan element in which it is named. All federal agencies are requested to review the management plan on a continuing basis to determine whether any of their projects or programs potentially assist or conflict with the goals of the management plan. Federal agencies are requested to submit specific actions to the Action Team for inclusion in biennial work plans.

Target Date for EM-9: Agencies to comply on an ongoing basis.

EM-10. Federal Consistency Review Process

The Puget Sound Action Team shall implement a process to review federal activities for consistency with the *Puget Sound Management Plan*.

The purpose of the review process is to ensure that federal activities are consistent with and will further the purposes and objectives of the Puget Sound CCMP. This process is called for in Section 320(b)(7) of the Clean Water Act. The review process shall consider all federal activities that may significantly affect the goals of the management plan, including but not limited to federal financial assistance and development projects. The review process shall complement and not duplicate existing state-federal review processes. The Department of Ecology administers federal consistency review processes for both the state's Water Quality Management Plan to Control Nonpoint Source Pollution, called for in Section 319 of the Clean Water Act, and Section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA). Ecology shall conduct these reviews for projects located in Puget Sound in cooperation and consultation with the Action Team.

For federal activities that do not come under the purview of the Nonpoint Plan or Section 6217 of the CZARA—e.g., federally issued discharge permits—the EPA shall work with the Action Team to ensure that federal consistency is being upheld.

EM-11. Implementation of Section 6217 of the Federal Coastal Zone Act Reauthorization Amendments (CZARA)

The state's strategy for achieving consistency with Section 6217 of CZARA is for Ecology to develop a statewide "Water Quality Management Plan to Control Nonpoint Source Pollution." Ecology's plan shall be consistent with the goals, objectives and strategies of the *Puget Sound Management Plan*. The management plan will also supplement the statewide plan with guidance specific to the Puget Sound basin. Using federal Clean Water Act Section 319 and Coastal Zone Management Act funds, the EPA and the National Oceanic and Atmospheric Administration shall consider funding demonstration projects in priority watersheds for each category of management measures.

Puget Sound/ Georgia Basin Shared Waters Program

Program Element Directory

Problem Definition

Puget Sound, the Strait of Juan de Fuca and the Strait of Georgia are three parts of a single ecological unit—the inland marine waters of Washington and British Columbia. Many people refer to these waters as the Salish Sea. Fish, birds and other marine life pass freely through these shared waters. However, human activities must be managed throughout the entire system to protect the shared resources.

Institutional Framework

The governor of Washington and premier of British Columbia created the Environmental Cooperation Council in 1992 to address a wide range of shared environmental issues between the state of Washington and the province of British Columbia. In 1993, the council formed the Puget Sound/ Georgia Basin International Task Force to address protection of the inland marine waters. As of fall 2000, Task Force membership from Washington includes several state and federal agencies, the Northwest Indian Fisheries Commission and the Northwest Straits Commission. British Columbia and Canada are represented by federal and provincial agencies and representatives of the Salish Sea Council.

The Puget Sound/Georgia Basin International Task Force works to protect the marine system through information exchanges, partnerships, and cooperative policy review and recommendations. The task force has addressed protecting nearshore habitat, establishing marine protected areas, protecting marine plant and animal populations, and minimizing the introduction of non-native species.

A number of partnerships have been formed to work on Puget Sound/Georgia Basin issues. San Juan County and the Islands Trust have partnered to work on issues of mutual concern, including marine protected areas. The Puget Sound Water Quality Action Team and the Puget Sound Council have partnered with the Fraser Basin Council to exchange information and expertise and to undertake joint projects. Environment Canada and the Environmental Protection Agency have also signed a Statement of Cooperation to work on Puget Sound/Georgia Basin issues.

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

Program Goal

To promote and coordinate efforts in Washington and British Columbia in order to ensure the protection, conservation and enhancement of the shared resources of the Puget Sound/Georgia Basin marine and estuarine ecosystem.

Program Strategy

The strategy to achieve the goal is for the Puget Sound/Georgia Basin International Task Force to coordinate and recommend policies and actions to protect the shared marine waters, to encourage cross-border partnerships and to measure progress through performance measures and adjust the program as needed.

Program Elements

PS/GB-1. Puget Sound/Georgia Basin International Task Force

To provide a forum for transboundary cooperation on protection of the inland marine waters, federal, state, local, tribal and other organizations will participate on the Puget Sound/Georgia Basin International Task Force. The Task Force will:

a. Research issues affecting the shared marine waters;
b. Adopt joint policies and implementing actions;
c. Provide for cross-border exchanges of information; and
d. Form work groups, as appropriate, to address issues of mutual interest.

PS/GB-2. Transboundary Partnerships and Exchanges

Federal, tribal, state and local governments and nongovernmental groups are encouraged to exchange information and expertise with partners across the border, undertake joint projects and enter into cross-border agreements. An example of an existing cross-border agreement is the statement of cooperation between the Environmental Protection Agency and Environment Canada.

PS/GB-3. Measuring Program Effectiveness

The Puget Sound Action Team support staff shall facilitate evaluation of program results by evaluating program and environmental performance measures. This supports the adaptive management approach described in the Estuary Management Program of this management plan. At a minimum, these evaluations should incorporate information from the following monitoring and assessment sources.

a. Program measures that track implementation of this program:
   - Continuation of the Task Force.
   - Partnerships supported by the Task Force.
b. Case studies that assess the effectiveness of program actions:
   - Adoption and implementation of selected recommendations of the Task Force.

Aquatic Nuisance Species Program

Directory of Program Elements

Problem Definition

Aquatic nuisance species are non-native aquatic plants or animals that threaten the diversity or abundance of native species, the ecological stability of infested waters, or the commercial, agricultural or recreational activities that depend on such waters (Chapter 77.60 RCW).

Not all non-native species become nuisance species. Native species live within their natural or historical range and zone of dispersal. Purple loosestrife, hydrilla and *Spartina spp.* are a few examples of plants that currently threaten estuaries, wetlands, rivers and lakes in the Puget Sound basin. The European green crab, Chinese mitten crab and zebra mussel are aquatic nuisance animal species that could arrive at anytime and threaten the Sound. After habitat loss, aquatic nuisance species pose the greatest threat to the diversity of Puget Sound.

Nationwide, about 400 of the 958 (42 percent) species listed as threatened or endangered under the Endangered Species Act are considered to be at risk primarily because of competition with and predation by non-indigenous species.[1] Aside from ecological damages, the economic consequences of aquatic nuisance species invasions are also significant. For example, the federal government estimates that the costs incurred to control or adapt to zebra mussel infestations in the Great Lakes at about $30 million per year. Even human health can be affected by aquatic nuisance species. Non-native microscopic organisms, such as various pathogens and viruses, have caused health concerns and illnesses around the nation.

One way non-native species enter aquatic and wetland environments is through ballast water (water that is taken onboard or discharged to stabilize ships). A large percentage of Puget Sound's 52 documented non-native species are probably due to ballast water. Other pathways include "hitchhikers" associated with the import of aquaculture species, shipment of live seafood and bait and the packaging associated with these, and the transport of recreational boats into and within the state.

[1] Pimentel, David, L. Lach, R. Zuniga and D. Morrison. *Environmental and Economic Costs Associated with Non-indigenous Species in the United States.* Cornell University, College of Agriculture and Life Sciences, June 12, 1999.

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

The key strategy for managing aquatic nuisance species is to prevent their introduction and to contain and eliminate existing aquatic nuisance species as quickly as possible. Coordinated federal, state and local programs are essential to carry out this strategy. Other elements of a successful strategy include education and technical assistance programs to build awareness and encourage voluntary management, and monitoring to detect the presence of new aquatic nuisance species and track the distribution of existing aquatic nuisance species.

Institutional Framework

Programs and voluntary efforts at the federal, state and regional levels address introduction of aquatic nuisance species and control or eradication of those already present in fresh and marine waters and wetlands.

The 1996 National Invasive Species Act (NISA) directs federal agencies to coordinate prevention and control activities and provide technical, financial, and research assistance to states and other entities. NISA also created the federal interagency Aquatic Nuisance Species Task Force to coordinate regional and national efforts to control and eradicate aquatic nuisance species.

The U.S. Coast Guard oversees a voluntary program to manage ballast water from ships whose voyages originate outside of the exclusive economic zone (EEZ). Vessels are encouraged to exchange ballast water in the open ocean prior to entering the coastal jurisdiction of the United States. This program does not apply to vessels that ply their trade within the EEZ. Ballast water is a major pathway for introducing and spreading aquatic and wetland nuisance species.

At the state level, the Department of Fish and Wildlife manages non-native animal species. The Noxious Weed Control Board and departments of Agriculture, Ecology and Natural Resources manage non-native aquatic and wetland plant species.

Fish and Wildlife can authorize the release of non-native aquatic animals and may also designate certain non-native animal species as deleterious, making it illegal to import or possess them. The agency also prepared a statewide *Aquatic Nuisance Species Management Plan* to respond to imminent threats of aquatic nuisance species to Washington waters under NISA. Fish and Wildlife administers a ballast water management program and will implement treatment standards for ballast water discharged to state waters after 2002. Fish and Wildlife also coordinates the statewide interagency Aquatic Nuisance Species Coordinating Committee. The committee's mission is to minimize the unauthorized or accidental introduction of non-native aquatic species and to control the spread of aquatic and wetland nuisance species already established in the state. Federally recognized tribes, federal agencies, local conservation organizations, environmental groups and affected businesses or industry are encouraged to participate on the coordinating committee.

The Noxious Weed Control Board lists non-native noxious plants that adversely affect agricultural and natural areas and oversees the work of county noxious weed control boards to control the introduction and spread of these species. The Department of Agriculture maintains a plant quarantine list of species that may not be transported, bought or sold in the state. The department also coordinates and administers a program to eradicate and control the spread of *Spartina spp.* and purple loosestrife that invade estuaries and wetlands. The Department of Natural Resources manages, controls and eradicates aquatic nuisance plant and animal species on state- owned lands. The Department of Ecology administers a financial and technical assistance program to eliminate noxious non-native aquatic plants in Washington's lakes and rivers. Local noxious weed control boards work with landowners to prevent and control noxious weeds and plants on their properties.

All state agencies with pest management responsibilities must use an integrated pest management approach defined in Chapter 17.15 RCW to prevent, control, contain and eliminate aquatic nuisance species. Integrated pest management means a coordinated decision-making and action process that uses the most appropriate pest control methods and strategy in an environmentally and economically sound manner to meet agency programmatic pest management objectives.

The shipping industry also plays an important role in preventing non-native species introductions. Through the Pacific Coast Ballast Water Group, the industry seeks to find west coast solutions to non-native species introductions from ballast water discharges, including the use of ballast water treatment technologies.

Program Goal

Prevent the unauthorized or accidental introduction of non-native species to Puget Sound; and control the spread of and eradicate aquatic and wetland nuisance species already introduced.

Program Strategy

The strategy to achieve this goal is to: adopt existing state and regional aquatic and wetland nuisance species management plans and programs; focus on Puget Sound and Georgia Basin shared waters aquatic nuisance species management issues; improve current management and monitoring of unauthorized and accidentally introduced non-native species; and provide education, public involvement and technical assistance.

Program Elements

ANS-1. Aquatic Nuisance Species Management Programs

The Action Team adopts the state *Aquatic Nuisance Species Management Plan*, the state *Spartina spp.* and purple loosestrife program and management plans for Puget Sound, the recommendations of the Zebra Mussel and Green Crab Task Force, the state freshwater aquatic plant management program and the state ballast water management program established in Chapter 77.120 RCW.

The Washington Department of Fish and Wildlife, in consultation with the state Aquatic Nuisance Species Coordinating Committee, the U.S. Fish and Wildlife Service and Puget Sound tribal governments, shall:

a. Review and update the state *Aquatic Nuisance Species Management Plan*.

b. Incorporate Zebra Mussel and Green Crab Task Force recommendations and actions into the state *Aquatic Nuisance Species Management Plan*.

c. Ensure that the state *Aquatic Nuisance Species Management Plan*, emergency response, and prevention and control efforts are not likely to jeopardize the continued existence of any endangered or threatened species; nor result in the destruction or adverse modification of critical habitat of such species as specified in Section 7 of the Endangered Species Act of 1973; nor cause unacceptable long-term impact or loss of other aquatic and wetland species or impair natural ecological processes.

Target Date for ANS-1: Review and update, as necessary, the state *Aquatic Nuisance Species Management Plan* by December of each odd numbered year starting in 2001.

ANS-2. Program Coordination

The Action Team endorses the state Aquatic Nuisance Species Coordinating Committee as the forum to coordinate and foster cooperation on statewide aquatic and wetland nuisance species management issues. Fish and Wildlife shall lead and support the activities of the committee.

The Action Team support staff shall ensure coordination of aquatic and wetland nuisance species programs in the Puget Sound basin including prevention, control, eradication, education, monitoring and research activities. The Action Team support staff shall also work with the following groups to rank and recommend priority actions, costs and funding sources for Puget Sound work plans: the U.S. Fish and Wildlife Service, Puget Sound tribal governments, the Puget Sound/Georgia Basin International Task Force, the Northwest Straits Commission and the state Aquatic Nuisance Species Coordinating Committee.

Target Dates for ANS-2: Recommend funding priorities to the Puget Sound Council and Action Team in December of even numbered years starting in 2002.

ANS-3. Management Improvements

In order to fill gaps in state programs and improve the management of all pathways for the unauthorized or accidental introduction and spread of nonnative species, the Washington State Department of Fish and Wildlife, with assistance from appropriate members of the Aquatic Nuisance Species Coordinating Committee, the U.S. Fish and Wildlife Service and Puget Sound tribal governments, shall:

a. Develop and implement, through the *Aquatic Nuisance Species Management Plan*, a biennial process to: identify potential new threats to the Puget Sound basin; identify the threats associated with the spread of existing aquatic nuisance species; assess the relative environ-

mental risks associated with these threats; and report these findings to the Puget Sound Council and Action Team.

b. Develop and implement a process to provide economic incentives for voluntary prevention, control and eradication of aquatic nuisance plants and animals.

c. Work with the departments of Agriculture and Natural Resources to review legal issues and develop solutions to facilitate control of aquatic nuisance species on property where ownership is in question or where access is denied.

d. Develop a model response plan that defines how to respond to new aquatic nuisance species threats, identifies permit and regulatory issues and solutions, defines agency responsibilities, ensures that adequate funding is available to respond to these threats, and determines if interagency agreements are necessary.

e. Develop a process to classify and regulate non-native aquatic animal species. The process should ensure that all species intended for introduction or sale are screened to demonstrate non-invasiveness before being allowed into the Puget Sound basin. The process and regulations should distinguish among: 1) species that pose a significant threat to the biological health and diversity of Puget Sound; 2) species that pose a minimal threat to the biological health and diversity of Puget Sound; 3) species for which there is little or no information to ascertain their status as an aquatic nuisance species; and 4) species that have potential commercial or recreational value.

f. In consultation with the departments of Agriculture and Health and other agencies, evaluate whether there is a need to classify and regulate microorganisms that are not currently regulated as plant or animal disease organisms by Department of Agriculture; as fish and shellfish pathogens by the departments of Fish and Wildlife or Health; or through the state's ballast water treatment standards. Microorganisms may include viruses, bacteria and fungi but excludes genetically modified organisms.

g. Develop and implement a program to inspect and certify that all vessels transported into Washington on trailers are free of unauthorized non-native species. This program should build on the state's commercial vehicle inspection program. The program should also implement a recreational boater education and inspection program to minimize the spread of aquatic nuisance species between water bodies within the Puget Sound region. Inspections should target recreational vessels that originate from water bodies infested with aquatic nuisance species classified as a significant threat to the biological health and diversity of Puget Sound.

h. Coordinate with Oregon, California, Idaho, Alaska, British Columbia, other states and national entities to develop and implement consistent regional solutions to aquatic nuisance threats and problems, including ballast water. The Washington State Department of Transportation will assist by bringing information regarding federal transportation agency policy on the spread of terrestrial non-native species as well as potential sources of funding from Federal Highway Administration to address the link between transportation activities and aquatic and wetland nuisance species.

i. Report annually to the Puget Sound Council and the Action Team on the status of implementing these management improvements and the state ballast water management program.

Target Date for ANS-3: Develop improvement components no later than 2003. Implementation ongoing.

ANS-4. Monitoring and Assessment

The Action Team support staff shall ensure the development and implementation of a strategy to monitor unauthorized or accidentally introduced non-native aquatic and wetland species in the Puget Sound basin. The strategy shall identify tasks, lead agencies, costs and funding sources and shall include actions to:

a. Encourage citizen monitoring activities to identify unauthorized or accidentally introduced non-native species and to monitor their distribution.

b. Conduct baseline and ongoing ecological surveys to characterize threats, risks and changes over time and to measure the per-

formance of the aquatic nuisance species program in achieving its goal.

c. Collect and distribute information to resource managers and the public.

Target Date for ANS-4: Develop the strategy no later than 2003. Implementation ongoing.

ANS-5. Education and Technical Assistance

The Action Team support staff shall ensure the development and implementation of a coordinated strategy for education, public involvement and technical assistance on aquatic and wetland nuisance species in the Puget Sound basin. The strategy shall identify tasks, lead agencies, costs and funding sources for each element and shall target, in the following priority order:

a. Pathways for the introduction of aquatic nuisance species such as the shipping, live seafood and aquaculture industries; pet and aquarium trade businesses; public and private laboratories; ports; and other potential pathway groups.

b. Federal, tribal, state and local government resource managers.

c. The general public.

Target Date for ANS-5: Develop the strategy no later than 2003. Implementation ongoing.

ANS-6. Measuring Program Effectiveness

The Puget Sound Action Team support staff shall evaluate activities and environmental performance of the program. This supports the adaptive management approach described in the Estuary Management section of this plan. At a minimum, these evaluations should incorporate information from the following monitoring and assessment sources:

a. Program measures that track implementation of the program:

- Measure: Completion of program elements.

  Target: Complete elements by target dates.

b. Measures of environmental conditions for which this program is a major or important determinant:

- Measure: The number of new unauthorized or accidentally introduced non-native plant and animal species established in the Puget Sound basin, determined by ambient monitoring data.

  Target: Detect no new introductions each biennium.

- Measure: The area of *Spartina spp.* infestations in the Puget Sound basin, determined by data provided by Agriculture.

  Target: Completely eradicate *Spartina spp.* by June 2011.

Contaminated Sediments and Dredging Program

Directory of Program Elements

Problem Definition

For more than 100 years, people have released toxic compounds into the waters and sediments of Puget Sound. When these toxic compounds contaminate sediments, they enter the food web and cause harm to a wide variety of habitats including salmon, flatfish and marine mammals.

Contaminants can reach Puget Sound's waters and sediments from various sources, but mainly from unpermitted discharges, stormwater runoff, raw sewage discharges (e.g., combined sewer overflows) and from permitted point-source discharges (e.g. industrial and municipal outfalls). Air pollution appears to be another large contributor of contaminants into Puget Sound. Airborne contaminants can enter the water directly or through runoff. In addition, dredging and disposing sediments (such as for navigation purposes) can disturb and redistribute contaminants.

Although contaminant levels in surface sediment have decreased in some areas since pollution controls were established, contamination levels in the deep central Puget Sound basin remain significantly higher than estimated pre-industrial levels. In urban areas, levels of contamination are much higher—up to 100 times the levels in the cleanest rural bay. As a result, accumulation of contaminants in sediments and the resulting damage to natural populations are recognized as serious threats to marine and estuarine ecosystems.

As of 1999, the Department of Ecology had compiled sufficient data to characterize more than 15,000 acres of Puget Sound's urban embayments. According to Ecology's records, 38 percent of this area, or 5,750 acres, was identified as contaminated above the state's sediment quality standards. Eighty-six of the most highly contaminated areas (estimated at 3,200 acres) within these urban embayments were identified as contaminated sediment sites, requiring cleanup directed by either state or federal cleanup laws. Currently, these sites are in various stages of cleanup—15 have been cleaned up since 1996—and the rest are being investigated. Sediment cleanups remain controversial because of disagreements about appropriate methods of disposal, treatment or reuse of the sediments.

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

Institutional Framework

Dredging and disposing of dredged material are regulated through state and federal permit systems. The U.S. Army Corps of Engineers regulates dredging, filling and construction in U.S. waters under the federal Clean Water Act and the Rivers and Harbors Act. The U.S. Environmental Protection Agency (EPA), the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration review permits issued by the Army Corps of Engineers. Ecology administers the state's Shoreline Management Act, regulating coastal development. The Department of Natural Resources is the state's trustee for submerged and intertidal lands. The federal Fish and Wildlife Coordination Act and the National Environmental Policy Act require agency coordination and environmental review of proposed activities in the above-named areas.

Dredged material with low levels of contamination may be disposed of at open-water sites, while material with higher levels must be treated or disposed of at confined-disposal sites. The Puget Sound Dredged Disposal Analysis (a cooperative effort by the Army Corps of Engineers, the EPA, Ecology and Natural Resources) has developed evaluation procedures and established new sites for unconfined open-water disposal. However, disposing of sediments that are too contaminated for unconfined open-water sites is still being evaluated on a case-by-case basis without uniform standards. Several agencies are currently pursuing the development of a multi-user disposal and/or treatment site for containing sediments with higher levels of contaminants.

Program Goal

To reduce and ultimately eliminate adverse effects on biological resources and humans from sediment contamination throughout the Sound by reducing or eliminating discharges of toxic contaminants and by capping, treating or removing contaminated sediments.

Program Strategy

The strategy for achieving this goal is to:

a. classify sediments that cause adverse biological effects and significant human health risks;
b. implement Soundwide controls on sources of contaminants causing sediments to fail the sediment standards;
c. provide rules and sites for disposal of dredged materials; and
d. expand the urban bay program to provide for additional source control and consideration of cleanup actions for existing areas of high sediment contamination levels.

S-1. Sediment Program Policies

The following policies shall be followed by all state and local agencies in actions affecting sediment quality, including rule making, setting priorities for funding and actions, and developing permit programs:

a. All government actions will lead toward eliminating the presence of sediments in the Puget Sound basin that cause adverse effects to biological resources or pose a significant health risk to humans.
b. Programs for managing the dredging and disposal of sediments should result in a net reduction in the exposure of organisms to adverse effects.
c. Sediment cleanup programs (which may include capping in place) shall be undertaken when reasonable to reduce, with the intent of eliminating, the exposure of aquatic organisms to sediments having adverse effects on those organisms. As methods become available, treatment shall be the preferred method of cleaning up contaminated sediments.

S-2. Program for Unconfined Open-Water Disposal

The U. S. Army Corps of Engineers, the Environmental Protection Agency and the state departments of Ecology and Natural Resources will continue to manage the Dredged Material Management Program (DMMP) for unconfined open-water disposal of dredged material. The DMMP will include:

a. criteria for selecting unconfined open-water disposal sites;
b. testing criteria and standards for allowing material to be disposed of at open-water sites;

c. management plans, including monitoring, for the open-water sites; and
d. an annual review process to update the program as new information becomes available.

Each federal and state agency, local and tribal government, and port is required to manage the disposal of dredged material in open water according to the DMMP and the goals of the *Puget Sound Management Plan*.

S-3. Confined-Disposal Standards for Sediments

The Department of Ecology shall develop an approval process and technical manual of standards for confined disposal or treatment of dredged material. Ecology shall adopt regulations necessary to implement the approval process and use of these standards. The standards shall address reuse, treatment or disposal of dredged material that exceeds the sediment management standards and that will not be disposed of at unconfined open-water disposal sites established by the DMMP. These standards for confined disposal will be used by Ecology, state and federal agencies, shoreline jurisdictions and local health departments in approving or denying permits for the use or disposal of dredged material that exceeds sediment management standards, and for choosing remedial actions for contaminated sediment sites. The decision to take a remedial action will be based on the guidelines called for in element S-5. The objective of these disposal standards is to prevent the exposure of aquatic or terrestrial organisms, including humans, to adverse effects from the contaminants in the sediments. The standards shall address treatment as well as in-water and upland confined-disposal methods.

Target Date for S-3: Ongoing.

S-4. Multi-User Disposal or Treatment of Contaminated Sediments

Completed portions of this element have been deleted.

The departments of Fish and Wildlife, Ecology and Natural Resources, the Puget Sound Water Quality Action Team, the Army Corps of Engineers, EPA, the U. S. Fish and Wildlife Service and other appropriate agencies will continue to pursue multi-user disposal or treatment of contaminated sediments consistent with the *Puget Sound Confined Disposal Site Study Final Environmental Impact Statement* published in October 1999. The agencies will:

a. detail the treatment or disposal siting process;
b. define the means for managing liabilities;
c. include provisions for evaluating human health considerations;
d. provide a management agreement listing institutional responsibilities;
e. define stakeholder and public participation roles;
f. identify funding sources and mechanisms for future siting and construction steps; and
g. pursue implementation of the preferred option.

Target Date for S-4: Implement preferred option by 2005.

S-5. Guidelines for Sediment Cleanup Decisions

To establish a uniform decision process concerning sediment contamination, Ecology shall periodically review and update its guidelines for deciding whether existing sediments that exceed the sediment management standards should be remediated by capping or excavating with off-site treatment or confined disposal, or whether no action should be taken. In updating the guidelines, Ecology shall consult with agencies and parties with expertise in these issues and provide a public education and public involvement program. The guidelines shall include consideration of deadlines for making decisions on cleanup actions. As a guide in deciding whether to wait for natural processes to cap or dilute the sediments or to undertake cleanup actions, the guidelines shall also include consideration of a time by which surface sediments should no longer have adverse effects. Because of the high cost of treatment or removal of contaminated sediments, the guidelines shall include a process and criteria for establishing priorities for such actions, including consideration of the cost of cleanup. The guidelines should include a process for ranking sediments with high levels of contamination by the relative potential risk they pose to human health and the environment.

Target Dates for S-5: Ongoing.

S-6. Investigations and Cleanup of Contaminated Sediments

This element deals with cleaning up existing sediment contamination. In S-6.1, specific sample locations that exceed sediment standards are inventoried. In S-6.2, Ecology uses the inventory and other information to identify bays or other similarly sized areas for further investigation under S-6.3 and S-6.4. Specific sites that should be considered for cleanup actions are discussed in S-6.5 and S-6.6.

Although this element contains specific directives and assignments, the Action Team intends that the EPA, Ecology and other agencies and local governments shall exercise flexibility in resolving contaminated sediment problems. To organize and coordinate the program, Ecology, in cooperation with the EPA and other state and federal agencies, shall undertake an integrated program consisting of the guidelines called for in element S-5 and the following components:

S-6.1. Inventory of Sediment Contamination

To provide information to the Puget Sound Council, the Action Team and the public and to allow for tracking of increases or decreases in the extent of sediment contamination, Ecology shall maintain an inventory of points or locations in the basin where sediment samples have been taken that violate the sediment management standards. The inventory should consist of graphic displays with locations of contamination indicated. All available sources of data, including monitoring, permit applications and published research studies, should be used in developing the inventory. The inventory shall be integrated into a geographic information system (GIS) and used to update the Puget Sound Environmental Atlas if possible. The inventory shall be updated every two years and made available in digital form. The Action Team support staff shall assist in distributing the inventory and include a summary of the inventory in the State of the Sound Report. As an aid in targeting pollution source-control activities, Ecology's inventory shall identify the chemicals or other characteristics for each location that causes it to be on the inventory.

Target Date for S-6.1: Ongoing.

S-6.2. Contaminated Sediment Area Priority List and Investigation Schedule

Ecology shall establish a priority list of areas to be investigated. Every effort should be made to investigate each area on this priority list within five years of its first appearance on the list. Ecology shall reevaluate both the area priority list and the investigation schedule every two years.

Target Date for S-6.2: Ongoing.

S-6.3. Investigations of Contaminated Sediment Areas

Ecology, in cooperation with federal and state agencies and local and tribal governments, shall carry out investigations of contaminated sediment areas identified and listed under S-6.2. Investigations shall be designed on a case-by-case basis using Elliott Bay and the Bellingham Bay pilot studies as models. The investigations shall include reviews of existing information on contamination and sources as well as field investigations designed to refine information on levels and distribution of contamination and probable sources.

S-6.4. Site Investigations and Baywide Plans

For each contaminated sediment area being investigated, Ecology, the EPA, local governments and other appropriate agencies will form a team of investigators to work on source control, habitat restoration and sediment cleanup. Members of the public should be given the opportunity to participate. Baywide planning is encouraged as a tool to balance cleanup, habitat restoration and other water dependent activities.

Baywide planning teams shall carry out various source control, cleanup and investigative actions including:

a. Review and comply with existing discharge permits;

b. Reopen and modify discharge permits for sources in the vicinity to control toxicants identified at problem levels in the sediments;

c. Search for unpermitted discharges and take enforcement actions;

d. Investigate contamination in storm drains or groundwater and search for sources of such contamination;

e. Take other actions to control sources of sediment contamination by seeking to achieve full compliance with applicable laws and reg-

ulations in locations that drain into the contaminated area.

f. Identify sites within the area that should be considered for cleanup;

g. Develop appropriate cleanup actions.

h. Develop baywide plans for each urban bay which include identification of habitat restoration needs and address future shoreline uses; and

i. Coordinate with applicable watershed-planning efforts.

Baywide planning teams should consider developing total daily maximum loads (TMDLs) as source control strategies for bays when appropriate.

S-6.5. Sediment Site-Cleanup Actions

Following the guidelines developed under element S-5, when sites with high levels of sediment contamination are identified, Ecology shall consider the feasibility and reasonableness of sediment cleanup actions and coordinate with Department of Natural Resources on actions that affect state-owned aquatic lands. Ecology, as part of this element, shall develop decision criteria for determining when sediment cleanup actions should be taken pursuant to laws regulating water quality and discharge permits (sediment restoration activities) and when cleanup actions should be taken pursuant to the Model Toxics Control Act (sediment remedial actions). If sediment cleanup actions are necessary, funds for such actions will be sought first from responsible parties and then from public sources. All cleanup actions shall be consistent with the guidelines that were developed under element S-5 and the confined disposal standards in S-3. Ecology shall maintain a priority list of specific sediment sites at which cleanup will be considered.

Target Date for S-6.5: Ongoing.

S-6.6. Responsible Parties

Where capping, treatment or removal of contaminated sediments is recommended, Ecology shall attempt to have such cleanup actions, including investigations and feasibility studies, undertaken and paid for by responsible parties, whether they are dischargers under water quality laws or liable persons pursuant to the Model Toxics Control Act. Natural Resources shall utilize state proprietary authority to secure, to the extent possible, site cleanup, natural resource damages, and cost recovery from responsible parties whose contamination is located on state-owned aquatic lands. Every reasonable attempt will be made to recover cleanup costs from responsible parties, including study costs.

Target Date for S-6.6: Ongoing.

S-6.7. Public Involvement, Education and Technical Assistance

State and federal agencies involved in contaminated sediment management will provide for adequate public involvement, education and technical assistance for sediment program issues including sediment management standards.

Target Date for S-6.7: Ongoing.

S-7. Measuring Program Effectiveness

The Puget Sound Action Team support staff shall evaluate program results through use of program and environmental performance measures. This supports the adaptive management approach described in the Estuary Management Program of the *Puget Sound Management Plan*. At a minimum, these evaluations should incorporate information from the following monitoring and assessment sources:

a. Program measures that track implementation of this program:
   - Progress towards establishing multi-user disposal or treatment of contaminated sediments.
   - Completion of baywide plans and remedial investigations.

b. Case studies that assess the effectiveness of program actions:
   - Environmental outcome of sediment treatment and disposal actions.

c. Performance of environmental conditions for which this program is a major or important determinant (recognizing that these measures may be affected by several plan programs):
   - Area of sediments in Puget Sound that exceed the sediment management standards.
   - Area of contaminated sediments that have been cleaned up.
   - Trends in measures of toxic contamination of marine animals.

Marine and Freshwater Habitat Protection Program

Directory of Program Elements

Problem Definition

The Puget Sound basin contains a mosaic of valuable fish and wildlife habitats. Upland forest and prairies absorb and deliver water to wetlands, streams and rivers. These water bodies ultimately supply fresh water, sediments and nutrients to Puget Sound and its marine habitats. The natural erosion of bluffs maintains beaches, coastal barriers and salt marshes that make up Puget Sound's shoreline habitats. Below the Sound's waves lies a world of sandflats, mudflats, eelgrass meadows, kelp beds and rocky reefs. Each of these habitats contributes to the Sound's spectacular natural productivity and makes the Puget Sound an important resource for the surrounding population.

The loss or alteration of habitats can reduce or eliminate its usefulness to the species that depend on them. For instance, the change in wetlands, in-stream habitat and marine nearshore habitat has contributed to the decline of runs of wild salmon. Puget Sound chinook, Hood Canal summer chum and bull trout are listed as threatened species under the federal Endangered Species Act. Floodplains and riparian areas (the land adjacent to a waterbody) also continue to be degraded or lost. Together, these habitats sustain a biologically diverse and interconnected ecosystem. Lack of knowledge about the functions of marine nearshore and riparian habitat for salmon presents difficulties for decision-makers.

Many of the processes that create and maintain marine and freshwater habitat have been threatened during the course of development and growth—in some cases, irreparably. Historically, restoration projects were designed to replace lost habitat. Unfortunately, these projects have had varying degrees of success, mainly because they were designed to recreate the appearance of the lost habitat and did not take into consideration the natural processes that sustain it. For example, a wetland might be built as part of a restoration project along a leveed stream. However, if certain natural processes are absent, such as overbank flooding to provide seasonal inundation, the wetland would not survive.

Today, seven additional fish species are proposed for listing under the Endangered Species Act, while several others are on the decline. Traditionally, the answer to declining populations

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

has been to manage the fish or wildlife as a single species and maximize their critical habitat—without consideration of natural processes that affect the habitat. For successful habitat restoration and ultimately marine and wildlife preservation, the biological diversity and health of the ecosystem needs to be restored. This includes minimizing adverse effects from stormwater and other sources of water quality degradation, removing physical barriers to species movements, and improving scientific knowledge about marine and fresh water habitats and the species that depend on them.

Institutional Framework

Wetlands, in-stream habitat and marine nearshore habitat are currently protected through regulatory and non-regulatory means at all levels of government. At the federal level, the Corps of Engineers (Corps) regulates the discharge of dredged or fill material into waters of the United States, including wetlands as well as structures placed in navigable waters. The Corps consults with the Environmental Protection Agency, U.S. Fish and Wildlife Service, and National Marine Fisheries Service. The role of the latter two services has become more formalized as projects are reviewed for their effects on listed species through the various authorities of the Endangered Species Act. Individual permits and the permitting programs themselves are being reviewed by the services to assess the cumulative effects on threatened and endangered species and their critical habitats. Additional conditions to permits may be added by the services to address these concerns.

Tribal governments manage natural resources, including marine and freshwater habitats, as well as some aquatic and marine species on tribal lands. They also have a role in management of fish and wildlife species throughout usual and accustomed harvest areas as provided under various treaties.

State agencies regulate actions that could cause adverse effects to marine and freshwater habitats. Agencies provide guidance and technical assistance to applicants and local governments. Generally the state provides oversight and review of local government actions under various state laws rather than direct review of individual permits. The Department of Ecology issues water quality certifications, reviews Corps' permits for consistency with the state's coastal management program approves variances and shoreline master programs, may appeal substantial development permits and approves conditional use permits under local shoreline master programs. The Department of Fish and Wildlife issues Hydraulic Project Approvals for activities that affect steam hydrology. The Department of Natural Resources manages 3 million acres of public lands and regulates forest practices and surface mining that effect marine and freshwater habitats and manages over 2.6 million acres of state-owned aquatic lands as both proprietor and natural resource trustee.

State agencies have improved their regulatory processes by adopting policies and developing guidance regarding the use of mitigation. Historic mitigation projects had variable success in restoring the function of marine and freshwater habitats lost as a result of permitted activities. Policy guidance on alternative forms of mitigation and a new rule on mitigation banking designate appropriate replacement ratios and give preference to "in-kind" mitigation but allow for "out-of-kind" if the net environmental benefit to the watershed can be demonstrated.

Local governments have a primary role in protecting and restoring marine and freshwater habitats. Under the Growth Management Act, local governments can identify and reserve critical habitat from development and maintain habitat corridors for movement of wildlife through their communities. Local capital improvement programs and agreements with private property owners provide additional opportunities to acquire and protect key habitat sites. Local planning under the Shoreline Management Act can give special attention to maintenance of shoreline processes and habitats. Through land use and shoreline permits, local governments can review individual development proposals to control site-specific impacts to habitat.

Each of these government entities also protects marine and freshwater wetlands through non-regulatory means or through their roles as natural resource trustees. Federal agencies provide funding for acquisition and restoration projects. Tribal governments are vigorously involved in habitat restoration projects on tribal lands. State agencies restore habitat on state-owned lands and produce public education materials. The Department of Transportation makes investments that reduce vehicle miles traveled and reduce the need to expand and construct new roads. This minimizes future degradation of marine and freshwater habitats. Local governments acquire property under capital facilities programs to implement their Growth Management comprehensive land use plans. Non-governmental organizations are

involved in strategic acquisition, management and restoration of key marine and freshwater habitats. Many private property owners voluntarily place restrictive easements on their own property or restore previously degraded marine and freshwater habitats to protect the natural integrity of their land for future generations.

Management of marine and freshwater habitats improves as people become aware of the effects their everyday activities have on those habitats, the species that depend on them and ultimately their own quality of life. Steps being taken to improve the state of the art include improving tracking of habitat gains and losses; watershed planning that considers processes needed to maintain habitat; and developing more efficient and effective regulatory practices.

Program Goal

To preserve, restore and enhance the ecological processes that create and maintain marine and freshwater habitats and to achieve a net gain in ecological function and area of those habitats within the Puget Sound basin.

Program Strategy

The strategy for achieving this goal is to:

a. Develop comprehensive local programs to protect marine and freshwater habitats that include planning, stewardship, education and regulation;

b. Improve regulatory program practices and scientific knowledge of marine and freshwater habitats;

c. Educate the public;

d. Create and maintain an accurate accounting of habitat gains and losses as a result of permitting actions;

e. Preserve remaining natural marine and freshwater habitats;

f. Measure progress through performance measures and adjust programs as needed; and

g. Pursue funding for implementation of the management plan and related activities from all available federal, state and local government and private sources.

MFH-1. Comprehensive Local Program

Local governments have the opportunity to preserve and enhance marine and freshwater habitats in a comprehensive manner. Developers have the opportunity to streamline the permitting process by creating development proposals to be consistent with countywide planning policies and local comprehensive land use plans. Local government comprehensive programs shall include the following elements: planning; acquisition and restoration; education; regulation; and incentives.

MFH-1.1. Planning

a. Participate in watershed and salmon recovery planning efforts, including multi-jurisdictional planning where watersheds are shared across boundaries. Include citizens and private landowners, businesses and other shoreline users in creating a vision for the future of their watersheds and community.

b. Update shoreline master programs in accordance with guidelines developed by the Department of Ecology. Incorporate provisions to protect listed fish species as approved by the National Marine Fisheries Service and the U.S. Fish and Wildlife Service.

c. Integrate protection and restoration of marine and freshwater habitats into countywide planning policies and local comprehensive land-use plans. Identify and rank for preservation or restoration critical habitats within each watershed including marine shorelines and submerged lands. Obtain this information from watershed and basin planning, salmon recovery planning, marine resource committees, floodplain management plans and shoreline master programs.

d. Evaluate opportunities for protection and restoration of marine and freshwater habitat considering the effect of full development under alternative scenarios. Incorporate recommendations into local comprehensive plans.

e. In association with habitat acquisition, identify opportunities for public access and open-space corridors that can provide sites for public enjoyment and education. Incorporate acquisition and development of sites into capital improvement programs.

f. Develop policies and plans to protect natural sediment sources and the drift of sediments

along marine shorelines in order to protect nearshore habitats. Implement these policies and plans through shoreline master programs, critical areas ordinances and other appropriate measures.

g. Encourage mixed-use master planned developments and other development approaches that preserve and enhance ecological processes of marine and freshwater habitats. These developmental approaches should also preserve and enhance historic public access to marine shorelines and they should utilize the principles of low impact development.

h. Cooperate with Washington Department of Transportation (WSDOT) in the development of the 20 Year State Highway System Plan.

i. Integrate stormwater management into countywide planning policies and local comprehensive land use plans.

Target Date for MFH-1.1: Consistent with the Growth Management Act comprehensive plan or shoreline master program update schedules.

MFH-1.2. Acquisition and Restoration

a. As identified above, acquire high quality natural marine and freshwater habitats and uplands that have direct influence on those habitats through fee title or less than fee title interest, such as transfer of development rights. Provide for responsible management of acquired lands.

b. Employ Ecology's Public Benefit Rating System to provide incentives for private preservation and restoration, such as current use taxation, for the protection of open space.

c. Restore processes that maintain the natural conditions of watersheds and shorelines through actions such as replanting native vegetation in riparian areas and throughout the watershed to restore natural hydrology and water quality; breaching dikes that impede natural water flow; removing culverts that block fish passage; and eradicating nonnative vegetation on public land and in partnership with private property owners.

Target Date for MFH-1.2: Ongoing

MFH-1.3. Education

a. Use public access sites to foster appreciation for and educate about natural processes and biological diversity of marine and freshwater habitats.

b. Provide education on the benefits that natural landscapes provide in maintaining biological integrity and decreasing the risk of landslides on private property.

c. Clearly mark and maintain existing public access sites and make maps of these sites available to residents and visitors.

Target Date for MFH-1.3: Ongoing

MFH-1.4. Regulation

a. Eliminate the loss and alteration of marine and freshwater habitats through appropriate updates of local ordinances and master programs and strong enforcement of shoreline permits, critical areas ordinances and other development regulations. Encourage public participation in setting strong anti-degradation standards.

b. Develop or continue implementing development regulations for critical areas consistent with the guidance for wetlands protection provided in the *1994 Puget Sound Water Quality Management Plan* (see Appendix A).

c. Use guidance provided by state agencies and best available science to protect stream banks, set ratios for compensatory mitigation, establish protective buffers and improve other aspects of local permitting programs.

d. Restrict new shoreline armoring and the construction of new agricultural levees in floodplains and estuarine wetlands. Encourage the use of "softer" methods of shoreline stabilization to protect natural processes.

e. Adopt the State of Washington Alternative Mitigation Policy Guidance for Aquatic Permitting, or an equivalent, for use in reviewing projects that may require compensatory mitigation.

f. Approve wetland mitigation banks that meet local and state goals for protecting wetlands and that provide benefits of mitigation before allowing loss of wetlands.

g. Track and evaluate permitted habitat losses, including losses from permit variances, mitigation successes and failures, and the effec-

tiveness of local ordinances. Report the findings of tracking and evaluation in biennial progress reports to the Action Team. Adjust regulatory programs as necessary to reverse the permanent loss of marine and freshwater habitats.

h. Eliminate or fully mitigate the loss of native vegetation in watersheds through implementation of comprehensive land-use and stormwater regulations.

Target Date for MFH-1.4: Update critical areas ordinances consistent with growth management timeline.

MFH-2. State Technical Assistance

Local programs can significantly benefit from assistance and coordination with state programs. Funding and technical assistance such as maps, targeted studies and guidance documents help local programs contribute to state goals.

a. Ecology, the Department of Fish and Wildlife, the Department of Natural Resources, the State Salmon Recovery Team, Office of Community Development (OCD) and the Action Team support staff shall provide technical assistance on watershed planning to watershed and basin planning groups and local governments. The agencies shall provide maps; assistance with watershed characterization; information on techniques to predict the impacts of full development under alternative scenarios; and other relevant data.

b. WSDOT shall provide information to local governments on highway and other transportation construction practices and mitigation procedures that protect marine and freshwater habitats.

c. Ecology, in consultation with watershed and basin planning groups and local governments shall develop Total Maximum Daily Load (TMDL) evaluations and proposed actions (cleanup plans) that may help reach habitat preservation or restoration goals.

d. Fish and Wildlife, Natural Resources and state colleges and universities shall provide available marine and freshwater habitat inventory data in a format useful to watershed and basin planning groups, salmon recovery groups and local governments.

e. Action Team support staff, in cooperation with Fish and Wildlife, Natural Resources and state colleges and universities, shall develop and distribute protocols for monitoring the condition of marine and freshwater habitats.

f. OCD, in consultation with the departments of Fish and Wildlife, Ecology and Natural Resources shall develop model local ordinances for the protection of marine and freshwater habitats.

g. Ecology shall provide maps of shoreline drift cells to local governments and planning groups.

h. OCD shall provide guidance to local governments on how to increase urban densities while protecting resources in urban growth areas.

i. Action Team support staff, in cooperation with Natural Resources, Ecology, Fish and Wildlife, and local government, shall initiate a local pilot project to study the supply and transport of sediments along marine shorelines and the ecological effects of changes to marine shorelines. The agencies shall use the pilot project to develop analytical techniques, public education materials and management practices. The agencies shall publicize the results and encourage and assist all jurisdictions in using these approaches.

j. State agencies represented in the Nearshore Habitat Loss Workgroup shall develop ways to recognize and encourage model local programs.

Target Dates for MFH-2: For TMDLs—in accordance with implementation schedule. For OCD actions—December 2003. For all others—ongoing. Initiate pilot project on sediment transport by 2003.

MFH-3. State and Federal Planning, Regulatory and Proprietary Practice

State and federal regulatory and proprietary programs have been a mainstay in marine and freshwater habitat protection through the years. These programs should continue and be enhanced in a number of significant ways to be responsive to changing conditions such as new scientific information about mitigation procedures or the listing of threatened or endangered species.

MFH-3.1. State Agencies

a. Ecology shall continue processing water quality certifications for Corps of Engineers permits. Fish and Wildlife shall continue processing hydraulic project approvals. Natural Resources shall continue processing forest practices permits and proprietary authorizations. In accordance with limits of their legal authority, agencies should deny or place conditions on applicable permits and proprietary authorizations to prevent permanent unmitigated loss or alteration of marine and freshwater habitats and natural processes that maintain them. The agencies shall continue to acknowledge the co-management roles of tribal governments and notify affected tribes.

b. Ecology shall implement the federal antidegradation policy.

c. Ecology, Fish and Wildlife and WSDOT shall implement the State of Washington Alternative Mitigation Policy Guidance for Aquatic Permitting.

d. Ecology, Fish and Wildlife and Natural Resources shall notify each other when an action requires permits from multiple agencies. They shall also provide permit assistance for restoration projects.

e. WSDOT shall coordinate with local governments and continue to integrate marine and freshwater habitat concerns through the Washington Transportation Plan, the strategic long-term transportation plan for highways, ferries, aviation, and rail. WSDOT shall also continue efforts toward commuter trip reduction and multi-modal investments.

f. Wetlands occurring on lands undergoing forest practices are subject to the protective requirements of the Wetlands Protection sections of the Forest Practices Act and associated rules as well as recommendations of the *Forest and Fish Report*. Natural Resources and Ecology should convene the Wetlands Working Group of the Forest and Fish Report to review the wetland recommendations in the report and propose actions to implement them.

Target Date for MFH-3.1: Ongoing

MFH-3.2. Federal Agencies

a. In addition to rules and regulations adopted under regulatory authorities of the U. S. Fish and Wildlife Service and National Marine Fisheries Service (NMFS), the services shall also provide guidance and criteria for compliance with the Endangered Species Act.

b. NMFS and U.S. Fish and Wildlife shall work to prevent further loss of habitats important to species listed as threatened and endangered.

c. NMFS and U.S. Fish and Wildlife shall provide guidance on goals for recovery of critical habitat that can be incorporated into mitigation requirements of state and local permits.

f. Corps and the Environmental Protection Agency (EPA) shall increase enforcement of the Clean Water Act to prevent unauthorized activities that could harm marine and freshwater habitats.

e. In coordination with U.S. Fish and Wildlife, NMFS, EPA and tribal governments, the Corps shall deny or place strong, protective conditions on permits in order to prevent permanent loss or alteration of marine and freshwater habitats or disruption of natural processes that maintain those habitats. Risk to human life and property shall be seriously considered when comprehensive countywide flood control projects are being evaluated for permits.

f. The Corps shall consult with state permitting agencies on the appropriate use of the State of Washington Alternative Mitigation Policy Guidance to provide consistent guidance on mitigation to applicants.

g. Federal agencies shall provide technical assistance and cost share to tribal, state, local and non-governmental marine and freshwater habitat protection programs.

Target Date for MFH-3.2: Ongoing

MFH-4. Habitat Accounting

The assessment of marine and freshwater habitat protection programs requires accounting of gains and losses through both regulatory and non-regulatory program actions. Cumulative impacts can be assessed only through accurate habitat accounting.

MFH-4.1. State Agencies

a. Fish and Wildlife, Ecology, and Natural Resources shall quantify, through administrative means such as permit and lease databases and aquatic reserve designations, changes in acreage and type of marine and freshwater habitats that are associated with Hydraulic Project Approvals, Clean Water Act Section 401 certifications of the Corps of Engineer permits, forest practices permits and aquatic land use authorizations as well as from restoration projects. If methods to assess functions exist, augment quantitative reports with qualitative statements on whether the permit or lease resulted in an increase or decrease in function.

b. Fish and Wildlife, Ecology and Natural Resources shall evaluate the success or failure of mitigation in a representative sample of permitted projects and leases and calculate the net change in acreage and function. The agencies shall invite citizens, where appropriate, to tour compensatory mitigation project sites and review data from agency-required monitoring. The agencies shall provide a summary report on the effectiveness of their permit programs to the Action Team.

c. WSDOT shall evaluate the success or failure of a representative sample of its compensatory mitigation projects and use the information to improve its mitigation practices. This evaluation should be in addition to monitoring that is performed as a requirement of WSDOT's project permits. WSDOT shall track the performance of habitat function for out-of-kind mitigation projects proposed as a result of applying the State of Washington Alternative Mitigation Policy Guidance and annually report findings to the Puget Sound Council and Action Team.

d. The Action Team support staff, in cooperation with Ecology, Natural Resources, Fish and Wildlife, the Office of Community Development (OCD) and state colleges and universities, shall complete the ongoing Soundwide baseline inventory using remote sensing, tribal government sources of resource inventory information, including the Salmon and Steelhead Information and Assessment Project (SSHIAP) and other relevant data. The inventory shall survey wetlands, floodplains, intact riparian areas, and marine nearshore habitats and be coordinated through the Puget Sound Ambient Monitoring Program. WSDOT shall assist by providing any applicable data that has been collected for transportation projects. The agencies shall update the results of the inventory by monitoring each biennium in order to assess the basinwide change in marine and freshwater habitat.

Target Date for MFH-4.1: First reports by December 2001. Begin inventory by 2001, update each biennium through ongoing monitoring.

MFH-4.2. Federal Agencies

a. EPA, Natural Resources Conservation Service, Corps, the U.S. Fish and Wildlife Service and NMFS shall assist the Puget Sound Ambient Monitoring Program with basinwide habitat inventories and shall share results of similar regional inventories they have conducted.

b. The EPA shall provide the Puget Sound Council and Action Team with an annual report summarizing restoration or acquisition projects that involve wetlands, floodplains, riparian areas and marine nearshore habitat. The report shall also document any change in habitat caused by those projects.

c. The Corps shall provide an annual report to the Puget Sound Council and Action Team that summarizes the loss of marine and freshwater habitat that is authorized by permits.

Target Date for MFH-4.2: Reports submitted annually.

MFH-5. Improved Science

Good decision-making for protecting and restoring marine and freshwater habitats depends on sound science. As new scientific understanding and management practices are developed, they should be reviewed, publicized and incorporated into management decisions.

a. The Action Team support staff shall identify and distribute scientific information on the functions of marine nearshore habitats and the impacts of human disturbance on those habitats.

b. Federal, tribal and state governments, state colleges and universities, in consultation with the Puget Sound Ambient Monitoring

Program, shall work with local governments and non-governmental organizations to identify gaps in science, including gaps in understanding of the functions of marine and freshwater habitat and of the impacts to these habitats from human disturbance. The agencies shall target research to address gaps and incorporate pilot projects that demonstrate practical application when possible.

c. The Action Team support staff shall collect and disseminate examples of the following: innovative technologies for stabilizing shorelines without armoring; restoration processes that help maintain natural habitats; techniques that avoid or minimize impacts to natural habitats; the role of marine buffers; and assessment methodologies to evaluate the effectiveness of each technology.

d. Natural Resources, in cooperation with Fish and Wildlife, shall designate a system of aquatic reserves that foster research, education and environmental protection to improve understanding of processes that affect the entire Sound.

e. State and federal agencies shall provide continued funding for the development of additional methods to assess the functions of wetlands.

Target Date for MFH-5: Ongoing

MFH-6. Education and Stewardship

It is important to educate citizens and waterfront businesses about the value of protecting marine and freshwater habitats and about tools available to assess and recover habitat. State and federal agencies and tribal governments shall:

a. Increase use of the Internet and other communications technologies to publicize educational and guidance materials;

b. Target educational programs about marine and freshwater habitats to the interests of various audiences. Conduct a survey of the public to assess current knowledge and understanding of environmental issues to define target audiences and how to reach them;

c. Keep citizens involved by frequently updating information sources;

d. Develop and support educational programs about: the loss and alteration of marine nearshore habitats; the natural processes that create and maintain marine and freshwater habitats; life history of fish, habitat requirements of marine ground and forage fish and the effects of human disturbance; and the protection and enhancement of marine biodiversity;

e. Educate the media on the importance of marine and freshwater habitats and biodiversity. Develop and disseminate educational materials regarding ways that waterfront businesses can minimize their impact on marine habitat. Educate members of the landscape trade and engineers on preserving existing vegetation;

f. Develop training and education materials and conduct workshops on new technologies and methods to protect and restore marine and freshwater habitats. Workshops should include a field component;

g. The Action Team support staff shall support an expansion of citizen stewardship and monitoring projects such as the Citizen's Shoreline Inventory and Beach Watchers. Organizations with established Quality Assurance Project Plans should be consulted to aid in the development of monitoring protocols; and

h. WSDOT Ferries shall be used as a venue to distribute educational materials and programs on Puget Sound's marine and freshwater habitats.

Target Date for MFH-6: Ongoing

MFH-7. Preserve and Restore Marine and Freshwater Habitats

We are just beginning to understand the contributions that healthy shorelines make to marine biodiversity and salmon production. We must preserve and restore these habitats in order to reap the benefits we know of thus far, as well as those we have yet to discover.

a. Federal, tribal and state governments shall restore historic natural processes of watersheds and shorelines through actions such as acquiring property for protection, breaching dikes that impede natural water flow, removing culverts that block fish passage and eradicating non-native vegetation. Preservation and restoration projects shall be based on best available science. Ranking of projects

shall be based on potential benefit and probability of success taking into account the level of disturbance and proximity to other natural areas. They shall also provide for management and maintenance of preserved or restored sites in their plans and budgets and timelines.

b. Lead entities under the State Salmon Recovery Act, local marine resource committees and the Northwest Straits Commission should take early action to preserve natural marine shorelines in order to protect species, including forage fish and salmon in various life stages.

c. Natural Resources and Fish and Wildlife shall continue to establish aquatic reserves and protected areas that incorporate state-owned wetlands, floodplains, riparian areas and marine nearshore habitats. These reserves are meant to protect important marine and freshwater habitats that may or may not be included in the definition of marine protected areas. The agencies shall coordinate their efforts with the establishment of marine protected areas for research, fish stock recovery and protection of biodiversity.

d. Federal, tribal and state governments shall support local habitat preservation and restoration groups with funding and technical assistance and by streamlining permits for restoration projects.

Target Date for MFH-7: Ongoing

MFH-8. Marine Protected Areas

Marine protected areas (MPAs) are an effective way to protect biological and ecological diversity and to respond to declines of marine species. MPAs are any areas of intertidal or subtidal terrain, together with their overlying water and associated flora, fauna, historical and cultural features and uses, that have been reserved by law or other effective means to protect part or all of the enclosed environment (as adapted from the definition by the International Union for the Conservation of Nature and Natural Resources). In Puget Sound, there are many marine protected areas already established for a variety of goals and objectives, with varying levels of restrictions (Murray, 1998). These include areas designated by state and federal agencies, local governments, University of Washington Friday Harbor Labs and the Nature Conservancy.

a. Agencies and tribal governments should work together with local governments, local marine resource committees, the Northwest Straits Commission, and non-governmental organizations to identify rare and unique marine habitats and those habitats that would most benefit declining marine species and shall seek their designation as marine protected areas. The goal shall be to seek a net gain in marine species that have suffered decline and a long-term protection of critical habitats.

b. Agencies will include best science when designating marine protected areas and will provide technical assistance, data and information to groups seeking to collect information about local marine resources.

c. When considering location, marine protected areas must address the operation and growth of the Washington State ferry system and marine freight transport routes.

d. The Action Team and Puget Sound Council shall develop a comprehensive management strategy including protocols and processes for establishing marine protected areas. Fish and Wildlife, tribal governments, Natural Resources, the Action Team support staff, the Northwest Straits Commission, local marine resource committees and other interested groups, should work cooperatively to develop and manage a network of marine protected areas in Puget Sound as part of an overall marine protected areas strategy. Sites should be based on ecologically sound, measurable goals and objectives. The network of marine protected areas may serve a variety of purposes including protecting representative habitats, protecting migratory corridors, and protecting habitats for reproduction and dispersal of larvae. New marine protected areas should complement existing sites. All sites must have long-term monitoring plans, provisions for periodic assessments and a strategy to evaluate effectiveness that serves the goals and objectives of the particular marine protected area. The entities should use a mixture of regulatory and voluntary management approaches.

e. Agencies should include an educational component in establishing and managing marine protected areas in order to promote increased understanding of marine resources among residents and other users (boaters,

fishers, recreational divers, etc.). Agencies should also consider the establishment of a local advisory committee for individual marine protected areas.

f. Individual marine protected areas should each have specific goals and objectives associated with their designation. Monitoring, assessment and evaluation efforts should be used to determine the overall success of the site. Areas not achieving their ecological goals in a reasonable amount of time (varies with differing goals) should be considered for relocation, different management regimes, or abandonment. When monitoring and assessment indicate that goals and objectives have been achieved, the future of the MPA should be comprehensively reevaluated with removing the designation considered as an option.

g. The Action Team support staff, Fish and Wildlife, Natural Resources, the Northwest Straits Commission, local marine resource committees and state colleges and universities, shall coordinate in identifying, establishing, managing and monitoring marine protected areas, including sharing physical and biological data and conducting periodic assessments which serve the goals and objectives of the particular marine protected area.

h. The establishment of marine protected areas, especially those that pose restrictions on hunting, fishing or the gathering of shellfish, must continue to acknowledge and uphold tribal treaty rights and co-management roles of affected tribal governments.

Target Date for MFH-8: Add newly identified marine protected areas from local marine resource committees by December 2003. The Action Team and Puget Sound Council shall develop a comprehensive management strategy including protocols and processes for establishing marine protected areas by December 2002, to be followed by establishment of a coordinated network of marine protected areas by December 2005.

MFH-9. Measuring Program Effectiveness

The Puget Sound Action Team support staff shall evaluate program results through use of program and environmental performance measures. This supports the adaptive management approach described in the Estuary Management Program of the *Puget Sound Management Plan*. At a minimum, these evaluations should incorporate information from the following monitoring and assessment sources:

a. Program measures that track implementation of this program.
   - The results of habitat accounting reported to the Puget Sound Action Team.
   - Reviews of critical areas ordinances by OCD.
   - Shoreline master programs approved by Ecology.
   - Number of comprehensive marine and freshwater habitat programs adopted by local governments.

b. Case studies that assess the effectiveness of program actions.
   - Evaluations of the success or failure of projects that attempt to restore habitat functions including mitigation.

c. Indicators of environmental conditions for which this program is a major or important determinant (recognizing that these measures may be affected by several plan programs).
   - Puget Sound Ambient Monitoring Program marine and freshwater habitat inventory using remote sensing.
   - Environmental outcomes of the State Salmon Recovery strategy balanced scorecard (stream miles accessible to salmonids, estuarine wetland acres).
   - Population trends of key marine species monitored by the Puget Sound Ambient Monitoring Program.

Target Date for MFH-9: Ongoing

Addendum

The basic elements that should be included in regulation designed to protect wetlands include the following:

A. **A "no net loss" goal**

The local government ordinance for protecting wetlands should include a "no net loss of wetlands" goal. To be consistent with federal and state policy, wetlands loss should be stated in terms of functions and acreage.

B. **A clear definition of "regulated wetlands"**

The Growth Management Act defines wetlands as:

Areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from nonwetland areas created to mitigate conversion of wetlands. (RCW 36.70A.030 (20))

C. **An established method of delineating wetlands**

The Growth Management Act defers to the Shoreline Management Act for designation of a manual for delineating wetlands.

Wetlands regulated under development regulations adopted pursuant to this chapter shall be delineated in accordance with the manual adopted by the department pursuant to RCW 90.58.380. (RCW 36.70A.175)

The Shoreline Management Act states

The department by rule shall adopt a manual for the delineation of wetlands under this chapter that implements and is consistent with the 1987 manual in use on January 1, 1995, by the United States army corps of engineers and the United States environmental protection agency. If the corps of engineers and the environmental protection agency adopt changes to or a different manual, the department shall consider those changes and may adopt rules implementing those changes. (RCW 90.58.380):

D. **A method of categorizing wetlands**

Categorizing or rating wetlands is an essential step in ensuring adequate protection of wetland functions and values. A wetland rating system provides the basis for tailoring protection standards and assists with land use planning decisions. A wetland rating system also provides predictability for landowners and applicants regarding the potential restrictions that may be placed on a proposed project.

Wetlands should be categorized according to their rarity, irreplaceability, sensitivity to disturbance and the functions they provide. Local governments should either use the Washington State Wetland Rating System for Western Washington developed by Ecology or they should develop their own, regionally-specific, scientifically-based method for categorizing wetlands. Management standards for permitted activities, avoidance criteria, buffers and mitigation replacement ratios should be designated for each category of wetland and should be adequate to ensure that all wetlands in that category will be adequately protected.

Local governments that do not have their own wetlands rating system are strongly encouraged to adopt the Washington State Wetlands Rating System. This system includes four tiers or categories to define relative wetlands values. Information on the Washington State Wetlands Rating System and guidance on the related field methodology are available from Ecology. Local governments that choose not to use this rating system must explain the rationale for their decisions in their next Biennial Report. This information will help the Action Team to identify other useful rating systems.

E. **A definition of "regulated activities"**

Wetlands functions and values can be severely affected by poorly controlled construction and land-development activities. Each local government should identify activities that adversely affect wetlands and their associated buffers. These activities should be regulated through a permit system and enforced at the local level.

The Action Team recommends that local governments adopt the following definition of "regulated activities":

a. The removal, excavation, grading or dredging of soil, sand, gravel, minerals, organic matter, or material of any kind.
b. The dumping, discharging or filling with any material.
c. The draining, flooding or disturbing the water level or water table.
d. The driving of pilings.
e. The placing of obstructions.
f. The construction, reconstruction, demolition or expansion of any structure.
g. The destruction or alteration of wetlands vegetation through clearing, harvesting, shading or planting of vegetation that would alter the character of a regulated wetland, provided that these activities are not part of a forest practice governed under chapter 76.09 RCW and its rules.
h. Activities that result in a significant change of water temperature, a significant change of physical or chemical characteristics of wetlands water sources, including quantity, or the introduction of pollutants.

F. **Wetland buffer zones**

A wetland buffer zone is an area that surrounds and protects a wetland from adverse effects of activities on adjacent lands. A buffer zone should be of adequate width and vegetative character to provide the following functions:

a. Stabilize soil and prevent erosion.
b. Filter suspended solids, nutrients and harmful or toxic substances.
c. Moderate effects of stormwater runoff.
d. Moderate system microclimate.
e. Support and protect plant and animal species and their habitats.
f. Discourage adverse human effects in wetlands.
g. Local governments should adopt standards that meet or exceed Ecology's standards for buffer-zone widths and vegetative character. This explanation should address the concern that buffer-zone widths and vegetative character must provide the necessary functions listed above.

Local ordinances should also include provisions to discourage activities in wetland buffer zones, except where such activities are compatible with and have no adverse effects on the overall functions of the buffer zone. Wetland buffer zones should be retained in their natural condition unless revegetation is necessary to restore the functions of the buffer zone.

G. **Standards for use and protection of wetlands**

Local governments should establish standards for use and protection of regulated wetlands. The order of preference for management options with respect to the control of regulated activities and their associated effects on wetlands should be as follows:

a. Avoid the impact altogether by not taking a certain action or part of an action;
b. Minimize impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;
c. Rectify the impact by repairing, rehabilitating or restoring the affected environment;
d. Reduce or eliminate the impact over time through preservation and maintenance operations during the life of the action;
e. Compensate for the impact by replacing, enhancing or otherwise providing equivalent or greater wetland functions; and
f. Monitor the impact and take appropriate corrective measures.

The standards should require project applicants to compensate through mitigation for all negative impacts to regulated wetlands. "Compensatory mitigation" means replacing project-induced wetland losses, and the following should be considered:

a. **Restoration**—actions performed to reestablish a wetland's functional characteristics and processes that have been lost.
b. **Enhancement**—actions performed to improve the condition of existing degraded wetlands so that the functions they provide are of a higher quality.

c. **Creation**—actions performed to intentionally establish a wetland at a site where it did not formerly exist.

The standards which govern the permitting system should include provisions requiring: (1) careful planning of compensation projects; (2) evidence that the project applicant has sufficient technical expertise and financial resources to satisfactorily complete the project; and (3) project monitoring, with corrective action when needed. Special care should be taken to ensure that native wetland vegetation is used in all mitigation projects, and that exotic and invasive species are controlled.

The standards also should specify acreage replacement ratios for projects involving compensatory mitigation. The acreage replacement ratio is used to indicate how many acres of wetlands must be created or restored to achieve full compensation for wetlands that are lost as a result of a permitted project. The following factors should be considered when developing these ratios:

a. The type, function and wetlands rating of the original and the created or restored wetland.
b. The size and location of the original and created or restored wetland.
c. The length of time it takes for a created or restored wetland to approximate the characteristics of the original wetland.
d. The probability of success of the mitigation efforts.

There is considerable scientific uncertainty with respect to the effectiveness of compensatory mitigation. Follow-up studies of wetlands restoration and creation projects indicate that about half of the projects fail to fully compensate for lost wetlands. Therefore, the acreage replacement ratios should be adjusted to reflect the risk of failure inherently involved in these projects.

In establishing the standards for compensatory mitigation, local governments should address the timing problems inherent in creating and restoring wetlands. Significant time may elapse between the effect or destruction of the original wetland and completion of the compensation project. Time is also required for the created or restored wetland to become fully functional. Up-front compensation, which is completed before a wetland is destroyed, is the only way to avoid a loss for at least some period of time. Provisions for increasing the acreage replacement ratio in situations where there will be a significant period of time between destruction and replication of wetlands functions may also provide a partial solution. Local governments seeking further guidance in developing acreage replacement ratios should consider those used in the model ordinance and contact Ecology for technical assistance.

Local governments should consider providing flexibility in local mitigation regulations to allow advanced mitigation (mitigation banking), joint mitigation projects, and off-site, out-of-kind projects where the proposed project can demonstrate a greater benefit to the wetlands resource than in-kind, on-site mitigation. Local governments are encouraged to identify potential off-site restoration projects in comprehensive plans. Off-site restoration projects should not promote trade-offs of function from lower to upper watershed or vice versa. Off-site, out-of-kind projects should be considered only after mitigation sequencing has been done, and where criteria for approval have been negotiated among regulatory agencies as per the State of Washington Alternative Mitigation Policy Guidance.

H. **Enforcement**

Regulatory programs should include provisions for enforcing local wetlands regulations as part of general land-use and growth management programs and local programs for protecting water quality. A combination of permit tracking and enforcement will allow for comprehensive protection of wetlands and monitoring of wetland losses. Local governments should include an educational component in their wetlands protection program to encourage residents to become involved in local preservation programs, and to help them to understand the need for wetlands regulations.

Municipal and Industrial Discharges Program

Directory of Program Elements

Problem Definition

Industries and municipal sewage treatment plants discharge nearly a billion gallons of wastewater into Puget Sound every day. These discharges are often referred to as "point sources," because they are discharged into water bodies at a specific point by a pipe or ditch. Both industries and municipal sewage treatment plants are issued permits that regulate their discharges; however, problems arise when the wastewater is treated insufficiently.

Efforts to control releases of conventional pollutants from point sources have been increasingly successful. Water quality problems related to these pollutants are now relatively rare in Puget Sound. But scientists are increasingly concerned that nutrient discharges may be causing harm to sensitive areas of the Sound.

Another concern is persistent toxicants. They exist long enough to accumulate and cause harm by concentrating in sediments and in the tissue of organisms—and ultimately pass through the food web.

The concentrations of toxicants recently found in samples from Puget Sound's urban bay sediments were up to 100 times greater than the concentrations found in the cleanest rural bay. Lesions and tumors found in fish from urban bays are asso-

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

ciated with these high concentrations. Because humans are part of the food web, toxic substances may also pose health risks to those who eat seafood harvested from Puget Sound.

Approximately half the toxics entering Puget Sound are from municipal and industrial point sources. The other half may be related to nonpoint pollution sources—such as storm water, household hazardous waste and runoff from improper agricultural activities. Current monitoring is insufficient to accurately estimate total toxicant contamination from either non-point or point source discharges. Air deposition and small spills are also not quantified.

It is expected that contamination to the Puget Sound from discharged wastewater may become more severe as population and industrial activity increase. The persistence of many toxic substances makes restoring contaminated waters very difficult.

Institutional Framework

The federal Clean Water Act and Washington State law have established a strong institutional framework for controlling municipal and industrial discharges. Direct dischargers must obtain a National Pollutant Discharge Elimination System (NPDES) permit from the state Department of Ecology for nonfederal facilities or from the U.S. Environmental Protection Agency for federal facilities. Ecology also administers state permits for discharges to sewers (and related pretreatment requirements) and to the ground. The administering agency periodically inspects the facility and takes action where necessary to meet other state water quality standards.

An activity doesn't have to look like a factory or sewer treatment plant to require a permit. For example, many boat repair operations require permits, as do shipyards.

The federal Clean Water Act requires Ecology to prepare a list of water bodies that do not meet water quality standards and are not expected to meet the standards through normal pollution control efforts. The Act then requires a total maximum daily load (TMDL) be established for each problem contaminant for each water body. The TMDL should also include a plan for reducing discharges to meet the water quality standards. The requirements identified through the TMDL process are then included in the discharge permit.

Program Goal

To achieve comprehensive improvement in the control of toxic and other pollutants discharged into Puget Sound by industrial and municipal dischargers, thus reducing and eventually eliminating harm from such contaminants entering or accumulating in the Sound.

Program Strategy

The strategy for achieving this goal is to:

a. adopt and, as needed, revise water and sediment quality standards;

b. require that all waste discharge permits include the monitoring requirements and limitations on toxicants and other pollutants of concern which are appropriate to the permit;

c. develop the tools needed to make these permit improvements, including the permit writers' manual, data management, lab support, quality assurance and technical assistance and training;

d. strengthen pretreatment;

e. inspect permitted discharges and take enforcement actions for violations of discharge permits; and

f. discover and control un-permitted discharges.

Standards

P-1. Adopt Water and Sediment Quality Standards and Mixing-Zone Criteria

P-1.1 Water Quality Standards

The Department of Ecology shall adopt and periodically revise numerical water quality criteria that are relevant to Washington State and equivalent to those published in the *Environmental Protection Agency's Quality Criteria for Water* (for the protection of aquatic life). These criteria will address toxicants and conventional contaminants. Ecology shall update the state water quality standards every three years as required under the federal Clean Water Act.

To ensure that point source discharges do not have adverse environmental consequences,

Ecology shall develop and include in the state water quality standards: implementation procedures for an antidegradation policy and biocriteria that are consistent with national guidance from the Environmental Protection Agency (EPA).

Target date for P-1.1: Ecology shall complete updates every three years.

P-1.2. Sediment Management Standards

Ecology shall periodically review and revise, by regulation, standards for identifying and designating sediments that have acute or chronic adverse effects on biological resources or that pose a significant health risk to humans. The sediment standards will establish the levels of sediment contamination that are acceptable throughout the Sound over the long term.

Sediments that exceed the sediment standards are undesirable in Puget Sound. When they are dredged, they may only be disposed of by meeting the requirements for use of unconfined open-water disposal sites (element S-2) or the requirements for treatment or confined disposal to be developed under element S-3 (which may include in-water as well as upland disposal and treatment methods). Sediments that exceed the sediment standards shall not be used as cap material for dredged-material disposal or remedial actions.

Target date for P-1.2: Ecology shall adopt human health criteria for sediments during the 2003-2005 biennium. Implementation of the standards shall be ongoing.

P-1.3. Water Column and Sediment Mixing-Zone Criteria

Ecology shall review and revise water column and sediment mixing-zone criteria as a component of the water and sediment quality standards to achieve the goal of this program.

P-2. Requirements in Wastewater Discharge Permits

P-2.1. Alternatives for Reducing Effects of Sanitary Discharge to Marine Waters

Ecology shall adopt a policy promoting alternatives to discharging effluent from sewage treatment plants to marine waters whenever such alternatives are feasible, economically achievable and environmentally preferable (for example, when discharge and/or disposal of effluent from sewage treatment plants could result in shellfish bed closures due to potential pollution). Alternatives to be considered shall include, but not necessarily be limited to, the following: land application, reuse, additional treatment and the use of constructed wetlands. The policy shall be used in state financial-assistance programs.

P-2.2. Reevaluate Allocation of Permits into Major and Minor Categories

The EPA and Ecology shall ensure that point source permits are properly classified as major or minor permits. Where appropriate, existing permits should be reclassified.

P-2.3 Permit Requirements

Ecology and EPA shall include the following requirements to protect Puget Sound, when appropriate, in wastewater discharge permits they issue. These requirements are most appropriate in individual permits for large facilities and may not be appropriate for general permits.

P-2.3.1. Discharge Limits

In issuing or reissuing National Pollution Discharge Elimination System (NPDES) or state waste discharge permits, Ecology and EPA permit writers shall review the dischargers' operations and incorporate permit conditions that require all known, available and reasonable methods to control toxicants in the dischargers' waste water. Such conditions may include, but are not limited to, limits on the discharge of specific chemicals and/or limits on the overall toxicity of the effluent. Where possible, permit writers shall incorporate a combination of concentration and mass limits into permits. The toxicity of the effluent shall be determined by techniques such as chronic or acute bioassays. Such conditions shall be required regardless of the quality of receiving water and regardless of the minimum water quality standards. In no event shall the discharge of toxicants be allowed that would violate any water quality standard, including toxicant standards, sediment criteria and mixing zone criteria.

Wastewater discharge permits shall have quantitative discharge limits for all toxicants present in significant amounts. At a minimum, discharge limits, including an appropriate mixing zone, shall be established for all toxicants that would exceed applicable ambient water-quality standards at the

end-of-the-pipe based on all known, available and reasonable methods of treatment (AKART). Similarly, discharge limits, including a mixing zone if appropriate, shall be established if monitoring results show that applicable ambient water-quality standards are exceeded at the end-of-the-pipe based on AKART.

Where a Total Maximum Daily Load (TMDL) has been established, Ecology or EPA permit writers shall incorporate applicable conditions into all discharge permits.

2.3.2. Particulate Contamination in Effluents

Ecology and EPA permit writers shall obtain and review information on particulate contamination in the applicants' effluents (looking at similar data for comparable effluents) and shall include specific conditions that address particulate contamination, appropriate to each case, sufficient to assure that the ambient sediment standards will not be violated, subject to any authorized sediment impact or mixing zones. Such conditions may include measures to control pollution sources, best management practices, numeric limits on toxicity of the particulate fraction of the effluent, numeric limits on the concentration or mass of specific chemicals discharged, or other conditions deemed appropriate by the permitting agency.

P-2.3.3. Solids Handling and Disposal

NPDES, pretreatment and federal facilities permits shall include solids handling and disposal plans that prevent pass-through of excessive solids. For municipal permits, these plans shall also address disposal of solids generated from cleaning out sanitary and combined sewer collection systems. Stormwater permits, including general or group permits, shall include solids handling and disposal plans for maintenance and cleaning. Solids handling requirements will be consistent with Chapter 173-308 WAC, Biosolids Management.

P-2.4. Monitoring Requirements in Permits

In issuing, modifying or reissuing NPDES and state wastewater permits (municipal, industrial and stormwater), Ecology and EPA permit writers shall consider the need for each of the five types of monitoring listed below and shall include requirements in permits for all types of monitoring that are appropriate to each permittee. Monitoring requirements included in permits shall be tiered so that if initial (baseline) sampling discloses no problems, a reduced monitoring schedule may then apply. Likewise, if baseline sampling indicates the possibility of problems, a more frequent and/or more comprehensive monitoring schedule would apply. Initial monitoring schemes shall be set to ensure that enough data is collected to determine if additional discharge limits should be set.

Although these monitoring requirements shall be primarily directed toward the detection of effects from individual wastewater discharges, as a second priority, and to the extent practicable, Ecology and EPA shall develop monitoring requirements for permits that will facilitate the calculation of the total quantity of contaminants discharged to Puget Sound.

The five types of monitoring are as follows:

a. Monitor specified parameters in the sediment in the vicinity of every significant outfall.

b. Separately analyze samples of the particulate fraction of the effluent from each significant outfall.

c. Conduct periodic acute and chronic toxicity bioassays on a sample of the effluent from each outfall and on the sediment near each outfall.

d. Conduct periodic surveys of the population, species composition and health of biota in the vicinity of each significant outfall.

e. Monitor water quality at the boundary of the mixing zone. Mixing-zone modeling may suffice, provided that appropriate field verification determined by Ecology is carried out.

All major municipal dischargers shall perform priority-pollutant scan analyses on their effluent at least annually and more frequently if appropriate. The permit writer may exclude groups of chemicals (e.g., pesticides) from the priority-pollutant scan requirements of dischargers with a capacity less than five million gallons per day if there is recent monitoring data or literature documenting that the particular group of chemicals is not of concern for that discharge.

Target date for P-2.4 Ecology shall review the monitoring guidelines annually and update as necessary.

P-2.5. Spill Control Plans Required

Every major permit issued or reissued, and minor permits as appropriate, shall include conditions

that require the development or updating of spill control plans. At a minimum, such plans shall apply to both oil and hazardous substances. Ecology, in consultation with the EPA, shall actively review and comment on the plans and shall require the permittee to implement the approved plan. Spill plans shall include the provisions of WAC 173-303-630 regarding secondary containment.

Consistent with other state and federal requirements, Ecology shall:

a. Track and improve requirements in dischargers' spill control plans;
b. Follow up on and improve upon dischargers' compliance with spill control plans; and
c. Ensure adequate staff to perform on-site compliance inspections for spill control plans and update spill control plans in permits as appropriate.

Ecology shall take enforcement action, consistent with its enforcement guidelines, against any permittee found out of compliance with its spill control plan (refer to the Spill Prevention and Response Program).

Target date for P-2.5: Ecology shall incorporate improved requirements for spill control plans into new and revised permits on an ongoing basis.

P-2.6. Enhanced Requirements for EPA-Issued Permits and Ecology Certifications

P-2.6.1. EPA-Issued Permits

The conditions in EPA-issued permits in the Puget Sound region shall be at least as stringent as those required under this management plan in permits issued by Ecology. This applies to all toxicant and particulate limits, and to monitoring, spill control, frequency of inspection and public notice requirements. The EPA shall also review existing EPA-issued permits and modify any permit as necessary to include such limits and requirements.

P-2.6.2. Ecology Certifications

Ecology shall not issue an NPDES permit or certify the issuance or renewal of any NPDES permit for a federal facility under Section 401 of the Clean Water Act, unless the permit includes appropriate numeric limits and other conditions required to comply with all applicable water quality and sediment standards and other elements of this management plan. Before considering a permit or 401 certification for a federal-facility permit, Ecology shall seek to be familiar with the facility site, through site visits, inspections or other means.

Target date for P-2.6: Ongoing.

P-2.7. Certified Labs

Ecology shall adopt regulations requiring all permittees to use a certified laboratory for their compliance and self-monitoring wastewater analyses, and requiring all certified laboratories to use specified protocols and comply with specified quality assurance and quality control procedures (see Laboratory Support Program).

P-2.8. Reopener Clause

Every permit issued or reissued by Ecology or EPA in the Puget Sound basin shall include a reopener clause allowing the permitting agency to modify, based on monitoring results or other causes consistent with state and federal regulations, the effluent limitations, monitoring requirements or other conditions in the permit.

P-3. Permit Fact Sheets, Public Involvement and Permit Review

The objective of fact sheets is to facilitate meaningful public review. In the fact sheet accompanying each draft major permit, the Department of Ecology shall clearly explain how the draft permit fulfills the goal of reducing and eventually eliminating harm from toxic contaminants in Puget Sound, including a summary of the information used to determine which limits on specific toxicants and/or overall effluent toxicity should be included in the permit. It is the Action Team's intent that the fact sheet information be as concise, consistently presented and efficiently prepared as possible, making use of computerized information and focusing on the issues addressed in this program. Fact sheets shall be written in language that can be understood by the general public.

Ecology shall ensure that the dischargers and the public have equal opportunity for access to and involvement in the permit decisions pertaining to discharge limits, mixing zones, monitoring schemes or other negotiable requirements of the permits.

EPA shall provide a similar explanation for any draft major permit issued by the EPA.

In order to provide an opportunity for meaningful public review, monitoring requirements shall be fully described in the draft permit.

The fact sheet accompanying each draft major permit shall include a brief discussion of how the draft permit has dealt with each of the five types of monitoring specified below, and shall explain those situations where any of these types of monitoring have not been required or otherwise addressed in the draft permit.

P-3.1. Explanation of Relaxed and Increased Limits in Permits

For any draft permit whose effluent limitations are in any way less stringent than those in the preceding permit, Ecology shall include a conspicuous notice and clear explanation of the reasons for such limits in the public notice of the draft permit. This requirement shall apply to all effluent limitations that are, or appear to be, a relaxation of limits in comparison to the previous permit. This requirement for notice and written explanation shall also apply to any draft permit proposing to allow a greater amount of effluent to be discharged due to increases in production. In every such explanation, Ecology shall report on measures available to and undertaken by the discharger to reduce the production of pollutants per unit of product. Ecology shall adopt a formal policy for implementing this program element

Target date for P-3.1: The notification and explanation process are ongoing activities.

P-3.2. Permit Review

The Washington departments of Natural Resources, Health, and Fish and Wildlife, appropriate federal agencies and tribal governments shall review and comment on selected NPDES permits with regard to protecting the respective resources for which they have responsibility. Ecology shall provide training for these departments upon request for the purpose of reviewing permits (element P-13).

Target date for P-3.2: Ongoing.

P-4. Permit Writers' Manual, Permit Quality Control, and Internal Technical Assistance for Permit Writers

Several comprehensive policies must be implemented to ensure overall coordination and quality assurance of the permit program. In order to fulfill this objective, Ecology shall build upon existing efforts and establish a centralized mechanism that ensures:

a. Development of consistent policies and communication of them to all permit writers in the Puget Sound basin;
b. Implementation of quality assurance reviews of permits prior to their issuance;
c. Coordination and resolution of cross-program issues;
d. Acceptance of permit applications from dischargers only if they are fully complete;
e. Equally stringent requirements for both municipal and industrial permits to the extent practicable; and
f. Implementation of pollution prevention through waste minimization.

P-4.1. Permit Writers' Manual and Checklist

Ecology shall revise, as necessary, a procedures manual for permit writers (referred to as the permit writers' manual). In preparing all NPDES permits in the Puget Sound basin, permit writers shall use the permit writers' manual.

This manual shall include examples, guidelines and procedures to ensure that all pertinent information is made available to and used by permit writers in determining appropriate effluent limits, particulate contamination limits (element P-2), measures to control pollution sources, monitoring schemes, best professional judgment, fact sheets, and other conditions in NPDES and state permits. Such information may be derived from documents already available to the department (e.g., the applicant's most recent hazardous waste annual reports) or additional information that would be requested from the applicant (e.g., information on the overall distribution of contaminants between the dissolved and suspended phases of the effluent).

The permit writers' manual shall require that all NPDES permits include appropriate conditions for addressing all stormwater runoff from permitted facilities. Procedures to incorporate requirements of applicable TMDLs shall also be included. The permits shall also address any significant issues raised in the fact sheet.

The permit writers' manual shall incorporate other requirements related to permit writing, including water quality and sediment standards (elements P-1); enhanced information in public notices and fact sheets pertaining to draft permits

(element P-3); particulates and solids (element P-2); monitoring requirements, including provisions for tiering (element P-2); spill control (element P-2); explanation of changes in discharge limitations; 401 certifications; assuring inspection access, assuring that inspection results are provided to permit writers and that permit modifications are made if necessary; pretreatment program enhancements (element P-10); and pollution prevention through waste minimization (element P-14). The permit writers' manual shall encourage Ecology staff to make the best possible use of municipal and industrial expertise and resources in carrying out permit writing and appropriate related activities.

The permit writers' manual shall also include guidelines for permit writers to use in evaluating the potential for cross-media transfer of pollutants. These guidelines shall emphasize mechanisms available to permit writers to encourage waste reduction at the source rather than end-of-pipe treatment if such treatment results in cross-media transfer of pollution. Ecology is encouraged to develop such effluent guidelines and technical standards as may be necessary to assist in the efficient administration of the permit program.

Ecology shall provide opportunity for review and comment on the draft permit writers' manual and any significant updates to it by an advisory committee made up of interested stakeholders.

A checklist shall accompany each public draft and final issued permit. The checklist shall document that all appropriate requirements of the Puget Sound Management Plan were met and procedures in the permit writers' manual were followed during preparation of the permit.

Target date for P-4.1: Ecology shall complete the missing elements of the Permit Writers' Manual during the 2003-2005 biennium.

P-4.2. Monitoring Guidelines

Ecology shall develop (and revise as necessary) guidelines for the frequency and methodology for monitoring by dischargers and for reporting requirements and format. The guidelines shall include the tiered approach.

The guidelines shall focus the monitoring resources of dischargers on the mandatory monitoring of effluent and the receiving environment and leave most of the in-plant, process-control monitoring to the discretion of the discharger except in cases of significant non-compliance, as necessary to meet permit effluent limits. Ecology shall minimize the mandatory in-plant, process-control monitoring to only what is necessary to verify that the appropriate technology is being used and to characterize influents as appropriate.

The guidelines shall use the Puget Sound Estuary Program Protocols and Guidelines when available and data management systems compatible with the Puget Sound Ambient Monitoring Program (PSAMP). The guidelines shall also define triggers for determining when action is necessary to modify a permit. Ecology shall develop the guidelines in consultation with municipal and industrial dischargers, laboratories, EPA, the Action Team and others as appropriate.

P-4.3. Technical Assistance and Quality Control

Ecology shall establish an internal "technical assistance team" to assist permit writers in researching and in writing appropriate conditions for NPDES and state permits. Ecology shall build on initial efforts and develop a comprehensive permit quality control and internal, technical assistance plan.

P-4.4. NPDES Rule Revision

Ecology shall revise or adopt rules governing NPDES permits (WAC 173-220, WAC 173-205) to include the permit improvements specified in the *Puget Sound Management Plan* as appropriate.

P-4.5. Biosolids Management

Ecology shall periodically update the guidelines for managing biosolids and the "biosolids management rule."

P-4.6. Training for Permit Writers

Ecology shall establish an ongoing, vigorous program of training for permit writers, including cross training in other environmental regulatory programs, recognition of problems related to cross-media transfer of pollution, and opportunities to reduce or recycle waste at the source. Ecology shall assure that an appropriate percentage of permit writers' time is allocated to training activities. Ecology shall establish minimum training requirements for permit writers and ensure that all staff complete these requirements before assuming their duties. Ecology shall take advantage of existing training programs, such as those offered by EPA, to the maximum extent practicable.

Compliance Assurance

P-5. Inspections and Enforcement

P-5.1. Adopt Enforcement Policies as Regulations, Report on Enforcement and Encourage Compliance

The objective of this element is to develop a more effective enforcement program that is consistently, efficiently and fairly applied to the regulated community for the purposes of protecting the water and sediment quality of Puget Sound.

Ecology shall provide a regular program of enforcement training for agency staff involved in enforcement actions.

Ecology shall continue to prepare and submit to the Puget Sound Council and Action Team quarterly lists of all water quality-related civil and criminal enforcement actions taken, together with statistics on the percentage of Ecology enforcement actions that were appealed and the dollar amounts of penalties assessed versus those sustained. Where possible, Ecology may include statistics on cases in which the Pollution Control Hearings Board has considered the post-penalty behavior of a violator in determining the amount of penalty to be sustained. In order to examine the relationship between penalties and compliance, Ecology shall establish a settlement reporting system. Ecology shall use the reporting system to better evaluate settlements throughout the agency, to assure that settlements are negotiated consistently, and to track settlement compliance. Ecology shall also develop comprehensive settlement guidelines to help staff make informed decisions and promote consistency across agencies. Guideline topics shall include:

a. Differences between simple and innovative settlements;
b. Types of proposed activities that are appropriate for innovative settlements;
c. Procedures for completing settlement agreements; and
d. Ecology and Attorney General Office roles in the settlement process.

The Pollution Control Hearings Board is encouraged to process appeals cases related to water quality permit issues within six months through the use of sufficient staff resources such as administrative law judges.

P-5.2. Inspections

Ecology shall conduct a significant number of Class I inspections on an unannounced basis. Similarly, a significant number of Class II inspections shall include an unannounced sampling visit. Ecology shall assure that appropriate permits include such conditions as may be necessary to provide a pre-arranged means for Ecology inspectors to obtain unannounced samples of effluent on a 24-hour basis.

Note: Class I inspections are walk-through inspections, including a visual inspection of the facility and some examination of records (self-monitoring reports, procedures manuals, operation and maintenance records, etc.). Class II inspections include all of the Class I activities plus effluent and some sediment sampling and analyses to determine compliance with the permit.

Ecology shall conduct inspections in accordance with the following minimum schedule:

Type of permit	Number of inspections per year per permit	
	Class I	Class II
Major	2	1
Significant minor	1	0.5
State and minor NPDES	1	0.1

Additional inspections (both announced and unannounced) shall be conducted based on the permittee's record of compliance. Ecology is encouraged to frequently perform quick surprise walk-through visits where a grab sample of the effluent is taken and obvious permit violations are addressed on the spot. Ecology inspectors shall ensure that they notify dischargers prior to leaving the facility of any obvious permit violations and any immediate corrective actions required. Ecology shall also ensure that copies of the results of the inspections reports are sent to permit writers and the dischargers within 90 days of the inspection date for Class I inspections and within 120 days for Class II inspections. Ecology shall ensure that discharge permits are modified as necessary to incorporate appropriate monitoring requirements, effluent limits or other conditions to correct problems identified through inspections.

In conjunction with reporting requirements under element P-15, Ecology shall submit a report to the Puget Sound Council and Action Team on the number and types of inspections (including unannounced inspections) undertaken. The report shall

also describe a system for tracking inspection information, including the number and types of inspections (including unannounced inspections), inspection results, the number and types of violations discovered, actions initiated in response to violations, lab data and inspection report turnaround times, and occasions on which an authorized inspector was denied access to a facility.

Target date for P-5.2: Ecology shall meet the inspection schedule when full funding becomes available.

P-5.3. Inspector's Manual

Ecology shall periodically update, as necessary, the inspector's manual to ensure that the most current EPA or other appropriate information is being used.

P-5.4. Training for Inspectors

Ecology shall establish an ongoing, vigorous program of training for inspectors, including cross training in other environmental regulatory programs, recognition of problems related to cross-media transfer of pollution, and opportunities to reduce or recycle waste at the source. Ecology shall assure that an appropriate percentage of inspectors' time is allocated to training activities. Ecology shall establish minimum training requirements for inspectors and staff involved in enforcement and ensure that all staff complete these requirements before assuming their duties. Ecology shall take advantage of existing training programs, such as those offered by EPA, to the maximum extent practicable.

P-6. Search for Unpermitted or Illegal Discharges

Ecology shall carry out a program for detecting illegal dischargers or wastewater discharges not covered by permits. This shall apply to both direct and indirect wastewater discharges and to direct discharges of stormwater from industrial facilities. Ecology shall ensure that its enforcement guidelines incorporate appropriate automatic penalty provisions for instances when dischargers without permits are discovered. Ecology shall submit a report to the Puget Sound Council and Action Team on the number and characteristics of unpermitted discharges discovered though this element, together with any analysis and recommendations that the department may have.

Target date for P-6: Ecology shall submit report by June 30, 2005.

P-7. Felony Provisions

The Action Team shall submit proposed legislation to the Legislature to amend appropriate sections of the state Water Pollution Control Act (RCW 90.48) to provide for felony penalty provisions. The proposed legislation shall ensure that accidental or emergency bypasses are not subject to the felony penalty, but rather shall target willful violators with demonstrated knowledge and intent to commit the violation.

Target date for P-7: Resubmit to 1993 or subsequent Legislature.

P-8. Data Management

Ecology shall maintain and enhance the Wastewater Permit Life Cycle System (WPLCS). Ecology shall ensure that the WPLCS system incorporates results of Class I and Class II inspections as well as self-monitoring data.

In addition, Ecology shall maintain accurate records of outfall locations (and other useful information pertaining to mapping the effluent effects of discharges as additional funds become available) in the WPLCS as appropriate, and provide this information to the Puget Sound Geographic Information System (GIS).

This data management program shall include features that simplify public access to permit tracking and discharge information.

Target date for P-8: Continue to load data.

P-9. Permit Fees and Aquatic Lands Leasing Rates

P-9.1. Permit Fees

Ecology shall periodically evaluate the adequacy of funding for municipal and industrial permits, review the municipal fee cap and make recommendations, if appropriate, to address any shortfalls. Ecology shall also consider the economic effect of fees on small dischargers and the economic effect of fees on public entities required to obtain permits for stormwater runoff and shall make appropriate adjustments.

P-9.2 Aquatic-Lands Leasing Rate

The Action Team encourages Natural Resources to review policies and laws for leasing aquatic lands as they relate to contamination of state-owned aquatic land. The purpose of the review is to determine whether changes in laws or policies might provide better proprietary management of historical and current particulate contamination and allow for proper compensation to the state for storage of that material on state-owned aquatic lands. In developing any changes to the leasing program, affected groups, including ports, municipal and industrial discharges and stormwater dischargers, shall be consulted.

Pretreatment

P-10. Pretreatment Program Enhancements

The Department of Ecology shall develop and maintain a strong pretreatment program, including permitting (with appropriate conditions for monitoring and control of toxicants in accordance with element P-2), compliance tracking, inspections, spill control, public notice, auditing of local programs and enforcement as needed. Ecology is encouraged to develop such effluent guidelines and technical standards as may be necessary to assist in the efficient administration of state and local pretreatment programs.

With the involvement of local governments; delegated and non-delegated agencies that manage municipal sewage systems that accept pre-treated industrial wastewater; federal and other state agencies; tribal governments; and interested citizens, Ecology shall coordinate and implement the pretreatment program and address the following issues:

a. Ensuring program consistency across jurisdictions in order to eliminate the creation of pollution-tolerant zones for indirect dischargers.
b. Ensuring the adequacy of staffing and funding resources.
c. Coordinating with the solids handling provisions of element P-2 .
d. Setting minimum pretreatment program requirements for municipal NPDES and pretreatment permits and establishing a quality review mechanism to ensure that those requirements are being included in permits.
e. Developing mechanisms to ensure that local governments (via comprehensive plans, etc.) identify new indirect dischargers resulting from regional growth and conversion of rural land use to urban uses including coordination with the state Growth Management Act, and evaluating the cost impacts and enforcement issues for municipalities.
f. Developing computerized tools for tracking and managing program data to effectively track compliance with minimum pretreatment program requirements.
g. Consulting with Ecology staff, the regulated community, the public, and other state and federal agencies as appropriate to identify and resolve any other barriers to success.

Target dates for P-10: Ongoing.

P-11. Training and Certification of Wastewater Treatment Plant Operators

Municipal Operator Training

Ecology shall ensure that each wastewater treatment plant operator-certification examination covers basic issues and facts about industrial discharges, pretreatment laws and regulations, treatment technologies, maintenance and troubleshooting, and recognition of pretreatment-related problems. Ecology shall consult with the Action Team and affected groups of wastewater treatment plant operators in drafting any additional test questions related to these topics. Ecology will prepare handouts identifying up-to-date pretreatment rules, regulations, and technology. Such handouts shall be mailed to all certified operators at least annually. Ecology shall encourage certified operators to attend pretreatment workshops, conferences and courses for credit toward the mandatory professional growth requirement.

Ecology is encouraged to review its testing and certification methodology to reflect the level of responsibility of the operator for pretreatment programs.

Certification of Industrial Treatment Plant Operators

In conjunction with its technical outreach to dischargers under element P-13, Ecology shall explore and facilitate the development of a voluntary process for certifying operators of both direct and

indirect discharger industrial treatment plants through a private trade or professional association or other appropriate entity. Certification shall initially be voluntary and evolve into a mandatory process. In exploring this approach, Ecology shall consult with industrial dischargers and treatment plant operators, private trade and/or professional organizations, appropriate labor unions, the Action Team, and other interested individuals and groups in Washington and other states.

Target dates for P-11: Initiate development of voluntary certification of industrial operations during the 2003-2005 biennium. Phase in implementation of voluntary program by June 30, 2005. Phase in mandatory program by June 30, 2010.

P-12. Employee Education Assistance

In connection with the current employee education programs required under the state Worker Right-to-Know law (Chapter 49.70 RCW), the departments of Ecology and Labor and Industries shall prepare and implement a coordinated plan for developing and distributing educational materials for employees to appropriate employers in the Puget Sound basin. This plan shall establish a schedule for distribution of such materials to these employers and shall establish a schedule for any necessary rule making by the departments of Ecology or Labor and Industries. Educational materials to be prepared shall provide information on the environmental consequences of waste disposal decisions typically made by employees of the firms and/or agencies included in the program.

Target dates for P-12: Ongoing.

Public Involvement

P-13 Public Outreach

Ecology shall establish a central clearinghouse for the public to contact regarding permits, and shall actively contact and assist groups and individuals regarding the NPDES and state waste-discharge permit program and related activities. For each permit or action under consideration, Ecology shall seek out those who may be interested or affected, inform them of the significance of the action, highlight key decision-making points, and provide technical assistance in working through the process. The public outreach staff shall take an active role in reviewing permit fact sheets for completeness and understandability by the public and publicizing which permits are open for public comment. Ecology shall also assist citizens and environmental groups, as well as federal and state agencies and local tribal governments upon their request in reviewing NPDES permits (element P-3), and shall ensure that they get copies of draft permits for dischargers that may affect their jurisdiction or areas of interest.

Ecology shall also expand its permit mailing lists to achieve broad circulation, regularly provide program information in general publications (e.g., newsletters, brochures), provide informative and widespread public notice of draft permits, and establish criteria for deciding when a public hearing will be held on a permit. Public information efforts shall include dissemination of both positive and negative information, as it is available, on pollution compliance by permittees. In establishing criteria, adopting guidelines and developing rules, Ecology shall actively seek and provide opportunity for meaningful public involvement in accord with the public involvement policy of this plan.

Target dates for P-13: Ongoing.

P-14. Technical Outreach to Dischargers, and Prevention, Reduction and Minimization Strategies

Ecology shall provide technical outreach to dischargers on permit requirements called for in the permit writers' manual, including the requirements of pollution prevention, reduction and minimization and other Ecology programs. Ecology shall establish a regular discharger newsletter to inform all dischargers of upcoming changes in permitting requirements and the reasons for them, along with other useful information such as pollution prevention, reduction and minimization strategies. To the maximum extent possible, Ecology shall consolidate information related to controlling water pollution with other environmental requirements to provide useful, timely, coordinated and accessible information and one-stop answers regarding multiple environmental programs. For maximum efficiency, the program shall emphasize delivery of information through existing mechanisms such as trade and professional organizations rather than to individual dischargers. Ecology shall coordinate this program with the business assistance (pollution prevention pays) program and other Ecology

programs as appropriate that provide information to businesses.

In coordination with Ecology, the Action Team shall initiate the development of a Technology Institute at the University of Washington or other appropriate state universities (pursuant to RCW 28B.20.420 and 422). The institute shall identify, develop and promote the latest pollution control technologies (emphasizing field-tested, cost-effective waste recycling, reduction and minimization strategies, as well as treatment technologies or combinations thereof) for the applied purpose of determining all known and available technology for use in the regulatory process for direct and indirect dischargers. The Action Team shall coordinate efforts to disseminate the results of the technology institute's work. In conjunction with Ecology, the Action Team support staff shall investigate appropriate mechanisms for long-term funding of the institute including the State General Fund, taxes or permit fees. The Action Team support staff shall also research funding mechanisms to assist businesses with implementation of strategies for controlling pollution.

Target dates for P-14: Action Team to initiate the Technology Institute by September 30, 2005.

P-15. Ecology Reporting Requirements

Ecology shall publish a report on the NPDES and state permits in the Puget Sound basin that it has considered for issuance, renewal or modification.

In the report, Ecology shall briefly summarize for the previous 12 months the following items and compare them to goals and historical trends when such data are available:

a. Permit quantity: The number of permits issued (major, minor, state, 401 certifications); the number of backlog expired permits; comparison to state/EPA agreement; the amount of permit fees collected.

b. Permit quality: The number and percent of issued permits that fully met the minimum checklist requirements (element P-4).

c. Inspections performance: The number and types of inspections (element P-5).

d. Compliance and enforcement trends: Rates for significant noncompliance among direct and indirect dischargers, and enforcement actions and trends.

e. Major accomplishments toward implementing elements P-1 through P-8, P-10 (pretreatment), P-13 (public outreach, and P-14 (discharger outreach).

Ecology is encouraged to include other information that may be useful, to present the information in tabular, comparative or other form that facilitates review and analyses, to comment on its experience in implementing these elements, and to provide appropriate recommendations.

Target dates for P- 15: Submit report by June 30, 1991, and every two years thereafter.

P-16. Measuring Program Effectiveness

The Puget Sound Action Team support staff shall evaluate program results through use of program and environmental performance measures. This supports the adaptive management approach described in the Estuary Management Program of the *Puget Sound Management Plan*. At a minimum, these evaluations should incorporate information from the following monitoring and assessment sources:

a. Program measures that track implementation of this program:
   - Reporting called for in Element P-15.
   - Number of facilities where effluent is applied to land or reused.

b. Case studies that assess the effectiveness of program actions:
   - Studies of environmental conditions around marine outfalls.

c. Performance of environmental conditions for which this program is a major or important determinant (recognizing that these measures may be affected by several plan programs):
   - Number of water bodies on the 303(d) list.
   - Area of sediments that exceed sediment management standards.
   - Permit compliance rates.
   - Amount of wastewater reused.

Nonpoint Source Pollution Program

Directory of Program Elements

Problem Definition

Nonpoint source pollution is a general term meaning pollution that is not collected in and discharged through pipes—such as a sewage treatment plant. Instead, it originates from human land uses. Cumulatively, nonpoint sources can introduce significant quantities of pollutants into waterways.

There are many sources for nonpoint pollution. These include runoff from urbanized areas, failing septic systems, poor animal-keeping practices, discharges from boats, poor forest management practices and improper use of household hazardous substances.

Fecal coliform bacteria and metals are the two most significant nonpoint source pollutants that impair water uses in Puget Sound. In 1999, the Department of Ecology reported that fecal coliform bacteria impaired about 45 percent of the river miles assessed and metals impaired 42 percent. Shellfish growing areas are another example of impaired water uses in Puget Sound. The Department of Health estimates that Puget Sound has approximately 141,000 acres of commercial shellfish harvest areas. Between 1987 and 1991 approximately 32,000 acres of commercial shellfish beds were downgraded and taken out of production because of nonpoint source pollution and improved monitoring.

The state's salmon recovery plan identified nonpoint pollution sources as one of the primary causes of impaired salmon habitat. Additionally, Ecology surveyed streams and estuaries and found that approximately 60 percent of streams and 65 percent of estuaries surveyed are impaired, primarily from nonpoint sources of pollution.

Institutional framework

The overall policies for clean water are set in state and federal law. The federal Clean Water Act and state Water Pollution Control Act require all sources of pollution to meet water quality standards and protect designated water uses, such as drinking water, fish and wildlife habitat, and aquaculture uses. The federal Coastal Zone Management Act requires states to develop nonpoint programs that control nonpoint sources of pollution in the coastal zone. The federal Endangered Species Act protects endangered and threatened species from various threats, including nonpoint source pollution.

The state's *Water Quality Management Plan to*

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

Control Nonpoint Sources of Pollution incorporates new watershed planning and fish and habitat protection initiatives authorized by the state to preserve water quantity and protect water quality for salmon. The state's plan relies heavily on nonpoint management strategy used in the Puget Sound basin and defined in this management plan and the following programs: Onsite Sewage System Management, Watershed Management, Agricultural Practices, Boating and Marinas, and Forest Practices.

A number of related watershed-level planning activities are discussed and described under the Local Watershed Action Program of the *Puget Sound Water Quality Management Plan*.

Under the state's 1990 Growth Management Act (GMA), all local governments in the Puget Sound basin address clean water and water quantity goals in local land-use plans and development regulations. Cities and counties profoundly affect, and are affected by, water resource issues. They control land use on about 65 percent of the land in Washington State. They determine the type, location, and quality of development and what infrastructure is needed to support development. They also determine what needs to be done to minimize the environmental impacts of development. The management of nonpoint sources of pollution, especially those associated with growth and development, such as stormwater runoff, will depend largely on local land-use design and capital facilities investments.

Local governments are encouraged to use their authority under GMA to protect the waters of the Puget Sound basin from the effects of nonpoint pollution. Local governments are also encouraged to integrate watershed plan elements that address nonpoint pollution prevention and control into local land-use programs. The state provides technical and financial assistance to carry out these programs.

Program Goal

To reduce and ultimately eliminate harm from nonpoint sources of pollution to Puget Sound, including pathogens, toxic contaminants, sediment and nutrients.

Program Strategy

The strategy for achieving this goal is to:

a. build on previous watershed planning efforts to integrate water quality and habitat issues through cooperative watershed planning and implementation processes;

b. provide technical and financial assistance and incentives to local governments for controlling and preventing nonpoint pollution; and

c. develop or enhance state programs or regulations for those nonpoint sources that are most effectively controlled at the state level.

NP-1. Integration with Growth Management Plans

Each local government shall fully use its authority under the Growth Management Act (GMA) to protect the waters of the Puget Sound basin from the effects of nonpoint source pollution. Existing and potential effects of nonpoint source pollution and mitigation strategies shall be analyzed and documented in environmental impact analyses for growth management plans. When a local government concurs with adopted, locally developed watershed action plans, the plan's goals, policies and control measures shall be incorporated into comprehensive plans, capital-facilities plans, critical areas ordinances and other appropriate land-development regulations. Jurisdictions sharing common watersheds shall cooperate in analyzing the effects of nonpoint source pollution and adopting coordinated and consistent programs for managing nonpoint pollution sources.

Agricultural Practices Program

Directory of Program Elements

Problem definition

Agriculture is the process of growing crops or raising livestock for commercial or recreational purposes. It is a leading source of water pollution to the Puget Sound. About half, or 145,000 of the state's dairy animals, are concentrated in the Puget Sound basin.

Livestock manure, farm chemicals and other pollutants can enter fresh and marine waters through runoff. Such pollutants and higher water temperatures due to bare areas along rivers and streams (because of grazing or farming) contribute significantly to the Sound's pollution problem. The results can be detrimental. Shellfish beds may be closed because of bacterial contamination. Fish habitat may be degraded because of warmer water temperatures. Surface and groundwater sources of drinking water may be contaminated.

In the Puget Sound basin, more than half of the river stations monitored routinely for fecal coliform bacteria violate state standards, although no consistent trend can be observed over time. The Department of Ecology estimates that agricultural practices impair about 55 percent of the river miles assessed statewide.

Institutional framework

The overall policies for clean water and habitat protection are set in state and federal law. The federal Clean Water Act and state Water Pollution Control Act require all sources of pollution to meet water quality standards to protect designated water uses, including drinking water, fish and wildlife, and aquaculture uses. The Coastal Zone Management Act requires states to develop nonpoint programs that control pollution in the coastal zone. The federal Endangered Species Act contains provisions to protect endangered and threatened species from various threats, including nonpoint source pollution. But with the exception of commercial dairy farms, Washington State relies largely on locally driven voluntary programs to achieve clean water from agricultural practices.

The main approach to achieving clean water in the Sound is to help farmers control and prevent pollution by implementing individual farm management plans. These plans are developed with assistance from local conservation districts or local governments. State-level financial and technical assistance (and, when necessary, enforcement) supports local efforts. In addition, the federal Natural Resources Conservation Service provides

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

technical assistance and cost-share programs to conserve environmental quality and habitat.

Many local watershed action plans developed under the Puget Sound Action Team's watershed planning rule for rural watersheds (Chapter 400-12 WAC) identify management actions to protect water quality from poor agricultural practices. More recent water resource planning and management conducted under the state Watershed Management Act in Puget Sound Watersheds may also identify management actions to protect water quality from nonpoint pollution sources.

In regard to dairy farms, state law requires the Department of Ecology to register, inspect and issue waste discharge permits to all dairies in the state that discharge to surface waters. In addition, all commercial dairy farms must develop and carry out plans to minimize water pollution from animal wastes and farm runoff. Local conservation districts, local governments and the Washington State University Cooperative Extension Service help farmers develop these plans. The Conservation Commission provides guidelines for developing the plans, and local conservation districts review and approve them. The plans must be in place by July 2002 and fully implemented by December 2003.

An Advisory and Oversight Committee oversees the dairy nutrient management program, and a separate task force will review how well the dairy nutrient management law protects water quality. Recommendations on how to improve the program will be made to the legislature, as necessary.

Program Goal

To reduce and ultimately eliminate harm from pollution stemming from agricultural practices on both commercial and noncommercial farms, including animal waste pathogens, pesticides, sediments and nutrients.

Program Strategy

The strategy for achieving this goal is to implement comprehensive programs through state and local agencies involving education, financial and technical assistance, and, as necessary, regulation and enforcement, to effectively implement farm management plans and management practices and measures.

AG-1. Local Conservation Programs

Conservation districts, local governments, and Washington State University (WSU) Cooperative Extension shall implement cooperative and comprehensive programs to assist commercial and noncommercial farmers in controlling and preventing pollution. Implementation of management practices and measures shall be consistent with conservation district and Natural Resource Conservation Service (NRCS) standards and recommendations and, as appropriate, management measures of the Coastal Nonpoint Pollution Control Program. Conservation districts and counties are encouraged to pursue the adoption of special assessments to finance ongoing conservation district activities under the provisions of Chapter 89.08.400 RCW.

Target Date for AG-1: Ongoing.

AG-2. Animal Waste Management

Conservation districts, local governments, WSU Cooperative Extension, and state and federal agencies shall continue to work cooperatively with commercial and noncommercial farmers to provide comprehensive assistance on the proper management of wastes from farm animals.

Dairy farms are to have fully implemented dairy nutrient management plans through the conservation district and NRCS system by December 31, 2003. In responding to water quality violations caused by farm animal wastes, the Department of Ecology shall carry out timely inspections and enforcement actions to ensure compliance with the state Clean Water Act (Chapter 90.48 RCW).

Farms with animal waste management activities that are not connected to a dairy operation are strongly encouraged to implement farm plans written by conservation districts or by the NRCS.

Target Date for AG-2: Ecology shall inspect all dairies by October 1, 2000. Conservation Districts shall formally approve dairy nutrient management plans (DNMPs) for all dairy farms by July 1, 2002. Conservation Districts and dairy producers shall jointly certify full implementation of all approved DNMPs by December 31, 2003.

AG-3. Cost-Sharing Programs

Ecology and the Washington Conservation Commission shall continue to establish adequately funded and accessible cost-sharing programs for

animal keeping, pasture management and other situations where agricultural management practices or measures are required in priority watersheds. The Conservation Commission shall consider and if appropriate, prepare, legislation to establish a permanent funding source for agricultural management practices and measures. Ecology and the Conservation Commission are implementing a $1.5 million State Revolving Fund (SRF) loan program for managing dairy nutrients.

Target Date for AG-3: Ongoing.

AG-4. Measuring Program Effectiveness

The Puget Sound Action Team support staff shall facilitate evaluation of program results by evaluating program and environmental performance measures. This supports the adaptive management approach described in the Estuary Management Program of the *Puget Sound Management Plan*. At a minimum, these evaluations should incorporate information from the following monitoring and assessment sources:

a. Program measures that track implementation of this program:
   - Ecology issuance of dairy permits, compliance inspections and enforcement.
   - Ecology approval and certification of management plans for dairy nutrients.

b. Measures of environmental conditions for which this program is a major or important determinant (recognizing that these measures may be affected by several plan programs):
   - Trends in fecal coliform bacteria in the Nooksack watershed.

Forest Practices Program

Directory of Program Elements

Problem Definition

Forestlands account for a large portion of land in the Puget Sound basin, particularly in the upper watersheds. Their presence has many positive effects on the Puget Sound and its surrounding areas. Forests assist in filtering and absorbing stormwater, shade streams and rivers that are home to anadromous fish, and provide a source of large woody debris in fish-bearing streams. They also provide habitat for important populations of birds, amphibians and mammals, and provide important habitat corridors. How we conduct forest practices affects Puget Sound's water quality and habitat.

As forestlands are developed, water quality can be affected. Runoff, sedimentation and riverbed scouring increase—which can have potentially devastating effects on fish habitat.

Timber harvesting and road construction contribute large amounts of sediment to streams and rivers if precautions are not taken. Sedimentation contributes significantly to the loss of fish habitat. Logging roads built prior to road requirements under the Forest Practices Act and since abandoned (or orphaned) are of particular concern. Since sedimentation impacts salmon and trout habitat, these concerns are more pressing since the 1999 listing of some species of salmon, steelhead and bull trout under the federal Endangered Species Act.

Many forest conversions happen in areas that have already been developed, usually in the lower portions of watersheds, as more housing tracts and malls are built. To preserve these important habitat lands, small forestland owners in the Puget Sound basin must receive assistance and support to both keep their lands in forest production and to use best management practices in doing so.

Institutional Framework

Forest practices are regulated by Washington's Forest Practices Act, RCW 76.09, administered by the Department of Natural Resources. The Forest Practices Rules contain additional requirements for wetlands and streams, clearcut size and timing, and a watershed analysis process. These rules are being updated in response to Endangered Species Act listings, Clean Water Act 303 (d) listings and the 1999 *Forests and Fish Report*. The proposed rules include new standards intended to protect salmon. These include provisions for riparian buffers, road building and maintenance, road abandonment and ground-based logging.

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

One of the most important aspects of forest practices management in Washington is the 1986 Timber/Fish/Wildlife (TFW) Agreement. Under this agreement, tribal governments, environmental organizations, state and federal agencies, counties and timber companies negotiated forest practice agreements. The TFW is a collaborative, consensus process involving various interest groups. The TFW interest groups have negotiated rule proposals for such factors as water quality, cumulative effects, spotted owls and aquatic habitat.

The Forest Practices Program endorses the TFW approach for managing our forests, sets forth a collaborative process between the state Department of Natural Resources and local governments for administering forestland conversions, and seeks to protect long-term timber production in areas zoned for mixed use.

Program Goal

To restore and protect water quality and fish habitat from effects connected with improper forest practices on federal, state and private lands and to restore water bodies and fish habitat already degraded by improper forest practices.

Program Strategy

The strategy for achieving this goal is to:

a. Continue using the TFW Agreement approach for reaching consensus on forestry management issues;

b. Implement the new forest practices rules; and

c. Develop and implement local programs to address the effects of private forestland conversions and small forestry operations.

FP-1. Timber/Fish/Wildlife Agreement

The Action Team endorses the Timber/Fish/Wildlife (TFW) Agreement and revisions to the Forest Practices Act and Regulations. The Action Team will support statutory and regulatory actions, including any federal and state funding proposals, necessary to implement the TFW Agreement. The Action Team also supports the watershed analysis requirements under the revised Forest Practices Rules and encourages the Department of Natural Resources to expedite the analysis schedule.

The Action Team may review and comment on major milestones and documents of the TFW Agreement as they relate to Puget Sound, both providing the Forest Practices Board with comments on regulatory and policy initiatives of the TFW Agreement and participating in the annual evaluation process of the agreement.

FP-2. Private Forestland Conversions

Any local government wishing to manage forest practice activities shall develop a memorandum of agreement (MOA) with Natural Resources. This MOA should clearly delineate and coordinate each agency's respective authorities and responsibilities in the processing, administration and enforcement of forest practice activities within the local government's jurisdiction, especially as they relate to the clearing of land for development purposes.

In conjunction with an MOA, a local government shall make full use of the existing regulatory tools for managing and regulating forest practices. This would include: adopting clearing and grading ordinances; imposing six-year development moratoriums on lands harvested without a declaration of intent to convert (RCW 76.09.060); utilizing Conversion Option Harvest Plans (WAC 222-20-050); acting as the lead agency, as appropriate, for the State Environmental Policy Act (SEPA) on Class IV general forest practices; and working with Natural Resources in designating areas likely to convert.

The Action Team encourages local governments; the departments of Natural Resources, Ecology, Fish and Wildlife; the Office of Community Development (OCD); tribal governments; forestland owners; and environmental interests to work in cooperation through the TFW Conversion Committee to develop recommendations to the legislature and appropriate rule-making authorities for improving the regulatory framework surrounding this issue. This would include an examination of the Forest Practices Act, SEPA and Growth Management Act to identify areas of conflict and unnecessary duplication.

FP-3. Long-Term Forest Management in Mixed-Use Areas

Washington State University (WSU) Cooperative Extension, in cooperation with the Department of Natural Resources, local governments, the departments of Ecology, Fish and Wildlife, and OCD, con-

servation districts and tribal governments, shall develop a program to encourage and promote the use of best management practices, consistent with Washington's Water Quality Management Plan to Control Nonpoint Pollution, by small forestland owners in mixed-use areas.

The program shall include technical assistance and education programs, as well as information on financial assistance, for small landowners who intend to keep their lands in long-term timber production.

Household Hazardous Waste Program

Directory of Program Elements

Problem Definition

Most household hazardous wastes are thrown in the garbage, taken to a landfill and disposed—and many people think that's the end of the story. However, household hazardous wastes, such as paints, lawn and garden pesticides, batteries, cleaners, fertilizers–even medicines and cosmetics—can actually harm the environment. Problems arise when a landfill is not lined or not properly lined, and the hazardous wastes leach into the ground. The leachate can contaminate surface water runoff, groundwater and ultimately Puget Sound.

Incineration, another method to dispose of household hazardous wastes, does not always destroy toxic substances. It can cause contamination from rainfall or improperly disposed ash.

Another problem source is disposal in the sewage system. Many people simply pour their household hazardous wastes down the drain or toilet, where the waste gets passed to a municipal sewage treatment plant. The Metropolitan District of King County estimates that residential households contribute 7 to 11 percent of the metals, 31 to 36 percent of the volatile organic compounds and 55 to 64 percent of the extractable organic compounds found in sewage treatment plants.

While treatment plants degrade or dilute some toxicants, others persist in sludge, evaporate into the air, or continue in suspension or solution through the treatment plant's discharge pipe and into Puget Sound. Toxicants in sludge or in the air can enter Puget Sound through rain and surface water runoff.

Institutional Framework

In 1985, household hazardous wastes were included as moderate-risk waste under the state Hazardous Waste Management Act (RCW 70.105.220). Local governments have developed plans and have provided various options for citizens to properly dis-

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pose of household hazardous wastes.

The state departments of Health and Ecology, the U.S. Environmental Protection Agency, and Washington State University Cooperative Extension participate in the Urban Pesticide Initiative. This effort provides education on reducing household hazardous wastes by using non-toxic alternatives. Ecology also provides this type of information on its 1-800-RECYCLE phone line.

The *Puget Sound Water Quality Management Plan* calls for more coordination between government agencies, private associations and nonprofit groups to effectively educate citizens about reducing the use of toxic materials and the proper use, storage and disposal of these substances when they are used.

Program Goal

To improve management of household hazardous waste through the provision of appropriate disposal options and through public education on proper waste disposal practices, waste reduction, alternatives to toxic substances and pesticide management.

Program Strategy

The strategy for achieving this goal is to ensure full implementation of the Hazardous Waste Management Act, including waste reduction through oil recycling and conservative use of pesticides.

HHW-1. Information and Education on Less-Toxic Alternatives for Household Products

The Department of Ecology and the Puget Sound Action Team support staff shall work with local governments, Washington State University (WSU) Cooperative Extension, retailers, and groups such as the Washington Toxics Coalition and the Adopt-A-Stream Foundation to collect and make available information on less-toxic alternatives to household toxicants. Ecology and the Action Team support staff shall distribute this information through newsletters and other means of environmental education. Ecology shall continue to distribute this information through its 1-800-RECYCLE information line and its waste reduction program.

WSU Cooperative Extension shall work with the Department of Agriculture, local governments and local groups such as Tilth, the Washington Toxics Coalition, the Washington State Nurserymen's Association, the Center For Urban Horticulture and garden retailers to make information and training available that promotes targeted and proper use and disposal of pesticides as part of the implementation of local hazardous waste plans. WSU Cooperative Extension shall consult with these groups on the type of information and programs needed, and shall include these groups where possible in the development and distribution of information through a regional pesticide education program. The pesticide education program is to support implementation of local household hazardous waste plans.

Target Date: Ecology, WSU Cooperative Extension and the Action Team support staff shall continue to distribute information concerning the proper use and disposal of toxic household products and of using appropriate, less-toxic alternatives.

Local Watershed Action Program

Directory of Program Elements

Problem Definition

The boundaries of land use and resource management programs have traditionally been established based on pollution sources, resources at risk, jurisdiction or land ownership. Significant improvements have been achieved on point sources of pollution but many underlying nonpoint pollution and habitat issues remain. Watersheds are a natural scale for resource planning and analysis because the watershed encompasses the entire hydrologic regime. Water quantity, water quality and many habitat issues can be analyzed and managed in a watershed context. Characterizing issues on a watershed scale also encourages planning participants to think across the lines of traditional jurisdiction and interest. Watersheds are planning units that people can understand and work with.

However, planning at the watershed scale provides unique challenges. Characterizing watershed health takes time and money and agreement from diverse interests on the data and methods. Watersheds can be identified as stream basins, river basins or groups of river basins. The size of the watershed unit strongly influences the cost and detail of data collection as well as the methods for working with constituents. Implementing solutions that will contribute to the long-term health of the watershed requires the participation and ongoing support of governments, businesses and citizens—groups that aren't used to working together. Working with such diverse clusters of governments and interest groups requires a high level of skill and different approaches from when one government only is in charge. Key ingredients in watershed approaches include technical expertise, long-term cooperative involvement of all levels of government and a variety of interested parties, and adequate financing.

The success of watershed planning efforts will depend in large measure on local land-use design and capital facilities investments. Cities and counties control about 65 percent of total land area and almost all developed land in the state. Cities and counties determine the type, location and quality of development and what infrastructure is needed to support development. They also determine what needs to be done to minimize the environmental impacts of development.

Another complication to watershed planning in the Puget Sound basin is the succession of different approaches to watershed planning since the 1970s. Beginning with sewage basin planning, watershed

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approaches have been targeted at individual issues or clusters of issues, such as water pollution, habitat, nonpoint pollution and water quantity. Each process used different procedures for data collection, problem identification, public involvement, and implementation. Currently there are a number of watershed approaches at every level of government. Refinements are on the way and there are several efforts to coordinate among watershed planning programs. While it is not necessary to have one watershed approach that suits all purposes, the challenge is to provide a coherent system that maximizes the use of government resources and the energies of the involved public.

Institutional Framework

Since 1987 the *Puget Sound Water Quality Management Plan* has called for development of watershed action plans. The general approach to planning is described in rules (Chapter 400-12 WAC). Plans are primarily intended to address water quality but other issues, such as habitat, flooding and water quantity could be added. Watershed action plans are locally led and developed through a cooperative project of governments and interests in each watershed. The Department of Ecology provides program oversight, technical assistance and funding through the Centennial Clean Water Fund. To date, 44 watershed action plans initiated covering about a quarter of the Puget Sound basin. WAC-400-12 planning is the focus of the watershed elements in this management plan.

In addition to WAC 400-12 plans, several other watershed planning approaches are being used or developed in the basin. Table 1 compares their different purposes.

The 1998 Watershed Planning Act (Chapter 90.82 RCW) is often called the "2514" process after its bill number (HB2514). The Act provides guidance and funding for watershed plans primarily intended to address water quantity but the planning entities may choose to include water quality and habitat issues. As of August 2000, plans were being prepared in the Puget Sound basin covering 16 Water Resource Inventory Areas. Seven of these were committed to addressing water quality and habitat issues, seven had not yet decided their scope and two were only addressing water quantity. Ecology provides guidance coordination and funding for development of 2514 plans.

In 2000, Ecology published *Washington's Water Quality Management Plan to Control Nonpoint Source Pollution* in April 2000. This plan describes a Unified Watershed Assessment (UWA) process for targeting use of federal funding provided under Section 319 of the federal Clean water Act. The UWA is intended to meet requirements of the federal Clean Water Action Plan. Under the UWA, the state evaluates the relative impairment of Water Resource Inventory Areas (WRIAs) according to water flow and quality, public health, and the status of fish resources. The state uses a combination of watershed restoration action strategies and knowledge of existing resources to coordinate efforts within watersheds.

Table 1. Approaches to Watershed Planning

Watershed Approach (Agency Lead)	Purpose (P-Primary, O-Optional)			
	Habitat	Water Quantity	Water Quality	ESA Fish Recovery
WAC 400-12 Watershed Action Plans (Action Team)	O		P	
Total Maximum Daily Loads (Ecology)			P	
Salmon Recovery Act Limiting Factors Analysis (Conservation Commission)				P
Forestland Watershed Analysis (Natural Resources)	P		P	P
Watershed Planning Act (Ecology)	O	P	O	O
Tri-County (King, Pierce, Snohomish)	P		P	P

The federal Clean Water Act requires Ecology to prepare total maximum daily load (TMDL) plans for water bodies that don't meet state water quality standards. These plans set total maximum limits on point and nonpoint source pollutants that can be discharged to each water body without exceeding state water quality standards. Currently, 115 water bodies in the Puget Sound basin are included on the Clean Water Act 303(d) list as not meeting water quality standards. Ecology will work with communities to develop plans to address these problems through a cooperative state-local planning effort. Most implementation will be the responsibility of local entities.

The 1998 Salmon Recovery Act calls for an analysis of watersheds where salmon are threatened. The analysis identifies biological, water quali-

ty, habitat and water quantity factors that limit salmon production. The state Conservation Commission provides the technical analysis. Local watershed committees evaluate the information and identify potential habitat restoration projects and funding sources.

Watershed analysis is used by Timber, Fish and Wildlife (TFW) cooperators to develop "prescriptions" for protecting and restoring forest resources. Interdisciplinary teams of certified state, tribal or private experts conduct this analysis. Forest practices and other land uses are evaluated in watersheds ranging from 10,000 to 50,000 acres. The U.S. Forest Service also conducts watershed-based analyses and planning for federal forestlands in the basin.

Cities and counties will carry out many of the decisions that come out of the watershed planning efforts. Their comprehensive plans, capital facilities plans and development regulations will be keys to implementation. The Growth Management Act provides the framework for this effort. The State Environmental Policy Act (SEPA) and the Shoreline Management Act (SMA) provide goals and steps that also will assist in carrying out watershed plans.

In the year 2000, new guidance for watershed planning was developed in response to the listings of salmon and other species in the Puget Sound basin. The "Tri-County" group of Snohomish, Pierce and King Counties is developing a watershed approach to guide salmon restoration. The Governor's Salmon Team is developing statewide guidance for watershed planning designed to protect and restore salmon.

Program Goal

All watersheds within the Puget Sound basin counties shall implement local watershed plans that result in reduction and prevention of nonpoint pollution to Puget Sound.

Program Strategy

The strategy for achieving this goal is to provide technical and financial assistance and incentives for local communities and governments both to support development of new watershed plans and to support the implementation of completed watershed plans.

WP-1. Ranking for Watershed Action Plans

Note: In the late 1980s and early 1990s, all counties in the Puget Sound basin ranked their watersheds in priority order for development of watershed action plans. Since that time, other watershed planning approaches have been developed. In lieu of developing watershed action plans under 400-12 WAC, local governments may address these issues through other watershed processes, such as "2514" watershed planning.

Watershed action plans shall be developed on an ongoing basis in the order that watersheds appear on each county's ranked list. A county may develop several plans simultaneously for a group of watersheds with similar rural or urban land uses. Ecology shall work with counties not actively participating in the watershed planning program to identify reasons they are not participating and to develop an appropriate strategy for addressing concerns about nonpoint source pollution.

The need to re-rank watersheds shall be reviewed at least every five years, and more frequently if a significant change occurs, as defined in Chapter 400-12 WAC, or if a jurisdiction is ready to proceed with planning. The county may develop a process for conducting the re-ranking that meets local needs, in accordance with the ranking criteria in this element and the public involvement policy in the *Puget Sound Management Plan*. If changes are made in the county's ranking of watersheds, a summary of the changes and a brief rationale shall be prepared and submitted to the Department of Ecology.

Proposals to the Centennial Clean Water Fund (CCWF) for the development of watershed action plans according to Chapter 400-12 WAC shall be made in the order in which watersheds appear on each county's ranked list. When a county chooses to plan in several watersheds at once, at least one of the watersheds shall be next on the ranked list. Once a completed watershed plan has been approved by Ecology, additional CCWF projects addressing nonpoint pollution in that watershed must be consistent with the approved watershed action plan. In each round of funding, Ecology shall consider proposals for projects in lower-ranked watersheds within a county, based on their merit, if funds are available after consideration of proposals in higher-ranked watersheds within that county. Ecology shall also consider funding proposals for projects to reduce nonpoint sources of pollution or restore streams from watershed action plans not yet completed under Chapter 400-12 WAC.

Ranking Criteria

Counties shall use the following criteria for reviewing the need to re-rank watersheds:

a. The watershed has a beneficial use, such as recreational or commercial shellfish beds, fish habitat, or drinking water that is impaired or threatened by pollution from nonpoint sources.

b. The watershed has a likelihood of intensified land or water use, including a likelihood of being developed and/or logged, in the next 10 years.

c. Environmental factors, such as soil, slope and precipitation on land and/or limited flushing in the Sound, increase the probability of future water quality or habitat degradation.

d. The watershed produces more contaminants, or causes greater harm to a beneficial use, than other watersheds.

e. Programs to control nonpoint pollution sources in the watershed are likely to succeed in protecting water quality in Puget Sound as evidenced by: local community and political support; programs already under way; existing institutional arrangements for interjurisdictional cooperation such as the Hood Canal Coordinating Council; integration with comprehensive planning under the Growth Management Act; the federal forest plan and other major implementation activities; or other factors.

Target Date for WP-1: Development and implementation of watershed action plans is ongoing.

WP-2. Guidance for Watershed Action Plans

WP-2.1. The Nonpoint Rule

The purpose of the nonpoint rule (Chapter 400-12 WAC) is to establish a process to identify and rank watersheds in the Puget Sound basin and to develop action plans to prevent nonpoint source pollution, enhance water quality and protect beneficial uses of watersheds.

The Action Team shall periodically review and revise the nonpoint rule and keep a copy of the rule on the Action Team's website. The Action Team shall provide assistance to Ecology as necessary in interpreting the nonpoint rule.

Target Date for WP-2.1: Action Team shall revise the nonpoint rule as needed.

WP-2.2. Contents of Watershed Action Plans

A watershed action plan shall include a watershed characterization, a problem definition, a statement of goals and objectives, pollution control strategies, and an implementation strategy, including a schedule and costs for the actions, a financing strategy and a monitoring program.

The watershed characterization shall include:

a. a description of the biological conditions, habitat, and physical characteristics of the environment;

b. information on land-use and population trends;

c. a water quality assessment;

d. maps showing the action plan boundaries; wetlands, shellfish beds and other critical areas, waterways and water bodies; and jurisdictional boundaries; and

e. a discussion of existing water quality and related programs in the area.

The goals of watershed action plans shall include meeting water quality, shellfish and other appropriate standards in priority watersheds. The objectives of watershed action plans shall include reopening shellfish beds, preventing further closures of shellfish beds, protecting fish habitat, protecting wetlands, riparian zones and nearshore habitat, and achieving other objectives appropriate to each watershed.

Watershed action plans shall address nonpoint pollution, and effects on habitat, as applicable, from agricultural practices, on-site sewage systems, stormwater, forest practices and any other potentially significant nonpoint sources in the watershed. Watershed committees shall also explore strategies, as needed, for the protection and restoration of wetlands, riparian areas streams and nearshore habitat. The pollution control strategies contained in action plans shall be consistent, as appropriate, with the management measures guidance under the Coastal Zone Act Reauthorization Amendments (CZARA) Section 6217.

The nonpoint rule (Chapter 400-12 WAC) shall permit watershed management committees to select regulatory, voluntary and/or educational approaches for addressing nonpoint pollution in the watershed. If regulatory programs are chosen, adequate enforcement must be provided; and if

educational programs are chosen, agencies and/or individuals with expertise in education must be involved in program development and implementation. Watershed plans may be organized as appropriate to address the various pollutants of concern and/or their sources in the watershed.

Overall, the strategies to control nonpoint source pollution contained in action plans shall be consistent with the relevant management measures in the CZARA 6217. The action plan implementation strategy shall include the following components:

a. A description of the specific actions required of each implementing entity
b. A schedule with annual milestones;
c. Estimated costs and a budget;
d. A long-term local financing strategy;
e. The lead agency for coordinating implementation;
f. A dispute resolution process;
g. Provisions for public involvement in the preparation and adoption of implementation plans, policies and ordinances; and
h. The designation of a watershed management council to advise and assist in overseeing implementation.

A process and strategy shall be developed for coordination and/or integration with ongoing local, state, federal or tribal natural resource management, land-use and watershed programs. These include: local comprehensive plans under the Growth Management Act; wetlands and riparian area management and protection programs; local stormwater and highway runoff programs; flood control plans; groundwater management programs; drainage basin plans; the Shoreline Master Program; fisheries and shellfish programs; the federal forest plan initiative; and others as appropriate.

A method shall be described for evaluating the overall effectiveness of the action plan in improving and protecting water quality and habitat, including setting up a long-term monitoring program and a process for annual review.

WP-2.3. Handbook for Watershed Action Plans

The Action Team shall revise and reprint the nonpoint handbook as necessary. The handbook is available from the Action Team. Ecology has produced a report with suggestions for how to conduct watershed planning and a technical guidance manual for 2514 watershed planning.

WP-2.4. Watershed Plan Compilation

Ecology, in cooperation with the Action Team, shall compile strategies for controlling nonpoint source pollution and practices for use by watershed committees in developing future watershed action plans.

WP-3. Development of Watershed Action Plans

When funding becomes available, the appropriate lead agency(ies) is (are) responsible for convening a watershed management committee. If two or more counties share a watershed, the counties may agree on a temporary lead to convene the committee or may jointly convene the committee.

The county is presumed to be the chair for each watershed management committee. However, the committee may designate a city, local health agency, conservation district or other agency if circumstances warrant.

It is the intent of the Action Team that the watershed committee include all entities that have a legitimate role in the development and implementation of a watershed action plan. This includes affected local and tribal governments, special purpose districts, watershed residents, appropriate state and federal agencies (if the watershed includes significant state or federal lands or regulatory role) and other affected parties. Affected parties are those whose beneficial use of water is being impaired, or potentially impaired, by nonpoint pollution and those groups associated with the various sources of nonpoint pollution. Examples of affected parties include agricultural groups, realtors, environmental groups, etc. Additional advisory committees may be established as necessary and agreed upon by the committee members.

The watershed management committee shall be responsible for developing the action plan. The lead agency shall be responsible for setting up the watershed committee, convening meetings, coordinating among local jurisdictions and other agencies, working with planning and implementing agencies in preparation of the plan, compiling and publishing the plan, submitting the plan to the Department of Ecology for approval, and seeking funding opportunities. Lead agencies shall prepare the characterization, prior to convening the committee, for the committee's subsequent review and approval. Watershed management committees are encouraged, but not required, to use consensus in making major decisions relating to the watershed plan.

For the purpose of this program, a planning agency is the agency that prepares reports and makes recommendations, and an implementing agency is the agency that carries out the day-to-day activities of the plan once a county and/or city council adopt it. An agency could be both a planning agency and an implementing agency. In watersheds with two or more counties or cities, there could be several implementing agencies for the same source.

The watershed action planning process shall include public participation. In addition to representation on the watershed committee, the public shall be educated and involved in making decisions through such activities as public meetings and hearings, watershed events and tours, citizen workshops, open houses and newsletters. Watershed committees are encouraged to take advantage of coordination and training opportunities under the Education and Public Involvement Program.

Lead agencies shall initiate the concurrence process as soon as the draft plan is published for public review, and preferably sooner. Each potential planning and implementing entity shall evaluate those provisions of the draft action plan that require the entity's involvement, and provide any comments to the lead agency within 60 days. Within 60 days of publication of the final action plan, each implementing entity shall submit a statement of concurrence to the watershed management committee indicating its intent to adopt implementing policies, ordinances and programs as required, or a statement of non-concurrence, proposing necessary modifications to those sections requiring its involvement.

WP-4. Plan Adoption and Implementation

The Action Team will maintain references to sample watershed plans on the Action Team website. Each watershed action plan submitted to the Ecology for approval shall meet the requirements specified in the nonpoint rule and shall be consistent with the goals and requirements of the *Puget Sound Management Plan:*

a. The plan must have been developed by a watershed management committee in accordance with the process described in Chapter 400-12 WAC.
b. The plan must contain a statement of goals and objectives, a summary of the watershed characterization and a problem definition.
c. The plan must specify a set of measures and actions, consistent as appropriate with the Coastal Zone Act Reauthorization Amendments (CZARA) Section 6217 management measures, to be carried out by implementing agencies to address the priority problems with nonpoint pollution in the watershed and to help meet the goals and objectives of the plan.
d. The plan must include an implementation strategy, budget, local financing strategy and implementation schedule.
e. The plan must include statements of concurrence from agencies responsible for implementing the recommendations made in the plan.
f. The plan must include a short- and long-term monitoring strategy, including provisions for annual reviews.
g. The plan must demonstrate that adequate public involvement and participation occurred during plan development and will be provided for during implementation.

It is the intent of the management plan that watershed plans be developed in such a way that they are adapted to the unique needs of each watershed. Ecology shall have 30 days to approve or disapprove local watershed plans.

Ecology shall approve final action plans that meet the minimum requirements of the Nonpoint Rule and other appropriate grant requirements. If a plan is not approved, the watershed management committee shall revise the plan as necessary and the lead shall negotiate with Ecology for final approval. If the lead agency and Ecology cannot reach agreement on approval, either entity may request review by the Action Team.

WP-5. Program Funding and Incentives

In addition to the following elements, new funding sources for managing nonpoint pollution may be identified or proposed as opportunities arise.

WP-5.1. Nonpoint Watershed Grants

Ecology shall administer programs for disbursing grant funds from the CCWF, the 319 Management Program and other sources to lead agencies and other implementing entities for preparing and

implementing watershed action plans. Disbursal of grant funds to agencies may be funneled through the lead administrative agency or paid directly to implementing agencies according to procedures established in the CCWF (see element WP-1), or under the 319 Management Program. Lead agencies for watershed plans are also encouraged to apply to the State Revolving Loan Fund and other state and federal funding sources for eligible projects, and to identify local sources of funding.

To ensure full participation in watershed planning, tribal governments are encouraged to evaluate their desired level of participation in watershed management committees. Tribal governments may submit grant applications to Ecology either simultaneously with lead agency applications or as an integrated part of lead agency applications. Tribal governments are also encouraged to coordinate with each other in the grant application process.

WP-5.2. Funding for Conservation Districts

Ongoing funding shall be provided by the Washington Conservation Commission to enable Puget Sound conservation districts to participate in planning and implementing watershed action plans. The Action Team recognizes the need for ongoing funding to maintain districts' basic administrative functions and also to carry out water quality programs. The Action Team expects that such funding will be made available, within the limitations of statewide responsibilities, from appropriations to the Conservation Commission for basic funding of conservation districts; basic funding and implementation of the *Puget Sound Management Plan*; and from appropriations to the Conservation Commission from the Centennial Clean Water Fund.

WP-5.3. Continued Funding for Washington Conservation Corps

Ecology shall request funds through its biennial budget process for the Washington Conservation Corps to allow it to continue to provide assistance in implementation of activities.

Financing for controlling nonpoint source pollution shall be coordinated with financing of other water quality improvements within the watershed. Establishment of utilities or other special-purpose districts such as on-site sewage maintenance districts, shellfish protection districts, and conservation assessments, shall be designed for maximum coordination and shall address implementation of water quality improvement and protection activities, monitoring and education.

In instances where property owners have fenced along streams as part of a watershed action plan, the Dairy Waste Management Plan, or an approved farm management plan through the Natural Resource Conservation Service (NRCS) conservation district program, counties should consider granting open-space tax status pursuant to the Open Space Act (Chapter 84.34 RCW) to lands with restricted use resulting from fencing.

WP-5.4. Federal Funding

The Action Team, Ecology and the Environmental Protection Agency (EPA) shall actively seek ways to provide federal funding for the preparation and implementation of watershed action plans. Specifically, funding from Section 319 of the federal Clean Water Act shall be used to accelerate the implementation of local watershed action plans, as specified in the approved 319 Management Program. Priorities for 319 funding in the Puget Sound region shall be based on the *Puget Sound Management Plan* and biennial work plans. Other funding sources should include the federal CZARA of 1990, federal forest and job restoration initiatives and other federal watershed programs.

WP-6. Technical Assistance for Watershed Plans

Ecology shall coordinate among state agency watershed leads and shall provide watershed committees with clear direction as to which individuals or agencies to call directly for specific types of assistance. Ecology shall convene the state agency watershed leads annually to evaluate the effectiveness of this technical assistance program. Ecology shall ensure that technical information and assistance provided under this program is coordinated with other state and federal financial assistance programs, the boater education program (element MB-4), Ecology and Department of Health shellfish protection programs, Health's on-site sewage program, and the Department of Natural Resources' watershed analysis and forest practices prescriptions and the Department of Fish and Wildlife's habitat programs. Action Team members and watershed committees are encouraged to use resources provided through the Education and Public Involvement Program in conducting education associated with watershed action plans.

Action Team agencies are responsible for tracking development and implementation of watershed action plans in their areas of technical expertise, providing technical assistance to watershed committees throughout the watershed planning process, coordinating technical assistance within their agency and with other appropriate agencies, facilitating the statements of concurrence process for their agency, participating in plan review and serving as an agency contact person. Information on actions that should not be proposed in watershed action plans because of state or federal preemption should be made available to watershed management committees early in the planning process.

The Action Team shall seek ways to involve federal agencies in providing technical assistance to watershed planning and implementation activities. Federal agencies shall also work with local governments to resolve cases where federal programs may conflict with local goals in a watershed action plan (in accordance with Section 313 of the Clean Water Act).

WP-7. Program Management

WP-7.1. Annual Watershed "Report Cards"

To ensure continued local support, each lead agency, in cooperation with the appropriate watershed council, shall annually report on the progress made under completed watershed action plans. These "report cards" shall address information such as key accomplishments, barriers to plan implementation, staff and financial resources dedicated to carrying out the plan, results of monitoring data, and other topics relevant to plan implementation. Copies of watershed "report cards" are to be sent to the Action Team and Ecology.

WP-7.2. Monitoring

Ecology, along with Health for watersheds in which shellfish or drinking water is an issue, shall assist lead agencies in monitoring water quality as appropriate in each watershed with an approved watershed action plan. The purpose of the monitoring shall be to provide information for measuring the success of action plans in achieving water quality goals. Additionally, Ecology shall assist counties in establishing baseline monitoring programs for upcoming watersheds on the ranked list. These programs may include the use of data from citizen monitoring and other volunteer monitoring programs. Watershed monitoring shall be coordinated with the Puget Sound Ambient Monitoring Program (PSAMP), including use of the Puget Sound Estuary Program Protocols and Guidelines. Counties shall, where applicable, use PSAMP protocols and transfer data to the PSAMP central database using data transfer formats developed under element M-4 of the Monitoring Program.

WP-7.3. Default Watersheds

Ecology shall work directly with local governments that fail to prepare watershed action plans to identify reasons for delay and to develop an appropriate strategy for addressing nonpoint concerns. Ecology shall use its regulatory authority under Chapter 90.48 RCW to require that water quality problems are corrected and, as a last resort, may prepare a watershed action plan. In the event of nonperformance or unsatisfactory completion of watershed action plans, Ecology may require repayment of grant funds disbursed to grantees.

WP-7.4. Program Management and Evaluation

Ecology shall be responsible for overall Nonpoint Program management and shall provide ongoing oversight of watershed action plan development and implementation. Management shall include program planning, intra- and interagency coordination, financial monitoring, public outreach, technical assistance to watershed committees and councils, information management, enforcement, and evaluation activities for all Nonpoint Source Pollution Program elements except on-site sewage and marinas and recreational boating elements for which Ecology is not lead. Ecology, in coordination with lead agencies, shall convene quarterly meetings of the local and tribal watershed planners to share information and experiences on the watershed action planning and implementation processes. The effectiveness of the nonpoint program, including the effectiveness of the watershed planning program and consideration of the need for more prescriptive standards, shall be evaluated by the Action Team as part of each revision of the *Puget Sound Management Plan*.

Target Date for 7.4: Ecology shall report progress on this element in its reports to the Action Team. Under the *1994 Puget Sound Management Plan*, counties were to have begun baseline monitoring in at least one new watershed by 1996.

Marinas and Recreational Boating Program

Directory of Program Elements

Problem Definition

Marinas and the operation, maintenance and cleaning of boats can be significant sources of pollutants in water and sediments, as well as in animal and plant tissues. Toxic pollutants enter marina waters through discharges from boats or other sources, spills or stormwater runoff. These pollutants can elevate the level of metals and hydrocarbons in the water and decrease the level of dissolved oxygen required by fish and other aquatic organisms for survival. Toxics can accumulate in the tissues of aquatic organisms such as shellfish. Moreover, metals and hydrocarbons may accumulate in higher concentrations in sediments than in the overlying water, and in turn affect the organisms attached to or burrowing in the sediment.

Untreated sewage from boats is one of several nonpoint sources of pathogens that pose a threat to human health. As indicated by the presence of fecal coliform bacteria, these pathogens may reside in the water column, in sediments and in the tissues of shellfish. In some areas of Puget Sound, water quality and marine life may be degraded by the discharge of sewage from recreational boats, even when all the boats have approved and functioning sewage treatment systems. Discharges of treated and untreated sewage from boats especially may be a problem in smaller bays with poor water circulation near shellfish beds, swimming areas and marinas. Boat operations, including anchoring, can destroy habitat, resuspend bottom sediments and increase turbidity, thereby affecting the photosynthetic activity of algae and estuarine vegetation.

Institutional Framework

Significant steps have been taken at all levels of government and in the private sector to reduce the impacts of marinas and boating on the marine environment. The federal Clean Water Act provides the federal government with the authority to regulate the discharge of boat sewage. Under this law, vessel-sewage discharges into marine waters are regulated primarily through the design and use of marine sanitation devices (MSDs). The Environmental Protection Agency (EPA) has developed federal standards for the performance of MSDs and directs the U.S. Coast Guard to promulgate regulations regarding their design, installation and use.

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

Marine sanitation devices can either be self-contained treatment and discharge systems or tanks that hold waste until safely discharged to land-based treatment systems. Any boat that has an installed toilet must have an MSD to treat and/or hold sewage.

The Clean Water Act prohibits state or local jurisdictions from regulating the installation and use of sewage disposal devices on boats. However, Washington State can and does prohibit discharges of untreated waste to state waters under its anti-degradation laws. The Department of Ecology is charged with prosecuting unlawful discharges.

Effective enforcement of federal and state boater waste laws has proven to be a logistical impossibility. Instead, federal, state and local agencies have placed their emphasis on providing marinas and other facilities with the means to safely dispose of boater waste and on educating boaters about the use of these facilities and other pollution prevention behaviors.

Under the *Puget Sound Management Plan*, a state agency task force oversees and coordinates state efforts with advice from the recreational boating community. Ecology has developed environmentally protective guidelines for the design and siting of marinas and sewage disposal facilities. The State Parks and Recreation Commission's boater education program provides technical assistance and signage and other materials to marinas. And, under state and federal pumpout grant programs administered by State Parks, the number of facilities available to recreational boaters for waste disposal in the Puget Sound region has greatly increased.

At the local level, governments and private businesses participate in boater programs as well. Some marinas have gone to great lengths to educate their moorage clients and provide them with the means to dispose of their wastes properly, particularly in urban areas.

Finally, the Clean Water Act allows states to apply to the EPA to designate certain water bodies as "no-discharge" areas or zones as an extraordinary means of protecting our most sensitive aquatic environments.

Program Goal

To reduce and ultimately eliminate harm from wastes generated by recreational boating activities.

Program Strategy

The strategy for achieving this goal is to:

a. Coordinate implementation of the program by state agencies and local governments;

b. Simultaneously address the needs for waste disposal facilities and processes, education for appropriate constituencies, financial and technical assistance, and regulation and enforcement of boating-related activities that affect water quality; and

c. Evaluate changes in both behavior and water quality that result from the above strategies, and evaluate the need for more extreme protective measures (no-discharge and no-anchorage areas).

MB-1. Coordination and Public Involvement

With the Action Team support staff as lead, and with the assistance of an advisory committee, the departments of Ecology, Health and Natural Resources, the State Parks and Recreation Commission, the Interagency Committee for Outdoor Recreation, and the Action Team support staff shall work as a task force to coordinate implementation of the Marinas and Boating Program. The advisory committee shall consist of representatives of local and tribal governments, ports, the boating community (liveaboards, day-use boaters and other recreational boaters), marina owners and operators, the marine trade industry and appropriate state and federal agencies. The task force shall keep members of the public informed of its activities.

Target Date for MB-1: The state agency task force shall meet every two months.

MB-2. Shoreline Master Program Amendments for Marinas

Ecology, in coordination with Health, shall periodically update its shoreline master program guidelines pertaining to standards for siting, design, renovation or expansion of new marinas, existing marinas and associated fuel docks, and boat repair facilities according to the best science available. The guidelines shall include:

a. Standards for new and expanded marinas to prevent any restriction in the use of commercial and recreational shellfish beds;

b. Specific regulations requiring best management practices to control pollutants from boat use, maintenance and repair;
c. Specification that local governments must, at a minimum, condition shoreline permits for marinas to require the use of best management practices, boater education, and proper sewage disposal facilities for boats, including specific provisions for ensuring that pumpouts are accessible and maintained; and
d. Means for controlling the effects that floating homes and barge homes have on water quality.

Local jurisdictions shall amend their shoreline master programs to be consistent with the revised guidelines.

Target Date for MB-2: Update guidelines as needed. Local shoreline master programs shall be amended within two years of guidance publication.

MB-3. Waste Disposal at Marinas

State agencies and local governments shall promote and coordinate the installation of sewage disposal facilities at new and existing, public and private marinas, launch ramps and other boating facilities, and promote the installation of recycling facilities for petroleum products at new and existing, public and private marinas. These tasks shall be accomplished by use of proprietary authorities (Natural Resources), funding opportunities (State Parks), and regulatory authorities (local governments and Ecology and Health).

Health shall provide updated information on the range of sewage disposal options (technical, educational, regulatory and financial) available to those involved in sewage disposal programs to operators of public and private marinas and other boating facilities.

With Health as lead, the state agency task force shall develop and implement a strategy for operating and maintaining marine sewage disposal facilities. This strategy shall include:

a. The option of petitioning Ecology to initiate an application for a no-discharge area designation for those areas in which water quality concerns persist after the installation of sufficient sewage disposal facilities;
b. Surveys of pumpout facilities for reliability and usage;
c. technical assistance and training on such systems; and
d. maintenance manuals and other guidance materials as needed.

State Parks shall allow public and private marinas that receive funding from the Clean Vessel Act grant program to recover operation and maintenance costs through user fees.

Target Date for MB-3: Information regarding sewage disposal options shall be prepared and distributed every two years. Operation and maintenance strategy development and implementation are ongoing.

MB-4. Marina and Boater Education Program

State Parks shall oversee and implement an education program for marinas and boaters that includes:

a. encouraging local governments and other entities to develop local environmental education programs for boaters and to use educational materials made available by state and other agencies;
b. using funds secured by state and federal grant programs to support the program;
c. providing interpretive signs to marinas and marine state parks where waste disposal facilities are installed;
d. periodically evaluating the effectiveness of the education program with the assistance of a qualified external evaluator and other appropriate entities. The evaluation shall include an assessment of the frequency of use of waste disposal facilities and other measures of changes in boater behaviors; and
e. providing information on marinas, boats and water quality to watershed management committees.

Target Date for MB-4: Complete first biennial program evaluation by December 1994. *This action item was first developed in 1993; it should be carried out as soon as possible.*

MB-5. Construction of Sewage Waste Disposal Facilities

State Parks shall provide grants for the construction and renovation of facilities for the disposal of boat sewage to owners of public and private marinas,

boat launches and other sites under state and federal grant programs as stipulated by relevant state administrative codes.

As administrator of the federal Clean Vessel Act grant program, State Parks shall maintain and update as needed a network plan for boater sewage facilities for the funding and installation of sewage disposal facilities. State Parks shall continue to provide technical assistance on issues of installation and maintenance of facilities for boat-sewage disposal to public and private marina operators.

State Parks shall continue to install pumpout stations at selected state parks with priority given to parks located in poorly flushed bays with shellfish resources and without other nearby pumpout facilities. State Parks shall coordinate placement of pumpouts in state parks under this element with placement of sewage disposal facilities in other public and private marinas as funded by state and federal grant programs.

Target Date for MB-5: State Parks shall install pumpouts in at least two parks per year until the need for pumpout services is met.

MB-6. Compliance with Marine Sanitation Device Regulations

State Parks in consultation with the U.S. Coast Guard, the Environmental Protection Agency (EPA), appropriate state agencies, local governments and the boating community, shall develop a comprehensive strategy to maximize compliance with federal regulations regarding marine sanitation device (MSD) installation and use. This strategy could include one or a combination of options such as new legislation, a memorandum of understanding (MOU) with the Coast Guard regarding enforcement, a model ordinance for local governments, or continuation of an environmental education program for boaters.

The comprehensive strategy shall include methods to protect environmentally sensitive areas. In developing it, State Parks and the consulted agencies and groups shall consider including an inspection program coordinated with the accelerated education program (element MB-4) and focused on shallow-water bays and other sensitive areas. State Parks shall also consider including enforcement of no-anchorage areas and no-discharge areas if instituted under elements MB-8 and MB-9.

State Parks shall hold public meetings in several locations around Puget Sound to take comment on the options prior to choosing an option. If State Parks and the consulted agencies and groups determine a memorandum of understanding with the Coast Guard is a preferred strategy, State Parks shall take early action to obtain the MOU and prepare any necessary legislation to permit state inspection of recreational vessels and other uninspected vessels under 65 feet in length for marine sanitation devices.

Target Date for MB-6: State Parks shall review current strategy of relying on the environmental education program for boaters by June 2001. State Parks shall submit any appropriate new legislation, draft an MOU with the U.S. Coast Guard, or develop other programs as necessary by January 2002.

MB-7. Monitoring Program for Boating Areas

Ecology, with the assistance of Health and State Parks, shall design and conduct a water quality monitoring program for boating areas to evaluate the effectiveness of control methods such as local programs to control boat waste, the placement of sewage disposal facilities, and the establishment of no-discharge areas. The program shall include baseline data, water and shellfish samples (where applicable) and boat counts. The monitoring program shall be consistent with the Puget Sound Ambient Monitoring Program.

Target Date for MB-7: Ongoing.

MB-8. No-Discharge Areas

MB-8.1. Needs Assessment

Ecology and Health, in consultation with State Parks, shall evaluate the need for no-discharge areas in Puget Sound. Their evaluation shall consider the effectiveness of the boater education program (element MB-4) and strategy for the enforcement of marine sanitation devices (element MB-6). In setting priorities for the areas to be considered for designation, the agencies shall draw upon:

a. survey and planning work done by State Parks for the Clean Vessel Act and state programs for pumpout placement;
b. information assembled by the Puget Sound Marina/Boater Advisory committee;
c. applications by local governments; and
d. other sources.

In determining whether an area needs a no-discharge designation, the departments of Ecology and Health shall consider:

a. water circulation and other natural characteristics of the area;
b. the presence of commercial and recreational shellfish beds and swimming areas;
c. the sufficiency and rate of use of existing sewage disposal facilities;
d. the number and type of boats using the area;
e. if available, information from the inspection program (element MB-6) and the monitoring program for boating areas (element MB–7).

MB-8.2. Designation Options

Ecology shall apply to the EPA for no-discharge area designations for those Puget Sound waters that require greater environmental protection than is currently afforded by law.

The Action Team shall inform local governments of the option to designate no-discharge areas for controlling sewage disposal from boats.

MB-8.3. Designation

Local governments shall petition Ecology to initiate applications for no-discharge areas for those areas in which water quality concerns persist after the installation of sufficient sewage disposal facilities.

Target Date for MB-8: Evaluations began in July 1995. *This strategy was first developed in 1993; it should be implemented as soon as possible.* Applications to the EPA as appropriate thereafter.

MB-9. No-Anchorage Areas

Health shall evaluate the results of boating areas monitoring (MB-7) and the success of the education program (element MB-4) in protecting commercial and recreational shellfish beds from downgrades due to pollution from anchored boats. Health shall develop information for use in the boater education program on areas where anchoring is discouraged. The education program shall warn boaters of the potential for anchorage prohibitions if education does not achieve standards for water quality and shellfish classifications in boating areas.

If Health finds that the education program has been unsuccessful in protecting commercial and recreational shellfish beds from such closures, it shall draft legislation with anchorage prohibitions to prevent any restriction in the use of commercial and recreational shellfish beds. No-anchorage areas shall be enforced as part of the program for the enforcement of marine sanitation devices (element MB-6), if applicable.

Target Date for MB-9: If necessary, Health shall submit legislation with anchorage prohibitions to prevent any restriction in the use of commercial and recreational shellfish beds to the legislature.

MB-10. Measuring Program Effectiveness

The Puget Sound Action Team support staff shall facilitate evaluation of program results by evaluating program and environmental performance measures. This supports the adaptive management approach described in the Estuary Management Program of the *Puget Sound Management Plan*. At a minimum, these evaluations should incorporate information from the monitoring and assessment sources that follow.

a. Program measures that track implementation of this program:
   - State agency task force meets six times a year.
   - Information on sewage disposal options updated biennially.
   - Operations and Maintenance Strategy developed and implemented.
   - Pumpout stations are installed in state parks.
   - Monitoring program for boater areas is designed and implemented.
b. Measures of environmental conditions for which this program is a major or important determinant (recognizing that these measures may be affected by several plan programs):
   - Reduction in the levels of fecal coliform bacteria in marinas and other heavy traffic areas.

Target Date for MB-10: Ongoing.

On-Site Sewage Systems Program

Directory of Program Elements

Problem Definition

When on-site sewage systems (also known as septic systems) are properly sited, designed, installed, operated and maintained, they can be a viable long-term option for sewage disposal in the Puget Sound area. They can be more cost-effective in rural areas than centralized sewage treatment plants, and by returning wastewater to the ground (rather than discharging to marine waters, as treatment plants do), on-site systems help recharge streams, wetlands and aquifers.

Local health jurisdictions estimate that there are approximately 450,000 on-site sewage systems in the Puget Sound area[1]. Unfortunately, failure rates for on-site systems can be high. Between 1991 and 1995, Mason County discovered failure rates along shorelines as high as 25 percent.[2] And failing on-site sewage systems can significantly degrade Puget Sound's water quality and resources. In the 1990s, with one exception, every restriction or closure of a shellfish growing area was at least partially due to a failing on-site system. The problem also poses health risks to the public, because failing or improperly managed on-site systems can contaminate beaches and drinking water supplies with bacteria, viruses and nitrates.

On-site sewage systems can fail for a variety of reasons. Inappropriate siting, inadequate soils, flaws in design, incorrect installation, improper use, lack of maintenance or simply age can all contribute to the failure of an on-site system.

Institutional Framework

In Washington, on-site sewage disposal is managed at the local level with guidance and support from the state. State Board of Health regulations (Chapter 246-272 WAC) set state standards for the use of on-site sewage systems. Local boards of health implement these regulations. The *Puget Sound Management Plan* calls on the Department of Health to evaluate issues relating to system den-

[1] Survey of Puget Sound Local O&M Programs, June 2000, Puget Sound Action Team.

[2] *Puget Sound Notes,* Number 39, June 1996.

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sity and siting within or adjacent to sensitive areas. It also calls on the department to maintain its programs for large, on-site sewage systems and alternative (such as sand filters or mounds) and experimental on-site sewage systems.

The management plan calls on local health jurisdictions to develop and implement programs to ensure proper operation and maintenance of on-site systems. Local programs are also to identify areas of special concern as part of operation and maintenance programs and to increase oversight of those areas. Operation and maintenance programs include education, regular notice to homeowners that an inspection is due, periodic monitoring and maintenance of each system, reporting of inspection results and follow-up to ensure that needed repairs are carried out. Local jurisdictions are encouraged to adopt a risk-based approach to system management and to tailor monitoring requirements accordingly.

The Department of Licensing carries out a program to license system designers and certify local health jurisdiction staff. The Northwest On-site Wastewater Training Center will continue to provide necessary education and training for industry professionals and local health jurisdiction staff.

This management plan program calls for measuring program effectiveness by evaluating program development and environmental performance measures. A key environmental measure is the number of shellfish growing areas restricted for harvest as the result of on-site system failures.

Program Goal

To protect the Sound's water quality, shellfish growing areas and other aquatic resources from wastes generated by on-site sewage systems.

Program Strategy

The strategy for achieving this goal is to:

a. establish comprehensive programs at the local level for the appropriate application of on-site sewage treatment and disposal technologies, and for effective operation, maintenance, inspection, education, and financial and technical assistance regarding on-site sewage systems;

b. provide effective state oversight, regulation and financial and technical assistance; and

c. investigate, review, approve, promote and apply, as appropriate, alternative technologies for on-site sewage treatment.

OS-1. On-Site Sewage Regulations and Programs

The Department of Health shall periodically review and, as appropriate, amend the state on-site sewage regulations, Chapter 246-272 WAC. Health shall ensure that the regulations remain consistent with management measures of the Coastal Nonpoint Pollution Control Program and shall evaluate issues related to system density and siting of systems within or adjacent to sensitive areas. The regulations shall continue to require local operation and maintenance programs in the Puget Sound basin, including designation of areas of special concern and enhanced oversight of systems within those areas. Health shall provide technical assistance and program oversight for local implementation of the state regulations. Health shall periodically review and evaluate the effectiveness of local on-site sewage programs at protecting water quality through application of on-site sewage treatment and disposal technology and reducing pollution from failing or inadequately located, constructed, installed or maintained on-site sewage systems.

Target Date for OS-1: Ongoing.

OS-2. Local On-Site Sewage Operation, Maintenance, Inspection and Education Programs

Local health jurisdictions shall develop operation and maintenance programs so that on-site sewage systems perform as designed and do not threaten aquatic resources and public health. These programs shall provide for regular notification, education, inspection (including periodic system monitoring), maintenance, reporting of inspection results and follow-up by the local health jurisdiction to ensure that failing systems are repaired or replaced. These programs shall also provide for identification of areas of special concern and enhanced oversight of systems within those areas. Local governments, in conjunction with health jurisdictions, shall select and establish appropriate mechanisms for funding on-site sewage programs, such as on-site sewage maintenance utilities, clean water districts or shellfish protection districts, public/private partnerships, or other means. Local

health jurisdictions are encouraged to adopt a risk-based approach to system management and tailor inspection requirements according to the relative risk of site conditions, proximity to sensitive areas, system complexity and/or other appropriate factors.

Target Date for OS-2: All counties shall implement local operation and maintenance programs by 2000, as required by Chapter 246-272 WAC.

OS-3. Certification of On-Site Professionals

Health shall develop a program, including any required legislation or amendments to Chapter 246-272 WAC and RCW 18.43.070, for state licensing or certification of installers, maintenance specialists, pumpers and others involved in the installation and maintenance of on-site sewage systems. Health and local health jurisdictions shall require all on-site sewage systems to be designed, installed, permitted and maintained by certified or licensed professionals.

The Department of Licensing shall continue to license system designers and certify local health jurisdiction staff under RCW 18.210.

The Northwest On-site Wastewater Training Center, in cooperation with Washington State University (WSU) Cooperative Extension, the Washington On-Site Sewage Association and Health, shall continue to provide education and training for industry professionals and local health jurisdiction staff.

Target Date for OS-3: Health shall develop licensing or certification programs for installers, maintenance specialists and pumpers by December 2002.

OS-4. Large On-Site Sewage Systems and Septage

Health, with assistance from the Department of Ecology, shall maintain its program for large on-site sewage systems. Health shall:

a. maintain an inventory of systems;
b. assess the need for new performance, siting or other requirements;
c. maintain an operational permit program; and
d. maintain a database of these systems.

Health shall provide technical assistance and training on such systems for local health agency staff and shall prepare design, performance and other manuals and materials as needed.

Ecology, with assistance from Health and other interest groups, shall continue to develop rules and guidelines for the management of biosolids, including holding-tank septage. Health, along with Ecology shall, as necessary, develop guidance and provide training and technical assistance for local governments on the environmentally sound disposal of septage.

Target Date for OS-4: Ongoing.

OS-5. Alternative and Experimental On-Site Sewage Systems

Health shall maintain its program for alternative and experimental on-site sewage systems. Health shall:

a. investigate, evaluate, review, approve, guide and encourage the appropriate implementation of alternative and experimental technologies for on-site sewage systems;
b. assist in the development of coordinated systems for collecting and managing data at the state and local health agency levels to provide an inventory of alternative and experimental systems;
c. assess the need for new performance, siting or other requirements;
d. evaluate the effectiveness and status of local approval and application of alternative systems; and
e. develop a database, in conjunction with local health departments.

Health shall provide technical assistance and training on such systems for local health agency staff and shall prepare design, performance and other manuals and materials as needed.

Target Date for OS-5: Ongoing

OS-6. Measuring Program Effectiveness

The Puget Sound Action Team support staff shall facilitate evaluation of program results by evaluating program and environmental performance measures. This supports the adaptive management approach described in the Estuary Management Program of this management plan. At a minimum, these evaluations should incorporate information from the following monitoring and assessment sources.

a. Program measures that track implementation of this program:
   - Adoption and implementation of local operation and maintenance programs Sound-wide

b. Case studies that assess the effectiveness of program actions:
   - Individual local operation and maintenance programs (e.g., methods used, successes, challenges, lessons learned)

c. Performance of environmental conditions for which this program is a major or important determinant (recognizing that these measures may be affected by several plan programs):
   - Commercial and recreational shellfish growing areas downgraded as a result of failing on-site sewage systems;
   - Surface waters listed on the state's 305(b) list due to failing on-site sewage systems

Target Date for OS-6: Ongoing

Pest Management Program

Directory of Program Elements

Problem Definition

Pesticides from home, forest, agricultural or roadway use can contaminate streams, lakes, wetlands, groundwater and ultimately Puget Sound. Homeowners account for approximately 20 percent of all pesticide use in the Puget Sound region. Unlike other pesticide users, household users are not trained in proper application procedures or in diagnosing whether a particular pesticide is needed.

Urban and suburban use of pesticides often occurs directly adjacent to storm drains, ditches, streams and lakes. Pesticides applied excessively or improperly can flow or leach into local waterways or seep into groundwater. Although pesticides are generally designed to be toxic to certain targeted organisms, they are sometimes toxic to other organisms, such as fish and other aquatic life in streams and lakes receiving waters from polluted runoff.

Institutional Framework

The major regulatory and enforcement authority for pesticide use rests with the state Department of Agriculture. The department is responsible for training and licensing commercial pesticide applicators. The state Department of Ecology has authority for pesticide waste disposal and targets commercial and public entities with an active education and compliance program on pesticide waste management. The Washington State University (WSU) research faculty and the WSU Cooperative Extension conduct the majority of research, training and education programs. These programs have traditionally targeted commercial agricultural and forestry pesticide users. In addition, some local governments and utilities have initiated integrated pest management programs for roadside and utility rights-of-way.

As we become more aware of the extent of pesticide use in homes, it becomes increasingly apparent that it poses a major risk to water quality. The *Puget Sound Management Plan* calls for learning more about the patterns and extent of local pesticide use and developing comprehensive educational efforts to inform all users—both commercial and non-commercial—of existing alternatives to pesticides, as well as proper application and disposal methods. This educational effort needs to include integrated pest management—which means a

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reduction in the use of pesticides—as alternative pest management approaches are implemented.

Program Goal

To effectively manage pests without harming water quality.

Program Strategy

The strategy for achieving this goal is to:

a. Develop a watershed-based analysis of pesticide use.
b. Develop and implement a program on pest management to research, promote and educate about pest management practices that ensure the greatest protection of water quality.

PS-1. Pesticide Usage Surveys in Selected Watersheds

Washington State University (WSU) Cooperative Extension shall act as the lead to design pilot pesticide-usage surveys for selected watersheds in the Puget Sound basin. WSU Cooperative Extension shall include appropriate agencies, scientists and local governments in designing and conducting the surveys. The surveys should define spatial and temporal usage patterns, focus specifically on pesticides of concern in the watershed, include information from all major users including both homeowners and commercial growers, and identify storage and disposal practices.

Target Dates for PS-1**:** WSU Cooperative Extension and the Department of Agriculture shall hire staff to design pilot pesticide-usage surveys for selected watersheds in the Puget Sound basin as funding becomes available.

PS-2. Puget Sound Pest Management Program

Several state agencies and universities are required by law to implement integrated pest management practices (RCW 17.15.020). This includes the departments of Agriculture, Ecology, Fish and Wildlife, Transportation, and Natural Resources; the State Parks and Recreation Commission; WSU and the University of Washington. These agencies are required to participate on an interagency pest management coordinating committee and to report on their activities every two years. The Center for Sustaining Agriculture and Natural Resources of WSU is to include research on integrated pest management.

WSU Cooperative Extension shall act as the lead to work with the Puget Sound Action Team, National Oceanic and Atmospheric Administration (NOAA) and Ecology, to find funding for and to establish a Puget Sound pest management program. WSU Cooperative Extension will design and implement program activities with an advisory group consisting of representatives from appropriate agencies, local governments, nonprofit organizations, business and industry groups, and educational and media groups. The program will work through existing institutions and groups to conduct research, work on a pesticide-use database, provide education on integrated and targeted pest-management and promote conservative use of pesticides and the use of alternatives to pesticides. Targeted audiences for educational activities shall include home users, commercial users, local government staff, and retailers of pest management products.

WSU Cooperative Extension shall help develop or conduct collaborative demonstration research on pest management with local governments, state agencies and private sector groups. Local governments and state agencies shall identify the pest-management issues that should receive priority for research.

The Action Team and WSU Cooperative Extension will establish a process for agencies and local governments to adopt practices that are proven effective through this program.

Priority will be given to research and promotion of pest-management practices that will ensure the greatest protection to water. The program shall coordinate with statewide needs for education and research on pest management in urban areas through participation of the signatory agencies (WSU Cooperative Extension, the Action Team, the Environmental Protection Agency (WSU), and Ecology, Health and Agriculture,) in the Urban Pesticide Initiative.

WSU Cooperative Extension shall provide resources to the local watershed management committees, the Ecology 1-800-RECYCLE hotline, and local governments managing hazardous waste.

Target Dates for PS-2**:** WSU Cooperative Extension shall hire a person to initiate the program when funding is available.

Shellfish Protection Program

Directory of Program Elements

Problem Definition

Puget Sound is one of the richest shellfish growing areas, and Washington State is the leading producer of farmed shellfish in the United States. The Pacific Coast Shellfish Growers Association estimates the wholesale value of commercial oyster, clam and mussel production in Puget Sound at about $50 million per year. In addition, the Department of Natural Resources reported average, annual harvests of approximately 1.6 million pounds of geoducks over the last 10 years.

The value of Puget Sound's shellfish resources goes far beyond the economic numbers. Shellfish are prized symbols of the region's heritage and quality of life. They play a critical role in maintaining the health of the estuary and providing popular sport fishing resources. According to the Department of Fish and Wildlife, nearly a quarter of a million people harvested shellfish from the Sound's public beaches in 1998, yielding approximately 700,000 pounds of clams and 900,000 pounds of oysters.

Shellfish harvesting, however, depends on many factors—most notably clean water. Oysters, clams and mussels are "filter feeders" meaning they take in and strain their food from the surrounding water. During the process of filter feeding, shellfish can accumulate contaminants that are present in the environment, including disease-causing organisms associated with human and animal feces.

Polluted waters are not strictly an urban concern. Growth and development are changing the character of watersheds around the Sound, threatening shellfish harvesting in an increasing number of rural areas.

Since 1980, roughly one-quarter of the area classified for commercial shellfish harvesting has been downgraded and taken out of production, primarily because of inadequately treated sewage from municipal treatment plants and on-site septic systems; contaminated stormwater runoff; and waste from marinas and boaters, farm animals and wildlife. (Figure 4, next page.)

The most dramatic downgrades occurred in the late 1980s. In the 1990s, things began to stabilize as communities and agencies carried out many successful efforts to protect and restore water quality in shellfish areas—relying on public education, watershed planning, growth management, and measures to find and fix nonpoint pollution sources.

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

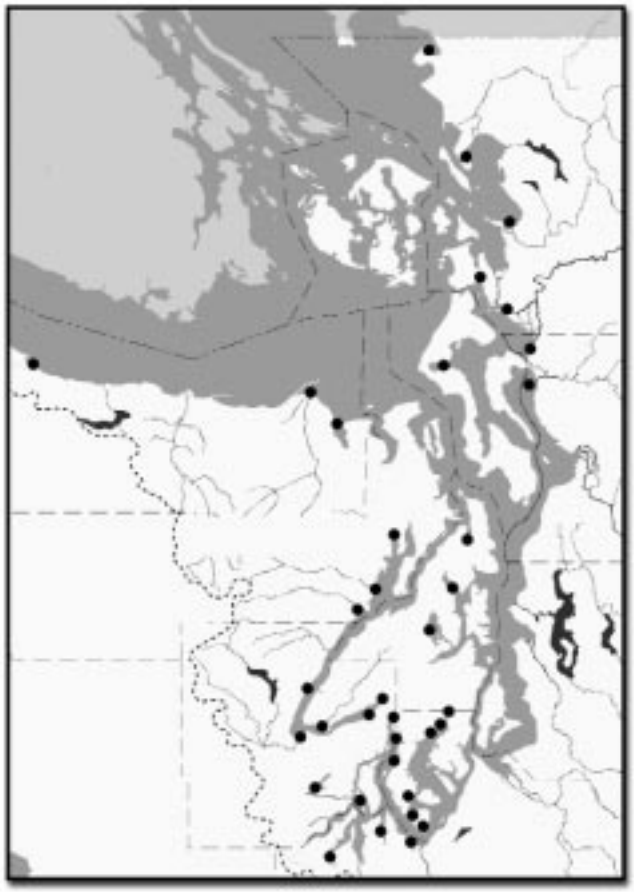


Figure 4

- Shellfish areas affected by pollution since 1980.

While much has been achieved, it is increasingly clear that efforts to restore already degraded shellfish beds will ultimately come up short if actions are not taken to permanently protect these unique and sensitive habitats.

Institutional Framework

State agencies, tribal and local governments, universities, shellfish growers, citizen committees and nonprofit organizations all play key roles in protecting and restoring water quality in shellfish areas.

On the state front, state agencies administer and enforce water pollution control laws, monitor and classify shellfish beds, oversee shellfish harvesting, and provide financial and technical assistance to tribal and local governments. State universities provide research and education on a range of issues related to shellfish harvesting.

The Northwest Indian Fisheries Commission works with tribal governments to carry out sound shellfish harvesting practices and to address management issues on a collective basis. Tribal governments also work independently and in partnership with federal, state and local agencies to protect and manage shellfish resources.

The Northwest Straits Commission and the local Marine Resources Committees are working to protect and restore shellfish beds and other marine resources and habitats in the seven-county area of north Puget Sound.

Local governments oversee a number of programs and operations that have a direct influence on water quality in shellfish areas, including programs related to land use, pollution control and public health. Cities and counties are responsible for comprehensive land-use plans, shoreline master programs, development regulations and public facilities (such as municipal sewage treatment plants). Local health jurisdictions collaborate with state Health to regulate the use of on-site sewage systems, monitor and classify recreational shellfish beaches and inform the public about safe shellfish harvesting practices. Local conservation districts work with farmers and other landowners to improve agricultural practices and other land-use activities to protect water quality.

The *Puget Sound Water Quality Management Plan* calls for a collaborative approach for protecting the Sound's shellfish resources. The Shellfish Protection Program's focus on water quality is designed to preserve safe, shellfish harvest opportunities for future generations.

Program Goal

To protect water quality and prevent contamination of shellfish beds so that shellfish are safe for human consumption, to reduce contamination of shellfish beds to achieve a net increase in acreage approved for harvest, and to prevent human consumption of shellfish from contaminated beds until such time as the contamination is corrected.

Program Strategy

The strategy for achieving this goal is to:

a. Adopt policies to ensure that pollution-control and land-use programs effectively protect water quality in shellfish areas;

b. Respond to existing and potential shellfish contamination with aggressive restoration and protection programs;

c. Monitor shellfish areas for bacterial contamination, marine biotoxins and other contaminants; and

d. Increase public involvement and education related to shellfish protection.

SF-1. Shellfish Protection and Restoration Policy

State agencies and local and tribal governments shall ensure that their pollution-control and land-use programs meet these objectives:

a. Protect shellfish beds from contamination and prevent classification downgrades; and

b. Restore water quality in contaminated areas so that harvest restrictions can be lifted.

Target Date for SF-1**:** Ongoing.

SF-2. Protection and Restoration of Shellfish Beds

The Washington State departments of Ecology, Fish and Wildlife, Health, Natural Resources and Agriculture; the State Parks and Recreation Commission; the Conservation Commission; the Office of Community Development (OCD); the Northwest Indian Fisheries Commission; Washington Sea Grant; the Northwest Straits Commission and local marine resources committees; and local and tribal governments, in cooperation with the Puget Sound Water Quality Action Team support staff, shall continue their existing programs and work cooperatively and aggressively to protect and restore water quality in shellfish areas. Efforts shall target priority shellfish areas that meet, or could be expected to meet, state water quality standards but are threatened or affected by contamination from existing or projected land and water uses. State funding and technical assistance shall be provided to local and tribal governments to develop and implement programs aimed primarily at preventing any degradation of water quality or downgrade in the classification of the Sound's threatened shellfish growing areas.

Ecology has lead responsibility on water quality issues, including enforcement of the federal Clean Water Act and state Water Pollution Control Act, Chapter 90.48 RCW. Ecology shall continue to provide policy guidance, financial aid, resource characterizations and technical assistance to local and tribal governments, conservation districts and other entities carrying out programs for shellfish protection and restoration. Ecology shall continue to provide technical assistance on:

a. Shellfish protection districts and other funding sources;

b. Water quality monitoring to locate and control pollution sources; and

c. Best management practices (BMPs) for stormwater runoff, agricultural practices and other potential pollution sources, including sewage treatment systems with flows greater than 14,500 gallons per day.

Health has lead responsibility on public health and shellfish sanitation issues, including implementation and enforcement of the National Shellfish Sanitation Program. Health shall continue to:

a. Coordinate its investigations and monitoring program with participating agencies and governments;

b. Convene meetings of the Shellfish Advisory Committee;

c. Monitor shellfish beds to determine classifications and to assess the effectiveness of actions taken to prevent contamination or to restore water quality in areas where harvesting restrictions apply;

d. Develop assessments of pollution sources, recommend corrective actions and provide technical assistance; and

e. Regulate and provide technical assistance on the siting, design, installation, use and maintenance of on-site sewage systems in partnership with local health jurisdictions.

Health shall provide data, as soon as it is available, from water quality monitoring, trend analysis and other summary information on shellfish growing areas to all parties involved in shellfish protection and restoration activities. Also, in conjunction with publication of the annual inventory and growing area reports, Health shall provide local governments, affected growers and others with information on shellfish beds threatened by contamination.

The Action Team support staff has lead responsibility on policies and actions developed and carried out under the *Puget Sound Management Plan* and the *Puget Sound Work Plan*. Action Team support staff shall continue to:

a. Coordinate state technical assistance for shellfish protection and restoration programs and projects;
b. Provide information on local finance authorities and public and private funding sources;
c. Recommend strategies for land-use and pollution-control plans and planning processes;
d. Assist with activities related to public involvement and education; and
e. Develop actions and set priorities for the biennial work plans.

Cities and counties shall fully implement provisions of the Growth Management Act (Chapter 36.70A RCW) and accompanying regulations (including Chapter 365-190 WAC) to protect and, where feasible, restore water quality in shellfish areas. Local governments shall also use other regulatory tools such as the Shoreline Management Act (Chapter 90.58 RCW) and accompanying guidelines (Chapter 173-26 WAC), the State Environmental Policy Act (Chapter 43.21C RCW, Chapter 197-11 WAC), and state and local on-site sewage regulations (Chapter 173-240 WAC) to protect shoreline habitats and to ensure compliance with water quality standards in shellfish areas. In places where existing or projected land uses or sources of contamination threaten the condition or classification of shellfish areas, local governments shall institute strategies to mitigate the effects.

When local governments adopt or concur with locally developed watershed plans, the goals, policies and strategies of those plans shall be incorporated into comprehensive plans, capital facilities plans, critical areas ordinances and other regulations and programs. Jurisdictions sharing watersheds shall cooperate in analyzing water quality threats and effects, and shall adopt coordinated programs for monitoring, protecting and restoring shellfish areas. Local governments shall also pursue funding to ensure the protection of water quality and shellfish, considering such authorities as shellfish protection districts, stormwater utilities, on-site sewage system maintenance districts, conservation district special assessments and comprehensive surface water utilities.

Target Date for SF-2**:** Ongoing.

SF-3. Testing Selected Shellfish Beds for Toxicants

The management and steering committees of the Puget Sound Ambient Monitoring Program (PSAMP) shall continue to periodically review the environmental and public health risks associated with persistent, bioaccumulative toxicants in shellfish and other marine invertebrates. The committees shall carry out sampling activities in selected shellfish areas as needed and as agreed to in the PSAMP implementation plans.

Target Date for SF-3**:** Ongoing.

SF-4. Recreational Shellfish Program

Ecology, Health, Fish and Wildlife, Natural Resources, State Parks, Northwest Indian Fisheries Commission, Washington Sea Grant, Action Team support staff, local and tribal governments, the Northwest Straits Commission and local marine resources committees and other organizations shall continue their programs to preserve and enhance recreational shellfish harvesting opportunities and to educate the public about safe shellfish harvesting.

Health shall continue working with the Shellfish Advisory Committee to guide and evaluate its recreational shellfish program. Based on the committee's guidance and the requirements of the state regulation for recreational shellfish beaches (Chapter 246-280 WAC), Health shall continue to distribute funds and collaborate with local health jurisdictions on the development and implementation of local programs for recreational shellfish harvesting. These programs shall emphasize recreational beaches where public use and health risks are highest, and shall include such activities as monitoring water quality, classifying beaches, posting signs, issuing press releases and educating the public to prevent the harvesting and consumption of contaminated shellfish. Health shall also convene workshops periodically to share information on key issues related to recreational shellfish harvesting.

Health, Ecology and the Action Team support staff shall continue to collaborate with other state agencies and local and tribal governments to carry out the activities described in elements SF-2 and SF-7 to protect and restore water quality in recreational shellfish areas.

Target Dates for SF-4**:** Health shall convene recreational shellfish workshops every six months; distribute funds to local health jurisdictions for recre-

ational shellfish programs annually; and rank recreational beaches based on use and health risks, reevaluate their classifications, and expand the list of classified beaches annually.

SF-5. Annual Inventory and Information Management

Health shall publish annual growing area reports and the *Annual Inventory of Commercial and Recreational Shellfish Areas of Puget Sound*, providing information on water quality conditions and highlighting those areas threatened by contamination and classification downgrades (early warning system). The inventory, growing area reports and accompanying list of threatened shellfish areas shall be distributed to local health jurisdictions, tribal governments, affected growers and other parties involved in shellfish protection and restoration activities. In coordination with PSAMP, Health shall continue to improve its management and analysis of data to better understand water quality conditions and trends in Puget Sound's shellfish areas. These findings shall be disseminated as described in element SF-2.

Target Dates for SF-5**:** Health shall distribute the growing area reports and list of threatened shellfish areas by April of each year, and shall distribute the inventory by June of each year.

SF-6. Public Involvement and Education

The Action Team support staff shall collaborate with Ecology, Health, Fish and Wildlife, Natural Resources, OCD, State Parks, Conservation Commission, Northwest Indian Fisheries Commission, Washington Sea Grant, the Northwest Straits Commission and local marine resources committees and other organizations to develop and carry out a communications strategy to educate and involve the general public and target audiences in protecting water quality and shoreline habitats for shellfish harvesting. The strategy shall be framed around a set of core messages, including the cultural and economic values of shellfish harvesting, the threats to water quality in shellfish areas from urbanization and population growth, and tools and techniques for protecting water quality and shellfish habitat. The strategy shall identify key events, publications and other opportunities for educating and involving target audiences in issues and activities related to shellfish protection. The strategy shall also lay out approaches for developing and disseminating information and for integrating key messages and materials into established programs, projects and planning processes. Action Team support staff shall collaborate with Health to ensure coordination with the Shellfish Advisory Committee.

Target Date for SF-6**:** The Action Team support staff shall work with the participating organizations to develop the communications strategy and convene meetings at least semi-annually to coordinate activities and to evaluate progress.

SF-7. Shellfish Closure Response Strategy

State agencies and local and tribal governments shall structure their policies, programs and projects to prevent the contamination of shellfish areas. When shellfish areas are identified as threatened in the annual growing area reports, the agencies and governments shall collaborate and target their actions to restore water quality and prevent classification downgrades. When shellfish areas are officially downgraded by Health, the state agencies, local and tribal governments and other affected interests shall develop and implement closure response strategies to restore water quality and to upgrade the classifications.

Ecology, Health and the Action Team support staff shall continue to implement and update, as necessary, a memorandum of agreement that governs their responses to classification downgrades caused by water quality degradation. Closure response strategies shall be initiated within 30 days of a downgrade and completed within 60 days. At a minimum, each strategy shall provide for the participation of all affected agencies, local and tribal governments, growers, interest groups and individuals, and shall include concise and aggressive assignments and compliance schedules for correcting the sources of contamination.

All organizations participating in the closure response process shall work together to secure funding from public and private sources to successfully carry out the closure response strategies. The closure response strategies shall also be coordinated with relevant land-use and water quality plans to ensure swift and effective restoration of water quality and avoid duplication of effort.

Chapter 90.72 RCW, Shellfish Protection Districts, encourages counties to establish shellfish

protection districts and programs to prevent the contamination of shellfish areas, and requires counties to take these actions when shellfish beds are downgraded due to nonpoint source pollution. Creation of these districts and programs shall be integrated with the closure response strategies.

Target Date for SF-7**:** State agencies and local and tribal governments shall prepare and implement closure response strategies as needed.

SF-8. Measuring Program Effectiveness

The Puget Sound Action Team support staff shall facilitate evaluation of program results by evaluating program and environmental performance measures. This supports the adaptive management approach described in the Estuary Management Program of the *Puget Sound Management Plan*. At a minimum, these evaluations should incorporate information from the following monitoring and assessment sources:

A. Program measures that track implementation of this program:
   - Number and miles of public recreational beaches classified.
   - Number of downgraded shellfish areas covered by shellfish closure response strategies.

B. Case studies that assess the effectiveness of program actions:
   - Changes in levels of bacterial contamination correlated with shoreline and watershed activities.

C. Measures of environmental conditions for which this program is a major or important determinant (recognizing that these measures may be affected by several plan programs):
   - Number and acres of commercial shellfish areas reclassified.
   - Number and miles of public recreational beaches reclassified.
   - Percentage of people harvesting from classified recreational beaches.
   - Percentage of people harvesting from approved recreational beaches.
   - Number and acres of shellfish areas downgraded and subsequently upgraded as a result of closure response strategies.
   - Percentage of sampling stations at core PSAMP shellfish sites with good, threatened or poor levels of bacterial contamination.
   - Percentage of sampling stations at core PSAMP shellfish sites with increasing, decreasing, or unchanging levels of bacterial contamination.

Spill Prevention and Response Program

Directory of Program Elements

Problem Definition

Our society depends on large volumes of gasoline, motor and heating oils, solvents and other hazardous substances to function. These substances are routinely transported and stored in huge quantities and can cause tremendous environmental damage if they are spilled or released on land or in water in large quantities. Response capabilities would likely be overwhelmed by a catastrophic spill and would fail to protect the environment.

Puget Sound is no stranger to spills of oil and other hazardous substances. For example, in November 1985, jet fuel spilled into Des Moines Creek, killing fish and other organisms in the stream. The spill eventually reached Puget Sound. In that same year, more than 75,000 gallons of a toxic chemical spilled into Hylebos Waterway in Tacoma. In December 1985, the tanker Arco Anchorage, en route from Valdez, Alaska to a refinery at Cherry Point, Washington ran aground near Port Angeles. The vessel spilled 239,000 gallons of crude oil, fouling Dungeness Spit and Ediz Hook. In 1988, the barge Nestucca collided with the tug Ocean Services and spilled 231,000 gallons of fuel oil off the coast of Washington at the mouth of Grays Harbor. The slick traveled as far north as Vancouver Island. Oil was found on Dungeness Spit and the San Juan Islands. More than tens of thousands of marine birds and many other animals died as a result of the spill.

In 1999, a petroleum pipeline ruptured in Bellingham, Washington. Approximately 277,000 gallons of gasoline were released and flowed down Whatcom Creek towards Bellingham Bay. The gasoline ignited, and the fire killed three young people and destroyed habitat along the creek.

Numerous minor spills occur in Puget Sound every year. Large or small spills have the potential to significantly harm water quality, both now and far into the future. When a spill occurs, the oil or other hazardous substance may remain at the surface of the water, where it affects marine birds, marine mammals, fish and shellfish eggs and larvae, and other organisms. The hazardous substance may be eaten or absorbed by aquatic life and enter the food web. It may sink to the bottom of the water body where it can contaminate sediments. . Dead birds, mammals and fish, as well as fouled beaches, are dramatic, acute effects of spills. The chronic and long-term effects to resources and the economy can be extremely large, as evidenced by the 1989 Prince William Sound spill in Alaska.

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

Institutional Framework

Spill Preparedness and Response—Under state and federal law, the party causing a petroleum spill is responsible for cleanup costs. The federal Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, or Superfund) assigns the same responsibilities for spilling other hazardous materials. These cleanup efforts are conducted pursuant to the National Contingency Plan and the joint federal/state Northwest Area Contingency Plan, both of which identify what is to be done by whom in the event of a spill. The U.S. Coast Guard and Department of Ecology are the lead agencies responsible for managing spill response in the marine waters of Puget Sound, with other federal agencies and tribal and local governments performing important roles. The Department of Ecology and U.S. Environmental Protection Agency are the lead agencies for inland spills. Ecology provides 24-hour, 365-day spill response capability in the Puget Sound region.

The States/British Columbia Oil Spill Task Force provides a mechanism for routine West Coast coordination, information sharing, oil spill mutual aid and other coordinated problem solving initiatives.

The Washington State Patrol is responsible for fire prevention and fire fighting training.

Spill Prevention—The Department of Ecology administers one of the most comprehensive spill prevention, preparedness and response statutes in the nation. The law provided for tank vessel spill prevention plans and inspections. This state spill prevention law was partially over turned by the U.S. Supreme Court during in the spring of 2000. The Department of Ecology continues to implement the remaining provisions of the law.

In 2000, Washington State adopted new pipeline safety legislation. Washington has received partial delegation of pipeline inspection authority from the federal Office of Pipeline Safety.

Program Goal

To enhance spill preparedness and response activities, while emphasizing spill prevention in Puget Sound and its tributaries, and to ensure that the spill prevention and response actions of state agencies are coordinated among themselves and with federal, local, tribal and private efforts.

Program Strategy

The strategy for achieving this goal is to review and approve industry spill prevention and contingency plans, update and revise the plans and policies for spill prevention and response, to seek improvements in vessel, liquid petroleum pipeline and oil facility safety, and provide education and technical assistance on spill prevention.

SP-1. Oil Spill Policy Implementation

Spill Preparedness and Response—The Department of Ecology shall continue to update and revise the Northwest Area Contingency Plan (NWACP) as necessary. Ecology shall continue its active involvement in the States/B.C. Task Force.

Ecology shall continue ongoing efforts to require and enforce spill prevention and contingency plans from onshore oil handling facilities. Ecology shall coordinate with the Department of Fish and Wildlife on the review of contingency plans for adequacy in protecting sensitive habitats. In updating the NWACP, Ecology shall develop policies for *in situ* burning and the use of dispersants for spill response in Puget Sound. Ecology shall provide an opportunity for Puget Sound Water Quality Action Team review of these policies prior to formal adoption.

Ecology, in coordination with Fish and Wildlife, and other organizations and experts shall continue to develop Geographic Response Plans (GRPs) that provide immediate guidance on priorities for protecting critical natural and cultural resources in Puget Sound. Because time is of the essence when a spill occurs, GRPs augment the NWACP and facility/vessel contingency plans making rapid consensus management and decision making possible by the federal, state and responsible parties' On-Scene coordinators (OSCs). This information will be broadly available and accessible..

Spill Prevention—Ecology shall continue to carry out vessel spill prevention programs; cargo and passenger-vessel screening; and field operations including vessel inspections. Ecology will continue to evaluate and take appropriate action on additional mechanisms to protect Puget Sound from the risk of major and catastrophic spills. These mechanisms include working with federal entities to improve vessel traffic management and establish new marine safety mechanisms such as a Rescue Tug in the vicinity of Neah Bay, if appropriate.

SP-2. Fire Fighting and Spill Prevention

The Fire Protection Bureau of the Washington State Patrol shall design and implement a program to train local fire department and fire district representatives, businesses and industries in the provisions of Article 80 of the Uniform Fire Code (WAC 51.44.8000). The program shall be designed to promote participation by appropriate volunteer fire departments. The focus of the training shall be on building design and storage requirements for hazardous substances that will prevent release of those substances into the environment in case of an accident.

Ecology shall review the marine fire-fighting program for Puget Sound. The program shall be designed to:

a. Inventory existing equipment, vessels and trained personnel in the Puget Sound region;
b. Summarize existing marine fire-fighting plans for all parties likely to respond to a marine fire;
c. Develop a comprehensive plan to establish a marine fire-fighting network;
d. Clarify roles of potential participants; and
e. Describe how existing marine fire fighting may be coordinated.

Target Date for SP-2: Ongoing.

SP-3. Vessel Safety

Ecology shall seek improvements in vessel safety through other state and federal authorities.. Ecology shall work closely with the U.S. Coast Guard in its implementation of its marine safety initiatives including maintaining a current Memorandum of Agreement (MOA) with the 13th District office. Ecology shall periodically report to the Puget Sound Council and Action Team on its progress under this element.

Target Date for SP-3: Ongoing.

SP-4. Spill Prevention Education

Washington Sea Grant shall continue to implement an education program targeting spill prevention for the commercial fishing industry and ports. The program shall target fishermen who fish or moor their boats in Puget Sound, and Puget Sound ports that support commercial fishing boat activity. Washington Sea Grant shall coordinate the program with spill prevention education of recreational boaters and marinas by the State Parks and Recreation Commission (see MB-4). The program shall illustrate ways to reduce oil contamination of bilge water, reduce accidental spills of hydraulic fluid and other hazardous substances during routine maintenance, reduce spillage during refueling, and encourage proper disposal of hazardous materials. In addition, the program will focus on ways to meet shoreside hazardous material handling and disposal needs of the targeted groups. This program shall be coordinated with actions taken by Sea Grant and the departments of Ecology and Fish and Wildlife to implement program element EPI-5.1.

Target Date for SP-4: Ongoing.

SP-5. Measuring Program Effectiveness

The Puget Sound Action Team support staff shall evaluate program results through program and environmental performance measures. This supports the adaptive management approach described in the Estuary Management Program of the Puget Sound Management Plan. At a minimum, these evaluations should incorporate information from the following monitoring and assessment sources.

a. Program measures that track implementation of this program:
   - Northwest Area Contingency Plan is updated and includes appropriate components.
   - Training on fire and spill prevention and response is available.
   - Measures to improve vessel safety are implemented.
b. Case studies that assess the effectiveness of program actions:
   - Investigations of causes and adequacy of response to selected spills.
c. Performance of environmental conditions for which this program is a major or important determinant (recognizing that these measures may be affected by several plan programs):
   - Number and volumes of spills; and number and type of vessel “casualties” in the Puget Sound basin.

Stormwater and Combined Sewer Overflows Program

Directory of Program Elements

Stormwater Problem Definition

Stormwater, or urban runoff, is rain or snow that falls on impervious surfaces[1] and is routed to natural or artificial drainage systems or water bodies. This also includes runoff from homes and businesses that results from excessive lawn or garden watering, car or equipment washing, spills or leaking storage containers. Stormwater can cause significant problems if not adequately managed and treated.

The first stormwater management controls were designed to prevent flooding and property damage. Conveyance systems were built to efficiently carry stormwater offsite to streams, rivers and bays. However, as our ability to monitor water and sediment quality has improved, stormwater has been found to be a significant contributor to water pollution and habitat loss.

When stormwater travels over developed land, pollutants (such as heavy metals, oil and grease, organic toxins, bacteria, nutrients and sediment) are carried into the stormwater stream. The sources of these pollutants are diverse. Oil, grease and metals come from motor vehicles and poor household and business practices. Improperly used or stored pesticides, paints, preservatives and solvents contribute organic toxins. Bacteria can be introduced from pet and farm animal wastes and failing septic systems. Nutrients can come from improperly applied fertilizers. Sediment flows from unprotected development sites.

These pollutants can have severe effects on aquatic resources. Heavy metals, oil and grease, and organic toxins can contaminate sediments and be toxic to fish and other aquatic life. Bacteria can

[1]Impervious surfaces are hard surfaces that either prevent or retard the entry of water into the soil mantle as under natural conditions prior to development. A hard surface area which causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions prior to development. Common impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and oiled, macadam or other surfaces which similarly impede the natural infiltration of stormwater. Open, uncovered retention/detention facilities shall not be considered as impervious surfaces (*Stormwater Management in Washington State,* Department of Ecology, Final Draft August 2000).

What does "shall" mean?

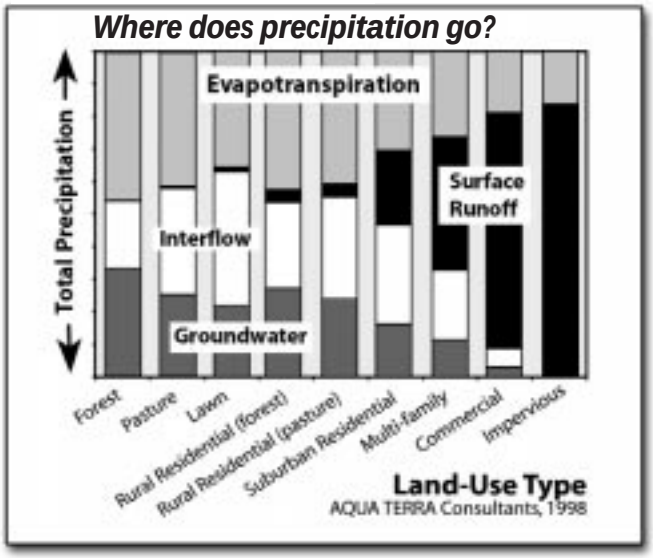
The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

close productive shellfish beds and public beaches. Sediment can smother fish habitat, clog fish gills, impair plant growth and transport other pollutants. Nutrients can cause plant blooms in lakes and bays that prevent swimming and deplete oxygen needed by fish and other aquatic life. Most recently, attention has focused on the role of stormwater runoff in the loss of salmon habitat in Puget Sound, especially since chinook and chum salmon and bull trout were listed as threatened under the Endangered Species Act.

Studies show that as a watershed is developed, and forests are replaced by impervious surfaces, a number of changes take place in the environment[2]. First, runoff from developed lands during the wet winter months is much greater. When discharged to streams, this increased runoff destabilizes stream channels and degrades or destroys valuable fish and wildlife habitat. Next, the impervious surface area prevents rain and snowfall from seeping into the ground and recharging streams, wetlands and aquifers. The result is a disruption of the hydrologic cycle. Streams experience exceptionally high flows during the wet months and exceptionally low flows during the dry summer months. Fish passage becomes difficult or impossible due to insufficient water flow. Wetlands experience extreme fluctuations of water level (washing away nests and eggs) and aquifers receive less recharge (affecting our water supply). These effects can be detected in watersheds with less than 10 percent impervious surface coverage. Effects grow more serious when impervious coverage exceeds 15 percent of a watershed. Figure 5 shows how surface water runoff (shown in black) varies dramatically among various land uses.

Explosive growth in the Puget Sound region within the last 10 to 15 years has led to significant alteration of the landscape. In many areas, forest cover has been lost, replaced by a range of impervious surfaces. The cumulative effects of this development can't be fully mitigated by engineered solutions at individual development sites. Care must be taken in determining where development is allowed; the extent of impervious surface area within each watershed; and how forests, streams, wetlands and other sensitive areas are protected. Discharging stormwater to shallow injection wells can also threaten groundwater resources and pose liability risks to municipalities that are out of compliance with state regulations (Chapter 173-218 WAC).

Figure 5



Comprehensive land-use planning under the Growth Management Act (GMA), including sizing urban growth areas, assigning zoning and densities, and protecting critical areas and natural resource lands, is critical to managing stormwater and protecting water resources. Watershed or basin planning is an excellent tool for assessing natural resources and pollution sources. Low-impact development practices, such as using native vegetation to treat and infiltrate stormwater, provide a viable alternative to traditional development techniques. Retaining minimum forest cover and setting watershed goals for impervious surfaces helps manage the effects of development at the landscape or watershed scale. Combined, these techniques may prove to be the most effective best management practices we can employ.

Combined Sewer Overflows

Problem Definition

Combined sewer systems collect sanitary sewage, industrial wastewater and stormwater in a single sewer system. During large rainstorms, total flows can exceed the capacity of sewer collection systems or treatment facilities. When this occurs, the system is designed to overflow to streams, lakes and bays—discharging a combination of untreated sewage and stormwater. Discharges from combined sewer overflows frequently contain large amounts of bacteria,

2 "Watershed Urbanization and the Decline of Salmon in Puget Sound Streams," Horner and May, Salmon in the City Conference, 1998.

pathogens, nutrients, suspended solids and floatable matter. These contaminants can pose public health risks, contribute to shellfish harvest restrictions, and degrade aquatic habitat.

Since the mid-1950s, the U.S. Environmental Protection Agency (EPA) policy and standard engineering practice have been to install separate sanitary and storm sewers for newly developed areas. However, 10 municipalities around Puget Sound have combined sewer systems built prior to that time.[3] Fortunately, all have developed reduction plans that have been approved by the Department of Ecology. Ecology estimates that since 1988, the average annual volume of untreated combined sewer overflow to state waters has decreased from 3.3 billion to 2 billion gallons.[4]

Institutional Framework

Federal and state statutes require stormwater management in the Puget Sound basin. Under the federal Clean Water Act and RCW 90.48, Ecology administers National Pollutant Discharge Elimination System (NPDES) stormwater permits for municipalities, industries, construction sites and the Washington State Department of Transportation (WSDOT). Municipalities with populations over 100,000 are currently covered by NPDES "Phase I" permits. In Puget Sound, this includes King, Pierce and Snohomish counties and the cities of Seattle and Tacoma. Municipalities with populations under 100,000 located in urbanized areas will be covered under "Phase II" permits by March 2003. In addition, a number of other smaller jurisdictions located outside urbanized areas will be reviewed for coverage under this permit. Ecology also maintains the region's stormwater technical manual, which contains minimum technical standards and best management practices for managing stormwater from all new development and redevelopment projects in the basin.

The EPA issues NPDES permits to federal facilities located in Puget Sound.

The recent listing of Puget Sound chinook and chum salmon and bull trout as threatened under the Endangered Species Act has profound implications for the region. The Governor's Salmon Recovery Office published the Statewide Strategy to Recover Salmon in November 1999. King, Snohomish and Pierce counties are also developing a stormwater management framework for federal review.

The *Puget Sound Water Quality Management Plan* calls on all local governments to develop comprehensive stormwater management programs that include the tools described above. The state is to maintain standards, issue permits, and provide assistance, guidance and training. State, federal and tribal governments are to manage runoff from their lands. Cities and counties are to achieve the greatest reasonable reduction in combined sewer overflows. Universities and local, state, federal and tribal governments are to cooperate to conduct research and disseminate findings. Progress will be measured through performance measures and the program will be adjusted as needed.

Program Goal

To protect and enhance the health of Puget Sound's aquatic species and habitat, natural hydrology and processes, and water quality, and to achieve standards for water and sediment quality by managing stormwater runoff and reducing combined sewer overflows.

Program Strategy

The strategy for achieving this goal is to:

a. Develop and carry out local programs that combine land use and watershed planning and comprehensive stormwater management;

b. Maintain minimum technical standards, issue municipal, industrial and construction NPDES permits that are consistent with this program; and provide guidance, technical and financial assistance and training;

c. Manage runoff on state, federal and tribal government land;

d. Achieve the greatest reasonable reduction in combined sewer overflows;

[3] King County and the cities of Anacortes, Bellingham, Bremerton, Everett, Mount Vernon, Olympia, Port Angeles, Seattle and Snohomish.

[4] Department of Ecology, *Brief Sheet on Combined Sewer Overflows*, January 1999.

e. Conduct cooperative research and disseminate findings; and

f. Measure progress through performance measures and adjust the program as needed.

SW-1. Local Government Planning and Stormwater Programs

Local government planning and stormwater management programs are critical components of a strategy to protect Puget Sound. Tools available to local governments include growth management and watershed planning, development regulations, capital investment and stormwater management programs. This element calls on local governments to use all these tools to gain maximum benefit from all these measures.

SW-1.1. Growth Management Planning

Every city and county required to plan under the Growth Management Act (GMA) shall review and revise, as necessary, countywide planning policies, local comprehensive plans and policies, zoning, capital facilities plans and development regulations to ensure that development does not degrade water quality, aquatic species and habitat, and natural hydrology and processes. Cities and counties should also incorporate provisions for managing stormwater into updates of their local shoreline master programs, and should designate appropriate land for future stormwater mitigation purposes. This review shall be completed according to GMA amendment timelines using best available science and shall include:

a. Designating urban growth management areas with appropriate densities and sufficient capital facilities to reduce sprawl;

b. Providing sufficient vegetative buffers and development setbacks in critical areas ordinances to protect riparian zones, shorelines, wetlands and other sensitive areas;

c. Assessing how full build-out according to the comprehensive plan will alter natural hydrology, water quality and aquatic species; and

d. Incorporating measures to retain natural hydrology and processes, such as establishing goals for limiting effective impervious surfaces[5] and preserving open spaces and forests.

SW-1.2. Comprehensive Stormwater Programs for Cities and Counties

Every city and county shall develop and implement a comprehensive stormwater management program. Stormwater programs will vary among jurisdictions, depending on the jurisdiction's population, density, threats posed by stormwater, and results of watershed planning efforts. Cities and counties are encouraged to form intergovernmental cooperative agreements in order to pool resources and carry out program activities most efficiently. Programs shall include:

a. **Stormwater Controls for New Development and Redevelopment[6]** – Adopt ordinances that require the use of best management practices (BMPs) to control stormwater flows, provide treatment, and prevent erosion and sedimentation from all new development and redevelopment projects. Adopt and require the use of the Department of Ecology's stormwater technical manual (or an alternative manual developed under SW-1.3) to meet these objectives. All new development in the basin, particularly new development sited outside of urban growth areas, shall seek to achieve no net detrimental change in natural surface runoff and infiltration.

b. **Stormwater Site Plan Review**–Review new development and redevelopment projects to ensure that stormwater control measures are adequate and consistent with local requirements.

c. **Inspection of Construction Sites**–Regularly inspect construction sites and maintain temporary BMPs according to guidance developed under SW-2 and 3. Adopt ordinances to ensure clear authority to inspect construc-

[5]Effective impervious surfaces are impervious surfaces that are connected via sheet flow or discrete conveyance to a drainage system (adapted from *Stormwater Management in Washington State,* Department of Ecology, Final Draft August 2000).

[6]On an already developed site, the creation or addition of impervious surfaces; the expansion of a building footprint or addition or replacement of a structure; structural development including an increase in gross floor area and/or exterior construction or remodeling; replacement of impervious surface that is not part of a routine maintenance activity; land disturbing activities associated with structural or impervious redevelopment . (*Stormwater Management in Washington State,* Department of Ecology, Final Draft August 2000.)

tion sites, to require maintenance of BMPs and to enforce violations. Provide local inspectors with training under SW-3 on erosion and sediment control practices.

d. **Maintenance of Permanent Facilities**–Adopt ordinances that require that all permanent stormwater facilities be regularly maintained according to guidance developed under SW-2 and 3 to ensure performance. Develop provisions as necessary, such as agreements or maintenance contracts, to ensure that facilities on private land (e.g., residential subdivisions and commercial complexes) are maintained. Provide training under SW-3 for professionals who maintain stormwater facilities.

e. **Source Contro**l–Develop and implement a program to control sources of pollutants from new development and redevelopment projects and from existing developed lands, using BMPs from Ecology's stormwater technical manual. Source control activities shall include pollution from roadways and landscaping activities. Integrated pest management practices shall be used to manage roadside vegetation.

f. **Illicit Discharges and Water Quality Response**–Adopt ordinances to prohibit dumping and illicit discharges. Carry out activities to detect, eliminate and prevent illicit discharges, and respond to spills and water quality violations.

g. **Identification and Ranking of Problems**–Identify and rank existing problems that degrade water quality, aquatic species and habitat, and natural hydrologic processes. Local governments may choose to achieve this through watershed or basin planning (SW-1.2.j) or another process. Conduct a hydrologic analysis and map stormwater drainages, outfalls and impervious surfaces by watershed. Develop plans and schedules and identify funding to fix the problems.

h. **Public Education and Involvement**–Educate and involve citizens, businesses, elected officials, site designers, developers, builders and other members of the community to build awareness and understanding of stormwater and water quality issues. Provide practical alternatives to actions that degrade water quality and biological resources.

i. **Low Impact Development Practices**–Adopt ordinances that allow and encourage low impact development practices. These are practices that infiltrate stormwater (using proper safeguards to protect groundwater) on-site rather than collecting, conveying and discharging stormwater off site. The goals of low impact development practices are to enhance overall habitat functions, reduce runoff, recharge aquifers, maintain historic in-stream flows and reduce maintenance costs. Low impact development provides a variety of benefits, including cost savings and added market appeal, additional green space for recreational users and greater esthetic appeal than traditional facilities. Low impact development practices may not be appropriate for all sites. Low impact principles include:

   i. Maintain the pre-developed, undisturbed stormwater flows and water quality;

   ii. Retain native vegetation and soils to intercept, evaporate and transpire stormwater on the site (rather than using traditional ponds and conveyances);

   iii. Emphasize a higher standard of soil quality in disturbed soils (by using compost and other methods) to improve infiltration, reduce runoff and protect water quality;

   iv. Cluster development and roads on the site and retain natural features that promote infiltration; and

   v. Reduce impervious surface area and use permeable surfaces instead.

   Low impact development projects should include methods to collect and reuse stormwater from rooftops for household reuse (e.g. toilets and washing machines) and for landscape watering.

j. **Watershed or Basin Planning**–Participate in watershed or basin planning processes, such as planning under Chapter 400-12 WAC or Chapter 90.82 RCW, in order to coordinate efforts, pool resources, ensure consistent methodologies and standards, maintain and restore watershed health, and protect and enhance natural hydrology and processes, including natural surface runoff, infiltration and evapotranspiration. Progress in achieving this goal shall include biological monitoring. Cities and counties may choose watershed or basin planning processes to identify

and rank existing stormwater problems, develop a plan and schedule to fix the problems, and set goals for limiting effective impervious surfaces and preserving open spaces and forests. Basin planning should use continuous runoff modeling to simulate existing and potential impacts of land use and water management on natural hydrology. Basin plans shall address water quality, aquatic habitat, groundwater recharge and water re-use. Basin plans may prescribe stronger stormwater management measures to protect sensitive resources in a certain basin or sub-basin. Stormwater management measures in all basins shall at least meet the minimum requirements of Ecology's technical manual. Cities and counties shall incorporate recommendations from watershed or basin plans and specific requirements from Total Maximum Daily Load (TMDL) Water Cleanup Plan processes[7] into their stormwater programs, land use comprehensive plans and site development ordinances.

k. **Funding**–Create local funding capacity, such as a utility, to ensure adequate, ongoing funding for program activities and to provide funding to contribute to regional stormwater projects.

l. **Monitoring**–Monitor program implementation and environmental conditions and trends over time (according to guidance developed under SW-2 and 3) to measure the effectiveness of program activities. Periodically share monitoring results with local and state agencies, citizens and others.

m. **Schedule for Implementation**–Develop an implementation schedule with specific target dates and funding sources to help plan program activities.

SW-1.3. Alternative Technical Manuals

Cities and counties that choose to develop an alternative technical manual (SW-1.2a.) shall submit their manual to Ecology. The submittal shall include an outline of significant differences between the manuals and shall demonstrate how the alternative manual is substantively equivalent to Ecology's. Ecology shall work with jurisdictions to ensure that all alternative manuals meet or exceed the standards in Ecology's technical manual. Jurisdictions choosing to develop an alternative manual shall use Ecology's technical manual in the interim.

SW-1.4. Local Program Evaluation, Reporting and Modification

Cities and counties shall review their monitoring data and program records at least every five years (or according to another schedule approved by the Action Team) to evaluate whether program goals are being met and whether any modifications to the program are needed. Ecology and the Action Team support staff shall work with cities and counties to develop a system to assess regional progress.

Target Dates for SW-1.1 through 1.4: Cities and counties shall revise their stormwater programs to incorporate the elements described above by March 2003, or earlier, according to the requirements and schedule in the municipal NPDES permit. (Under the *1994 Puget Sound Management Plan*, jurisdictions were to have adopted basic stormwater programs by 1995.) All alternative manuals shall be completed by March 2003.

SW-2. Stormwater Technical Manual and Federal Permits

A single technical stormwater manual for the region provides uniform standards and a central repository for BMPs. Ecology will maintain the region's technical stormwater manual, and issue and oversee National Pollutant Discharge Elimination System (NPDES) permits for municipalities, industries and construction activities.

SW-2.1. Stormwater Technical Manual

Ecology shall maintain a stormwater technical manual for new development and redevelopment with overall goals of protecting and restoring aquatic species and habitat, water quality and natural hydrology and processes, including achieving no net detrimental change in natural infiltration and surface runoff, particularly for new development

[7]The Total Maximum Daily Load (TMDL) or Water Cleanup Plan process is established by section 303(d) of the Clean Water Act. Federal law requires states to identify sources of pollution in waters that fail to meet state water quality standards, and to develop Water Cleanup Plans to address those pollutants. The Water Cleanup Plan establishes limits on pollutants that can be discharged to the water body and still allow state standards to be met (Department of Ecology).

sited outside of urban growth areas. The manual shall:

a. Encourage use of stormwater as a resource to recharge aquifers, streams and wetlands and maintain the natural hydrology of the watershed;

b. Incorporate recent research findings regarding techniques for stormwater management including low impact development practices; need for and feasibility of matching predeveloped surface runoff, infiltration and evapotranspiration; recommended percentages for maintaining forest cover and limiting impervious surfaces; and effects of urbanization and stormwater runoff on aquatic resources;

c. Discuss the relationship of the technical manual to local, state and federal regulations;

d. Describe the role of local land use planning in effective stormwater management and suggest guidance materials such as those developed by the Office of Community Development (OCD);

e. Provide minimum technical requirements for all new development and redevelopment;

f. Provide standards for the design, operation and maintenance of public and private temporary and permanent stormwater facilities and structures;

g. Provide a design storm and hydrologic runoff model to estimate runoff;

h. Provide BMPs for:

   i. Controlling erosion and sedimentation from construction activities (including methods to ensure that disturbed, post-construction soils possess a minimum level of quality);

   ii. Controlling and infiltrating stormwater flow with proper safeguards to protect groundwater, to protect natural hydrology and processes and maintain adequate stream flows;

   iii. Treating and removing pollutants;

   iv. Controlling sources of pollutants;

   v. Low impact development practices (see SW-1.2i);

   vi. Innovative land clearing practices, including clearing in sections and preserving forests, vegetation and open spaces; and

   vii. Collecting and using stormwater from rooftops for household uses (e.g. toilets and washing machines) and for landscape watering.

i. Provide guidance on preparing stormwater site plans, selecting BMPs and strengthening minimum requirements through watershed or basin planning, and monitoring; and

j. Provide performance standards for BMPs.

SW-2.2. Performance Standards for BMPs

Ecology, in cooperation with the American Public Works Association (APWA), local governments, universities and the Washington State Department of Transportation (WSDOT), shall develop performance standards for BMPs currently approved in the technical manual. Ecology shall include performance standards in future updates of the technical manual. Groundwater shall be protected in accordance with Ecology's Underground Injection Control Program.

SW-2.3. New and Experimental BMPs

Ecology, in cooperation with the APWA, local governments, universities and WSDOT, shall develop protocols for evaluating and reviewing new and experimental BMPs. Entities conducting research on the effectiveness of BMPs under this element and SW-7 shall follow these protocols. Ecology shall periodically distribute supplemental information on BMPs to local governments, state agencies, tribal governments, businesses and others.

SW-2.4. Revisions to the Technical Manual

Ecology shall convene a committee at least once every five years to review continued adequacy of the technical manual. The committee shall include representatives from local, state, federal and tribal governments, non-profit groups, business and citizens. National experts shall also be consulted. Based on the review, Ecology shall update portions of the technical manual to ensure that the manual continues to reflect the best approaches to stormwater management.

SW-2.5. National Pollutant Discharge Elimination System Stormwater Permits

Ecology shall issue NPDES stormwater permits for municipalities, construction sites and industries as required by state and federal regulations. In deter-

mining whether small municipalities outside of census urbanized areas must obtain municipal stormwater permits, Ecology shall develop criteria to evaluate whether stormwater discharges result in or have the potential to result in exceedances of water quality standards, including impairment of designated uses, or other significant water quality impacts, including habitat and biological impacts. The evaluation criteria shall be based on a balanced consideration of the following criteria on a watershed or other local basis: discharge to sensitive waters; high growth or growth potential; high population density; contiguity to an urbanized area; significance of the contribution of pollutants to waters of the United States; and the effectiveness of protection of water quality by other programs. Ecology shall ensure that all municipal permits issued for Puget Sound cities and counties are consistent with the elements described in SW-1.2. Before issuing permits, Ecology shall consult with interested parties that include permittees, local, state, federal and tribal governments, businesses, environmental groups and citizens.

Target Dates for SW-2.1 through 2.5: Ecology shall begin issuing performance criteria and protocols for evaluating new BMPs starting in June 2001. Ecology shall reissue federal NPDES phase I municipal permits by April 2001 and issue NPDES phase II municipal permits to Puget Sound jurisdictions by December 2002. Ecology shall conduct a review of the technical manual at least every five years, starting in 2005.

SW-3. Guidance, Assistance and Training

Cities and counties will need assistance to develop effective local stormwater programs. The state will help by developing additional guidance and model ordinances, and providing technical and financial assistance (see the Estuary Management Program for financial assistance). A broad-based committee will regularly assess training needs and make recommendations for new or enhanced training.

SW-3.1. Guidance

Ecology, OCD, the Department of Fish and Wildlife and the Action Team support staff, with advice from local governments and WSDOT, shall periodically review existing guidance and develop additional guidance as necessary to ensure that guidance is available to cities and counties developing local programs under SW-1. Guidance shall be available on:

a. Adopting ordinances and development regulations;
b. Adopting stormwater utilities;
c. Educating and involving the public;
d. Land use planning to protect sensitive areas and aquatic resources;
e. Minimizing impervious surfaces on individual sites and throughout watersheds;
f. Using low impact development practices to treat and infiltrate runoff on site;
g. Preserving trees and native vegetation;
h. Inspecting and maintaining stormwater facilities;
i. Implementing a source control program;
j. Handling and disposal of street waste;
k. Monitoring program effectiveness and environmental response;
l. Prioritization science together with cost-benefit analysis; and
m. Use of alternative mitigation policy that does not jeopardize water quality standards.

Ecology, OCD, the Governor's Salmon Recovery Office, Fish and Wildlife, WSDOT and the Action Team support staff shall develop guidance on ranking existing stormwater problems that degrade water quality and fish and wildlife habitat. Ecology, in cooperation with area businesses, shall develop guidance for businesses covered by NPDES stormwater permits.

SW-3.2. Model Ordinances

Ecology and the Action Team support staff, with advice from local governments, shall ensure that model ordinances are available to cities and counties that are developing comprehensive programs under SW-1.2.

SW-3.3. Technical Assistance

The Action Team support staff shall coordinate state technical assistance to cities and counties that are developing comprehensive stormwater programs. State agencies providing technical assistance shall include Ecology, OCD, Fish and Wildlife and the Action Team. Ecology shall provide technical assistance to industries that are implementing NPDES stormwater permits.

SW-3.4. Training

The Action Team support staff shall convene a committee at least every two years to assess current training opportunities and make recommendations to the Council and Action Team on the need for additional training for local government staff, the building community and others on stormwater management techniques. The committee shall include universities, local governments, Ecology, OCD, Fish and Wildlife and WSDOT.

SW-3.5. Public Educational Materials

The Action Team, Ecology, OCD, Fish and Wildlife and other state agencies shall develop and distribute educational materials related to this program to the general public, local governments, businesses and others.

SW-3.6. Agency Coordination and Permit Streamlining

State and local agencies that issue stormwater-related permits (e.g., NPDES permits, Hydraulic Project Approvals), with the assistance of Action Team support staff, shall seek opportunities to coordinate efforts and streamline the permitting process.

Target Dates for SW-3.1 through 3.6: Additional guidance and model ordinances shall be made available to cities and counties beginning June 2001. The Action Team support staff shall convene a committee to discuss training needs and develop recommendations every two years, beginning in June 2001.

SW-4. Stormwater Runoff from State Highways

Runoff from state highways can have a significant effect on the Sound's water quality and biological resources. WSDOT can avoid or mitigate these effects through project planning, controls at construction sites, operation and maintenance, research, interagency coordination and retrofit of existing facilities.

SW- 4.1. Highway Runoff Program

WSDOT, in consultation with Ecology, Fish and Wildlife, the Department of Natural Resources (Natural Resources), local governments and the Action Team support staff, shall develop and carry out a program to manage stormwater runoff from all state highways that includes:

a. Methods to ensure that stream channels, and aquatic species and their habitat are protected and stream crossings are minimized;
b. Implementation of a federal NPDES permit;
c. Adoption and use of a stormwater technical manual that has been approved by Ecology;
d. Regular inspection of construction sites and use of BMPs to control erosion;
e. Regular maintenance of temporary and permanent stormwater facilities and structures;
f. Improvement of existing facilities when roadways are redeveloped;
g. Identification and ranking of existing stormwater problems that degrade water quality and fish and wildlife habitat, and planning and scheduling to fix these problems;
h. Recognition of stormwater as a resource to recharge aquifers, streams and wetlands;
i. Use of low impact development practices, when appropriate, to treat and infiltrate runoff on site rather than collecting and conveying the runoff off site;
j. Preservation of native vegetation, use of permeable surfaces and use of amended soils to improve infiltration;
k. Use of integrated pest management practices to manage roadside vegetation;
l. Activities to respond to spills and water quality violations;
m. An implementation schedule; and
n. Monitoring to measure program implementation and environmental response.

WSDOT shall phase in the technical standards of Ecology's technical manual once it is adopted, in accordance with the NPDES permit schedule and with accommodation to the project development process. Ecology shall review and approve the WSDOT manual to ensure that it is technically equivalent to Ecology's manual for the basin.

SW-4.2. NPDES Permit

Ecology, in consultation with WSDOT, Fish and Wildlife, Natural Resources, local governments and the Action Team support staff, shall revise the NPDES permit according to a schedule determined by Ecology and in accordance with federal law.

SW-4.3. Puget Sound Highway Runoff Rule

Ecology, in consultation with WSDOT, Fish and Wildlife, Natural Resources, local governments and the Action Team support staff, shall review the Puget Sound Highway Runoff Rule (Chapter 173-270 WAC) and revise it as necessary.

SW-4.4. WSDOT Research

WSDOT shall continue and expand its efforts to research and demonstrate improved methods for managing stormwater from state highways and roads, and integrate findings from the National Cooperative Highway Research Program. WSDOT shall participate in and share research findings with state, federal and tribal governments as described in SW-7.

Target Dates for SW-4.1 through 4.4: WSDOT shall implement a stormwater management program for state highways according to a schedule determined by federal NPDES stormwater permit deadlines and Ecology. WSDOT shall phase in the technical standards of Ecology's technical manual once it is adopted, in accordance with the NPDES permit schedule and with accommodation to the project development process. Ecology shall review the Puget Sound Highway Runoff Rule by December 2001 and revise it as necessary.

SW-5. Runoff from Federal Facilities and Tribal Lands

Federal and tribal governments manage a significant portion of land area in the Puget Sound basin, including military bases and tribal reservations. The same practices that are used to manage stormwater on private and state lands can be used effectively on federal and tribal lands.

SW-5.1. Runoff from Federal Facilities

Managers of federal facilities shall control stormwater runoff on federal lands according to practices outlined in SW-1.2 and use Ecology's stormwater technical manual. The Environmental Protection Agency (EPA) shall ensure that all NPDES permits issued to federal facilities, including military bases, are at least as stringent as municipal, industrial and construction NPDES permits issued by Ecology. The EPA shall review and modify, as necessary, existing permits to ensure that these requirements are included. Federal facilities shall conduct monitoring to measure program implementation and environmental response and periodically evaluate and modify their programs as necessary.

SW-5.2. Runoff from Tribal Lands

Tribal governments shall manage stormwater runoff on tribal lands consistent with the practices described in SW-1.2. Tribal governments shall conduct monitoring to measure program implementation and environmental response and periodically evaluate and modify their programs as necessary.

The EPA Region 10 Indian Programs Office shall provide technical and financial assistance to help tribal governments develop effective stormwater management programs.

Target Dates for SW-5.1 through 5.2: Ongoing.

SW-6. Reducing Combined Sewer Overflows

Combined sewer overflows (CSOs) can significantly degrade the Sound's water quality and biological resources. Jurisdictions with CSOs will continue to reduce the number of CSO events to meet state standards.

SW-6.1. Local Reduction Plans

Cities and counties with CSOs shall continue to carry out reduction plans that have been approved by Ecology under Chapter 173-245 WAC. The goal of these plans shall be to meet state objectives for achieving the greatest reasonable reduction of combined sewer overflows at the earliest possible date. Greatest reasonable reduction has been defined in Chapter 173-245 WAC as no more than one overflow event per year. Ecology shall define "CSO event" with input from local, state and federal agencies, tribes, environmental groups, businesses and citizens. Reduction plans shall include sampling of receiving water sediments adjacent to each CSO to determine the presence and extent of potential contaminants, as called for by Chapter 173-245 WAC. Jurisdictions shall provide Ecology with data concerning the number of discharges and volume discharged from each CSO, and shall assess the effectiveness of their reduction plans to date.

Jurisdictions that choose to separate stormwater as a reduction technique shall use treatment BMPs, a source control program, and monitoring to ensure that aquatic resources are protected. When a jurisdiction has reduced CSOs to an average of one overflow event per year, Ecology shall consider reducing monitoring requirements to frequency of overflow events as per Chapter 173-245 WAC. Ecology shall continue to review and approve new or modified CSO reduction plans as needed.

SW-6.2. Combined Sewer Overflow Reduction Guidance

Ecology shall review the existing CSO Reduction Guidance at least once every five years to ensure that the guidance continues to reflect best science and current research findings. Ecology shall involve local, state, federal and tribal governments and members of the public in this review.

Target Dates for SW-6.1 through 6.2: Ecology shall review the CSO Reduction Guidance at least once every five years starting in 2002.

SW-7. Research

A broad-based committee will assess research needs and share research findings on a biennial basis to ensure that the region continually increases its understanding of stormwater management and resource protection.

SW-7.1. Review of Research Needs

The Action Team support staff shall convene a committee at least once every two years to assess research needs and make recommendations to the Council and Action Team regarding the need for new or enhanced research efforts. The committee shall include representatives from universities; local governments; Ecology, Fish and Wildlife, WSDOT, OCD, EPA and tribal governments.

SW-7.2. Cooperative Research Activities

Universities, non-profit organizations and local, state, federal and tribal governments that carry out research related to stormwater management shall seek opportunities to cooperate and collaborate with one another on research projects. These groups shall share research findings with one another through organizations such as the APWA Stormwater Managers Group and at conferences such as the Puget Sound Research Conference.

Research shall include:

a. Low impact development practices to treat and infiltrate runoff on site rather than collecting and conveying runoff off site;
b. Percentage of forest cover needed to protect streams and aquatic resources; need for and feasibility of matching pre-developed surface runoff, infiltration and evapotranspiration; and effectiveness of the current design storm in meeting goals;
c. Improved measures to control erosion from construction sites;
d. Effectiveness of best management practices such as long-term effects on hydrology and groundwater, including summer low flows and groundwater recharge; and
e. Effects of stormwater on wetlands, streams and aquatic species.

Research findings shall be submitted for peer review to appropriate organizations, including universities, APWA and local, state, federal and tribal governments.

SW-7.3. Sharing of Research Findings

The Action Team support staff, in cooperation with universities, local, state, federal and tribal governments, environmental organizations and the development community, shall coordinate workshops at least every two years to share research findings.

SW-7.4. Using Research Findings to Improve the Stormwater Program

State and local governments shall use research findings to improve local programs (SW-1), the technical manual and NPDES permits (SW-2), programs to control runoff from state highways, (SW-4) and CSO reduction plans (SW-6). Federal and tribal governments shall use research findings to improve stormwater management practices on their lands (SW-5). Businesses shall use research findings to improve their practices (SW-2).

Target Dates for SW-7.1 through 7.4: The Action Team support staff shall convene committees to assess research needs and share research findings every two years, beginning in July 2001.

SW-8. Measuring Program Effectiveness

The Puget Sound Action Team support staff shall evaluate program results through use of program and environmental performance measures. This supports the adaptive management approach described in the Estuary Management Program of the *Puget Sound Management Plan*. At a minimum, these evaluations should incorporate information from the following monitoring and assessment sources.

a. Program measures that track implementation of this program:

- Adoption of local comprehensive stormwater programs;
- Timely issuance of federal stormwater permits; and
- Reduction of combined sewer overflows.

b. Case studies that assess the effectiveness of program actions:
   - Findings of local government monitoring as called for in SW-1.

c. Performance of environmental conditions for which this program is a major or important determinant (recognizing that these measures may be affected by several plan programs):
   - Area of sediments that exceeds sediment management standards;
   - Extent of toxic contamination, as measured by liver lesions in fish;
   - Changes in conditions and classifications of shellfish growing areas that are affected by stormwater runoff;
   - Surface waters listed on the state's 305(b) list due to stormwater runoff; and
   - Percentage of salmon streams with flows that, over time, closely mimic natural conditions (from the Governor's Salmon Recovery Scorecard).

Education and Public Involvement Program

Directory of Program Elements

Problem Definition

Protecting the health of Puget Sound requires an ongoing commitment from everyone—as individuals at home, work and play and as members of our communities where we influence others. Because many of the solutions to Puget Sound's problems must occur through individual action, education and public involvement are integral to a long-term management strategy for Puget Sound. Education is the key to giving people the knowledge they need to understand how their behavior impacts the soil, groundwater, habitat and water in Puget Sound. Public involvement opportunities allow people to voice their concerns about environmental issues that affect their communities. Government officials can use this information to determine how to manage and protect Puget Sound.

The public must have access to accurate, credible information about the Puget Sound ecosystem. Conveying information about the Sound in an engaging and understandable way while doing justice to its complexity is difficult. The resolution of many of the tough issues we face—threatened fish species, stormwater management and habitat loss—depends on how well the public and the official they elect understand complex interconnections.

A 1998 survey by the National Environmental Education and Training Foundation revealed that many Americans do not understand how their behavior impacts the environment. According to the survey:

- Only 23 percent knew that stormwater runoff is the leading cause of water pollution.
- Sixteen percent knew that do-it-yourself oil changes are the leading source of oil entering surface waters.
- Most people in the survey assumed that factories, landfills, barges and refineries were causing pollution—not themselves.

The survey also showed that people who understand their role in water pollution are more likely to engage in behaviors to reduce pollution.

Programs must be designed to fulfill the needs and concerns of the people we are trying to reach. The school reform movement has motivated schools to place primary focus on basic skills. Environmental education curricula for K-12 must integrate the state learning requirements in basic

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

subject areas before teachers can justify spending time on it. Programs that do not address cultural and ethnic diversity will fail to reach significant segments of the population.

In the past 10 years, federal, state and local government agencies, environmental groups, schools and concerned citizens in the Puget Sound area have developed numerous education and stewardship programs. Coordination to encourage more efficient use of resources remains a challenge. Although education is recognized as the best way to motivate voluntary behavioral changes, many programs struggle with funding. Resources are wasted as groups around the Sound reinvent the same wheels.

Informed citizens transfer knowledge into actions to protect the Sound. The collective actions of all citizens will determine whether we can meet the challenges of an expanding population in a way that sustains the health of Puget Sound and protects the quality of life we value.

Institutional Framework

Involving the public through environmental education programs and policy making is a key tool in the management of Puget Sound. Dozens of education and stewardship projects are operating in the Puget Sound basin. Government agencies at the federal, state and local levels have allocated more resources toward education and have reorganized their education efforts to better serve agency missions and resource management goals. The listing of Puget Sound chinook, Hood Canal chum and bull trout has done much to mobilize government and non-profit groups to coordinate efforts to benefit salmonid species habitat.

When the Public Involvement and Education program (PIE) was launched in 1987, it was one of the first programs to provide support for local stewardship projects. Since then, the PIE format has been reproduced in many communities and has provided guidance for hundreds of projects. Vigorous public and private sector efforts by local government, People for Puget Sound, Adopt a Beach, the Conservation Districts, Sea Grant, Washington State University (WSU) Cooperative Extension, and schools have provided meaningful stewardship opportunities for citizens through PIE partnerships and on their own.

The *Puget Sound Water Quality Management Plan* advocates local and regional coordination. The Governor's Council on Environmental Education supports and coordinates State environmental education programs. The Governor's scorecard for restoring salmon lists volunteers as an indicator to help assess efforts to restore salmon, steelhead and trout populations. Field agents and local liaisons help to coordinate local programs.

The Office of the Superintendent of Public Instruction has developed a framework for environmental education that complies with the State Essential Learning Requirements. Agencies are learning to create curricula that meet these standards. Curricula such as Project WET and Aquatic Wild meet state academic requirements and are frequently adapted for use in the Puget Sound region. The Environmental Education Association of Washington and Northwest Aquatic and Marine Educators are two organizations comprising teachers, agency staff, and community educators that promote quality environmental education in the Puget Sound basin.

Environmental education and stewardship programs are becoming more inclusive of all segments of society in the Puget Sound Basin, though much is still targeted too narrowly. Many PIE projects have been implemented by culturally and ethnically diverse groups who provide valuable insights into how programs can reach more people. These pilot programs have potential for wider use throughout the basin.

Communicating accurate information about Puget Sound helps build a long-term foundation of knowledge in the public. Many federal, state, local and tribal agencies collect information about Puget Sound but efforts to make the data understandable and accessible to the public are challenging. Data obtained from the Action Team's Puget Sound Ambient Monitoring Program are published in a tabloid and distributed in major newspapers in the basin. Newsletters and websites produced by state agencies and non-profits distribute information that helps to protect Puget Sound. Aquariums, zoos, and universities are increasingly using their resources and skills to educate the public about Puget Sound.

To keep up with the impacts from population growth and the influx of new people into the area, it is important to make accurate information, quality education, and stewardship opportunities available to the public. The *Puget Sound Management Plan* provides guidance for building cooperative partnerships that protect Puget Sound through education and public involvement.

Program Goal

To support, improve and sustain regional education and public involvement programs that

a. Inform, educate and involve individuals, groups, businesses, industry and government in the cleanup and protection of Puget Sound;
b. Increase understanding of the Sound's ecosystem; and
c. Create the commitment necessary to improve and protect water quality over the long term.

Program Strategy

The strategies for achieving this goal include:

a. Creating a public involvement policy for agencies and local governments;
b. Helping state agencies and tribal governments coordinate education programs on marine and freshwater habitats, water quality policy issues and volunteer action;
c. Hiring field agents to coordinate among local and regional education and public involvement programs; and
d. Administering a PIE Fund to support short-term public involvement and education efforts in both the private and public sectors.

EPI-1. Education and Public Involvement Guidelines

EPI-1.1. Public Involvement Policy

The public involvement policies established in this element shall be followed by all state agencies and local and tribal governments in implementing the *Puget Sound Water Quality Management Plan*. The Action Team support staff shall monitor public involvement activities of agencies implementing the management plan.

The policies are as follows:

a. A broad representation of the public shall be consulted in developing and adopting rules, establishing criteria, setting guidelines, selecting sites or target areas, developing action plans and carrying out other activities related to the *Puget Sound Management Plan*.
b. A variety of public involvement techniques shall be used. Where advisory or review committees are deemed helpful to provide public involvement in the implementation of the management plan, existing standing committees or commissions and established processes and procedures for local comprehensive plans should be evaluated and improved where possible rather than creating new committees. However, new or additional committees or processes should be created if necessary to achieve full public involvement. Agencies shall consider reimbursing travel expenses of members of advisory bodies.
c. Agencies shall allocate adequate staff resources to their public involvement programs. Agency staff responsible for public involvement shall receive training in public involvement techniques and skills.
d. State and federal agencies and local and tribal governments shall use public information techniques that exceed requirements for legal notice or publication in the Federal or State Register to ensure that: (1) public information on decisions to be made or actions to be taken for the management plan is complete and understandable; (2) the effects of the proposed decision or action, especially on special groups or geographic areas, are fully described; (3) the ways in which the public might be affected by the decision or action are fully presented; and (4) the ways in which the public may influence the decision-maker and appeal the decision are explained.
e. To facilitate access to decision-making processes, state agencies and local and tribal governments shall send notification for public hearings or meetings as early as possible, shall seek to provide both day and evening meetings and hearings and shall explain how public comment was incorporated into decisions and actions. For decisions affecting a large geographic area, meetings and hearings shall be held at locations throughout the area.
f. To facilitate understanding of decision making and management plan programs, the Action Team support staff and other agencies shall communicate clearly and simply using lay language whenever possible.
g. To involve tribal governments in the deci-

sion-making process, agencies shall follow the Centennial Accord. Local governments shall communicate with tribal governments to determine the most effective mechanism for intergovernmental communication on any programs or projects related to the management plan. Tribal governments shall follow the Centennial Accord.

Target Date for EPI-1.1**:** Ongoing.

EPI-1.2. Technical Assistance on Public Involvement

The Action Team support staff, the Department of Ecology, Washington State University (WSU) Cooperative Extension and the Office of Community Development (OCD) shall provide technical assistance on public involvement for local government staff and elected officials. Technical assistance shall include developing materials, providing training and making recommendations. Training topics shall include consensus-building, conflict management and ways to use volunteers.

These agencies shall support citizen groups by opening their public involvement training sessions to citizens whenever possible. Citizens shall have the opportunity to receive training in public involvement related to federal, state and local permit processes, and ways to organize and maintain effective volunteer groups.

Target Date for EPI-1.2: The Action Team support staff's technical assistance and monitoring is ongoing. The Action Team support staff, WSU Cooperative Extension, OCD and Ecology shall be organized to provide coordinated technical assistance, as funding is available.

EPI-1.3. Ecology Coordinator and Mailing List Brochure

Ecology shall maintain a public involvement coordinator who shall be responsible for coordinating public involvement activities related to Ecology's responsibilities under the management plan. Ecology shall periodically update the brochure describing the various mailing lists maintained within the agency, defining the purpose of each and giving instructions on how to get on each list.

EPI-1.4. Short Course on Local Planning

OCD and the Action Team support staff shall develop materials for use in training programs. The materials shall include information about integrating water quality protection into comprehensive plans developed under the Growth Management Act and other land-use planning processes as appropriate.

Target Date for EPI-1.3 - 1.4: Ongoing.

EPI-1.5. Education Guidelines

The following guidelines shall be used in developing programs as part of the long-range strategy for education and public involvement:

a. Support activities that develop an ethic that promotes protecting Puget Sound as a treasure.
b. Move beyond the "us versus them" attitude and emphasize water quality as being in everyone's self-interest.
c. Develop mechanisms for cooperation among the public sector, private sector and educational institutions.
d. Promote a sense of place by focusing on local issues and resources and how they relate to the larger picture.
e. Emphasize interesting, innovative activities that involve people, put them in charge of decisions and lead to local action.
f. Provide people with solutions and things they can do, including adaptation of successful Public Involvement and Education (PIE) projects.
g. Include concrete goals that will visibly demonstrate progress and success.
h. Include connection with an ongoing information base that provides accurate information on Puget Sound issues. Build on existing programs.
i. Improve coordination and cooperation among the education and public involvement resources and activities of federal, tribal, state and local governments.
j. Design and organize activities, training and information tailored to the target audience.
k. Include youth.
l. Concentrate resources at the local level but include a Soundwide entity or process to provide common direction, standards and coordination for local actions.
m. Include an ongoing public awareness campaign to support and connect education and public involvement activities.

n. Conduct educational activities in a variety of settings, both regulatory and non-regulatory.

o. Have clear goals and objectives and a built-in means of evaluating and modifying the strategy for achieving them.

p. Include scientific review of materials and information when appropriate.

q. Reflect the diversity of existing and past cultural values for and uses of Puget Sound.

Target Date for EPI-1.5: Ongoing.

EPI-2. Coordination Mechanisms

EPI-2.1. Local Coordination: Field Agents

Together, the Washington Sea Grant Program, WSU Cooperative Extension and the Action Team support staff shall provide regional field agents to help coordinate and implement local and regional education and public involvement efforts to implement the management plan with an emphasis on working with local governments and communities.

To accomplish this, the regional field agents shall:

a. Assist local government staff and elected officials and communities in developing, implementing and evaluating education and public involvement activities or programs that are related to Puget Sound water quality.

b. Provide assistance to the Action Team's outreach efforts and to local communities working on Puget Sound action campaigns.

c. Facilitate citizen participation in local, state and national water quality issues.

d. Assist local shellfish protection districts, clean water districts and watershed committees.

e. Coordinate local programs with regional and state programs.

f. Facilitate the transfer of university-based research and other appropriate information and technology to local communities.

g. Facilitate communication of community research needs to appropriate university programs.

h. Meet regularly with the Action Team support staff to coordinate activities for implementing the management plan.

In consultation with the Action Team support staff and local governments, field agents will develop biennial work plans that reflect assignments in this sub-element.

Field agents shall coordinate their work with tribal government field agents described below.

Target Date for EPI-2.1: The Washington Sea Grant Program and WSU Cooperative Extension shall hire field agents when funding becomes available. By 1996 there shall be 18 field agents in the region.

EPI-2.2. Tribal Government Coordination: Field Agents

The Action Team shall provide funds for tribal governments to establish field agents who will conduct education and public involvement programs related to implementation of the *Puget Sound Management Plan* and in coordinating with other education and public involvement programs. Specific responsibilities of the tribal field agents shall include those listed for Puget Sound field agents above (element EPI-2.1): facilitating tribal involvement; facilitating funding for tribal governments; providing technical assistance and training; coordinating tribal programs with regionwide or statewide programs; working with watershed management committees and evaluating programs. Tribal field agents shall meet regularly with Puget Sound field agents.

The Action Team support staff, Washington Sea Grant, WSU Cooperative Extension and tribal governments shall meet to determine the guidelines for: tribal applications to receive funds under this program, including provisions to ensure participation in the program by small tribes; and coordination among tribal governments, Washington Sea Grant and WSU Cooperative Extension to implement and operate this program. The program shall be operated in conjunction with element EPI-2.1 in order to meet the needs of specific tribal and local governments while accommodating some regionwide goals and activities. Implementation of the program shall be contingent upon Washington Sea Grant and WSU Cooperative Extension receiving funds to coordinate the local field agents with the tribal field agents.

Target Date for EPI-2.2: The equivalent of six full-time tribal field agents shall be hired by December 30, 1991.

EPI-2.3. State Coordination: Governor's Council on Environmental Education

The Governor's Council on Environmental Education (GCEE), comprising agency staff from

the Washington departments of Agriculture, Ecology, Fish and Wildlife, and Health, the Interagency Committee for Outdoor Recreation, the State Parks and Recreation Commission, the Puget Sound Water Quality Action Team support staff, WSU Cooperative Extension, University of Washington Sea Grant, the Washington State Energy Office, Environmental Protection Agency (EPA) Region 10, the Commissioner of Public Lands and the Superintendent of Public Instruction, should:

a. Establish a clearinghouse for education and public involvement information produced by state agencies that relates to Puget Sound and water quality;
b. Serve as a forum for coordination of state agency programs that fund water quality and environmental education;
c. Coordinate educational and interpretive services to the public on state-owned lands and at state facilities in Puget Sound, with emphasis on education about watersheds and opportunities for existing volunteer groups to work together in watershed stewardship activities.

Target Date for EPI-2.3: Program assistant position to serve as clearinghouse coordinator funded beginning July 1, 1995.

EPI-2.4. Agency Coordination and Education Coordinators

The departments of Ecology, Fish and Wildlife, and Natural Resources, the State Parks and Recreation Commission, WSU Cooperative Extension, and Washington Sea Grant will designate staff to coordinate education programs related to Puget Sound within each agency and among agencies. The coordinators will ensure that agency education programs related to Puget Sound are consistent with the direction of the statewide program of each agency. Specific responsibilities of the coordinators include coordinating the agency's education resources with those of other agencies to develop the training teams for volunteer audiences, the waste reduction and habitat protection programs for business and industry audiences, the cooperative interpretive programs for general audiences, programs for the schools, agency participation in the GCEE (element EPI-2.3), and agency participation in the *Puget Sound Management Plan* coordination and evaluation meetings (element EPI-2.6).

Target Date for EPI-2.4: Ecology and WSU Cooperative Extension have hired education coordinators. Other agencies shall hire coordinators as funding becomes available.

EPI-2.5. School Coordination: Office of Environmental Education

The Office of Environmental Education of the Superintendent of Public Instruction shall support and improve K-12 environmental education in the Puget Sound region. Specifically, the office shall provide assistance to Puget Sound school districts and educational service districts to incorporate habitat, wetland, watershed, water quality and marine education into the K-12 curriculum and develop pre-service and in-service training opportunities for teachers emphasizing interdisciplinary curriculum design and adaptation of existing teaching materials to fit local educational goals and water quality issues.

Target Date for EPI-2.5: Ongoing.

EPI-2.6. Puget Sound Management Plan *Coordination and Evaluation: Meetings*

The Action Team support staff shall convene a meeting each biennium in which educators and program staff will advise the agency on effective strategies for education and public involvement programs related to the *Puget Sound Management Plan*. The meetings will provide an opportunity for education and public involvement program staff to discuss program needs that might be met with resources or ideas from other programs, timing and coordination issues, and techniques for evaluating programs. The meetings will be widely advertised to local governments, tribal governments, nonprofit groups, and business and industry.

Target Date for EPI-2.6: Ongoing.

EPI-2.7. Coordination Among Federal Agencies

Implementers of Puget Sound education programs focused on water quality who work with one or more federal agencies should consult with agency representatives on the Federal Educators' Consortium.

Target Date for EPI-2.7: Ongoing.

EPI-3. Programs Tailored to General Audiences

EPI-3.1. State Interpretive Programs

For each topic or issue that would benefit from interpretive programs or projects (as opposed to major interpretive centers), the GCEE shall designate a lead agency to develop a pilot interpretive project. The purpose of the pilot interpretive project shall be to identify the issues, perspectives, controversies, expertise and educational approaches held across agencies on that topic or issue. After a comprehensive interpretive approach has been identified, agencies may subsequently undertake interpretive projects on their own, using the knowledge gained through the pilot project.

The lead agency shall convene a committee including representatives from the private and public sectors and tribal governments. Lead agencies are already designated for those topics listed below:

Watersheds and Fish Habitat. Fish and Wildlife shall convene a committee to develop a model watershed interpretive program at hatcheries that are easily accessible to visitors.

Shellfish. Fish and Wildlife shall convene a committee to develop an interpretive program for shellfish.

Wetlands. Ecology shall convene a committee to develop an interpretive program for wetlands.

Contaminated Sediments. Ecology shall convene a committee to develop an interpretive program for contaminated sediments.

The resulting materials shall be maintained and made available to educators, the media and the public.

Target Date for EPI-3.1: As funding becomes available.

EPI-3.2. Washington State Ferries

The Washington Department of Transportation (WSDOT) shall implement a program on the Washington State Ferries system. The program shall train volunteers to make presentations on topics directly related to Puget Sound, such as the history of the ferry system, ports, marine resources and protection of Puget Sound.

Target Date for EPI-3.2 No target date established.

EPI-3.3. Wildlife Habitat Education

Fish and Wildlife, in cooperation with State Parks, shall implement a program to introduce wildlife education at state parks and other recreational settings. The program shall promote understanding of the habitats for marine, freshwater and upland wildlife by adapting hands-on activities from existing programs, many of them from K-12 curriculum. Fish and Wildlife shall work with State Parks to provide training to park rangers. Fish and Wildlife and State Parks shall provide stipends for facilitators of the various programs, such as Project Wild, so that teachers may be trained to implement these. State Parks shall coordinate the educational activities of the rangers and the facilitators operating at state parks.

Target Date for EPI-3.3: Ongoing as funding is available.

EPI-3.4. Interpretive Centers

The Action Team support staff shall provide funding to existing interpretive centers around the Sound to support staff development and training, workshops, displays and interpretive activities on Puget Sound. The Action Team support staff shall provide interpretive centers with information from which interpretive centers can design displays or programs. The Action Team support staff and the Office of Environmental Education shall publicize the schedules and activities of interpretive centers on a regionwide basis.

Using a geographic information system (GIS), the Action Team support staff may create three-dimensional representations of Puget Sound bays or marine water bodies portraying the local information from the Puget Sound Ambient Monitoring Program (PSAMP) and the past and/or current research efforts occurring in that location. These representations shall be distributed to a local interpretive center in order to educate citizens about the PSAMP and the Research Program.

Target Date for EPI-3.4: Ongoing as funding becomes available.

EPI-3.5. New Interpretive Centers

The Action Team support staff may initiate a process to establish new interpretive centers that would fill both geographical and topical gaps in interpretive activities related to the Sound.

EPI-4. Programs Tailored to Volunteer Audiences

State agencies and local governments shall support and utilize the interest and expertise of volunteers who wish to protect or enhance Puget Sound water quality and habitats, and who wish to educate their communities on related issues. Toward this purpose, state and local agencies shall fund and utilize the field agents described in EPI-2.1 and shall notify volunteers of funding opportunities through programs such as the PIE Fund (EPI-8.1).

The Washington Sea Grant Program and WSU Cooperative Extension, in cooperation with the GCEE, shall create an advanced program for Master Stewards for Puget Sound watersheds in which volunteers are certified. These volunteers will then be available to provide technical assistance to government and private sector programs. Washington Sea Grant and WSU Cooperative Extension shall meet with representatives of state agencies, the GCEE, and local and tribal governments to design the criteria for certification.

Target Date for EPI-4: Washington Sea Grant and WSU Cooperative Extension shall offer a program for Master Stewards as funding becomes available.

EPI-5. Programs Tailored to Business and Industry Audiences

EPI-5.1. Pollution Prevention

Ecology shall expand its waste reduction program to coordinate with the waste reduction or pollution issues of the departments of Fish and Wildlife, Health, Agriculture and Natural Resources, in order to provide audiences in business and industry with comprehensive messages on the actions necessary to prevent pollution generated by the particular activities of each audience. This program would integrate information for each group on issues such as municipal sewage treatment systems, pretreatment programs, discharge permits, stormwater systems, on-site sewage systems, solid waste landfills, hazardous waste disposal, waste reduction and plastic marine debris. Where appropriate, referrals should be made to related local government.

WSU Cooperative Extension shall coordinate the educational resources of conservation districts, Agriculture, Ecology, Fish and Wildlife, and Health to provide target agricultural audiences and pesticide applicators with a comprehensive message on the actions necessary to prevent their wastes from entering the water.

Washington Sea Grant shall coordinate the educational resources of Ecology, Fish and Wildlife, and Natural Resources, and the Coast Guard in order to organize a similar program to deliver coordinated messages to commercial fishing, aquaculture and marine-transport industry audiences.

The lead agencies designated above shall work with the Business Assistance Office of the Office of Community Development, local field agents and members of the target audience to develop the information and materials, and to determine the best mechanisms to deliver the message.

Target Date for EPI-5.1: As funding becomes available.

EPI-5.2. Habitat Protection

Fish and Wildlife shall coordinate with Ecology, Natural Resources, and WSU Cooperative Extension to provide education on habitat protection and enhancement to developers, realtors, contractors, and business and industry. This program shall include the implementation of joint habitat enhancement and education.

Target Date for EPI-5.2: Fish and Wildlife shall initiate a program as funding becomes available.

EPI-5.3. Water Quality Protection Through Peer Education

The Action Team support staff shall continue to encourage business, industry and nonprofit organizations to use the PIE Fund (EPI-8.1) to implement water quality education projects by peer education through their networks and associations.

EPI-6. Programs Tailored to Youth Audiences

The Office of Environmental Education and the GCEE shall consult with the Action Team support staff, Ecology, the PSAMP Steering Committee, community college faculty, elementary and high school teachers, and citizens to provide recommendations to the Action Team support staff on:

a. The feasibility of expanded citizens' and school monitoring programs;

b. The parameters for which citizens and students can best provide information for the PSAMP and freshwater programs;

c. Appropriate laboratory support and training for such a program;

d. Data access and feedback mechanisms for effective citizen and school participation in monitoring programs; and

e. The practicality of integrating monitoring into existing school curricula.

Target Date for EPI-6: Ongoing.

EPI-7. Programs Tailored to College and University Student Audiences

EPI-7.1. Puget Sound Internships and Credit

The Action Team support staff shall work with Ecology and other agencies to establish internships and opportunities for students to prepare case studies on issues related to Puget Sound.

Target Date for EPI-7.1: Possible internships will be developed when funding becomes available.

EPI-7.2. Post-Secondary Monitoring

Agencies and local governments involved in water quality monitoring through ambient monitoring, watershed or stormwater programs shall seek opportunities to involve universities and community colleges in monitoring projects through classes or internships or by utilizing community college laboratories.

Target Date for EPI-7.2: Possible internships will be identified as funding becomes available.

EPI-8. Public Involvement and Education Fund

The Action Team support staff shall continue to support the funding of local programs through the PIE Fund. The Action Team support staff shall publish requests for proposals for local programs that:

a. Raise awareness of water quality issues by engaging people in actions to protect Puget Sound. These action projects could include such activities or projects as adopt-a-beach, adopt-a-stream, protect-a-wetland, household hazardous waste collection days, water quality monitoring and biological surveys. To be effective, these programs often require funds for signs, equipment and brochures, and may require technical expertise and training.

b. Raise awareness of water quality issues through general and diverse education activities. These communications programs could include such activities as workshops, conferences, plays, poster projects, tours, festivals and brochures. To be effective, these programs often require funds for printed and audio-visual materials or staff and may require technical expertise and training.

Groups will apply for these funds through a request-for-proposals process which would include the criteria in element EPI-1. Funds will be awarded by contracts. Groups eligible for funding will include business and trade associations with special emphasis on peer education, local and tribal governments, conservation districts, community and environmental organizations, schools and school districts, community colleges and universities. Projects eligible will include existing and new programs, as well as proposed activities related to any topic addressed in the management plan and any area of Puget Sound. The Action Team support staff shall issue guidelines, call for proposals, select participants and administer contracts. The Action Team support staff shall invite other agencies to specify programs or categories for which to solicit proposals.

The proposals will be reviewed by an Education and Public Involvement Program advisory group which will make final recommendations on funding to the chair of the Action Team support staff. The advisory group will be a 10- to 14-member group including educators, media experts, representatives of environmental and public interest groups, industry and business, agriculture, and local and tribal governments. At least half the membership will come from the private sector, business and industry, environmental non-profit groups and other non-government organizations.

A portion of the PIE Fund should be directed toward programs that specifically support educational needs of local governments that are directly related to the management plan, particularly for those governments that are not receiving direct support from the field agent program (EPI-2.1). Contracts may also be awarded for conferences, evaluations, publications and projects that relate directly to the purpose of the PIE Fund.

Target Date for EPI-8: Ongoing.

EPI-9. Activities of the Action Team Support Staff

The Action Team support staff shall continue to use its planning and oversight process as a means to provide leadership in education and public involvement on water quality issues in the Puget Sound region. Specifically, the Action Team support staff shall conduct the following activities:

Public Outreach. The Action Team support staff shall conduct a proactive public outreach program that includes:

a. Seeking out parties interested in or affected by implementation of the *Puget Sound Management Plan*.
b. Designating staff liaisons for:
    i. County and tribal governments (staff and elected officials). Staff liaisons will work to ensure that program staff conduct planning, implementation and oversight with an awareness of local water quality programs, needs and issues.
    ii. Constituency groups, including business, agriculture and environmental groups. Staff liaisons will work to ensure that program staff conduct planning, implementation and oversight with an awareness of the issues that different constituencies face as a program is introduced and implemented, and the role of a constituency in protecting water quality.
    c. Training Action Team support staff to provide general information on any program in the management plan.
    d. Developing concise, readable materials for the general public describing issues, programs and activities.

Public Education. The Action Team support staff shall continue to educate the public through seminars, field trips, conferences, public meetings, publications, media, videos and distribution of Action Team support staff information to local libraries.

Publicity. The Action Team support staff shall use its newsletter, slide shows and media contacts to publicize opportunities for the public to become involved in policymaking, monitoring, cleanup or educational activities related to the Sound. The Action Team support staff shall also use its newsletter and slide shows to give recognition to new and existing efforts and programs that are supportive of the goals of the plan.

Coordination. The Action Team support staff shall coordinate the integration of education and public involvement elements of all programs in the management plan in order to avoid duplication of resources (see EPI-2.3, EPI-2.6 and EPI-2.7).

Schools. The Action Team support staff shall work with the Superintendent of Public Instruction and with the GCEE to coordinate educational programs on water quality and habitat for K-12.

Campaigns for Puget Sound. The Action Team support staff may initiate public awareness campaigns or activities that:

a. Focus on tangible results toward which individuals in both the private and public sectors can easily direct initiative and resources.
b. Provide an opportunity to show measurable results that present clear and visible feedback on our success in meeting a water quality goal or objective for Puget Sound.

Campaigns could address tangible results towards such goals as: reopening commercial and recreational shellfish beds; reducing plastic debris in Puget Sound; reducing the amount of oil in Puget Sound; reducing septage in Puget Sound; reducing contaminants in storm water; restoring wetlands or shoreline habitat; etc.

Year of the Sound. The Action Team shall request that the Governor declare the Year of the Sound and appoint a Year of the Sound Committee which includes representatives of both the public and private sectors. The committee shall seek funding and support for schools, colleges, agencies and industry to work together to promote and create events which highlight the Sound and what people are doing to protect it, and which provide in-depth educational opportunities on the Sound and its management issues.

Sound Waters Award Program. The Action Team support staff shall work to develop an annual Sound Waters Award program which recognizes small or large businesses, trade associations, local governments or local government officials, developers, service clubs, youth groups, individuals, and others for positive action taken to protect water quality.

Target Date for EPI-9: Activities related to public outreach, public education, coordination, publicity, and schools are ongoing. Other activities as funding becomes available.

Laboratory Support Program

Directory of Program Elements

Program Definition

Efforts to restore and protect Puget Sound depend on accurate and timely laboratory analysis of data to provide information on the presence, concentrations and effect of contaminants in Puget Sound. The laboratory accreditation and capacity element of the Laboratory Support Program helps to ensure the availability of quality-assured analysis methods.

Standard methods and quality assurance and quality control (QA/QC) procedures are necessary to ensure the usefulness of laboratory analyses. Laboratory data must be generated by accepted methods and must be accompanied by supporting documentation to assure the data user of the quality of the analysis. The Laboratory Support Program specifies a QA/QC approach based on the Puget Sound Protocols and Guidelines.

Institutional Framework

The Department of Ecology implements the laboratory accreditation and capacity element of the Laboratory Support Program. Through this work, Ecology ensures that laboratories meet the needs of state agencies and local and tribal governments.

A number of federal and state laws and regulations (e.g., the federal Clean Water Act and the state's sediment management standards) require the laboratory analysis of environmental samples—often through the use of specific laboratory and field procedures. The Puget Sound Protocols and Guidelines builds upon the methods developed for regulatory programs to describe appropriate field and laboratory approaches for collecting and analyzing many types of environmental samples within Puget Sound.

The Laboratory Support Program provides a foundation for the collection of usable, environmental information through other management plan programs, including Monitoring, Research, Shellfish Protection and Contaminated Sediments. Experiences in implementing other management plan programs have identified field and laboratory issues that need to be addressed when updating the Puget Sound Protocols and Guidelines.

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

Program Goal

To assure the quality and timeliness of physical, chemical and biological laboratory tests necessary to support the protection and enhancement of the waters of Puget Sound.

Program Strategy

The strategy for achieving this goal is to:

a. Establish a laboratory accreditation program administered by Ecology that will review the capability of environmental laboratories to generate data of known quality;

b. Assure that adequate laboratory support exists for agency and other sampling programs;

c. Develop and update protocols and guidelines to standardize data collection, analysis and transfer within Puget Sound, and to encourage their use for all data collected in Puget Sound; and

d. Develop and encourage the use of uniform quality assurance guidelines for data collected under all Puget Sound programs.

L-1. Laboratory Accreditation and Capacity

L-1.1. Laboratory Accreditation

The Department of Ecology shall continue to implement a laboratory accreditation program. As part of regulatory environmental programs, Ecology shall adopt rules requiring that laboratory analysis be conducted by laboratories that are accredited to use approved laboratory protocols. As part of the laboratory accreditation program, Ecology shall adopt rules requiring accredited laboratories to comply with specified quality assurance and quality control procedures. Ecology shall inform all certified labs that the use of adopted Puget Sound Protocols and Guidelines (see L-2) is required for many programs in the *Puget Sound Management Plan*. Ecology shall implement the Puget Sound Protocols and Guidelines in the Ecology laboratory at Manchester.

Target Dates for L-1.1**:** Ecology shall continue its ongoing efforts to carry out the lab accreditation program.

L-1.2. Laboratory Capacity

Ecology shall prepare a biennial laboratory plan that addresses the short- and long-term needs, capacity, and data management of Ecology and other state agencies and of local and tribal governments, and make recommendations regarding means to rectify shortfalls in the ability of the labs to support agency programs. The plan shall: identify target turnaround times and specify acceptable holding times for analyses; assess available means to assure that all samples are analyzed within those times while meeting the highest possible quality standards; describe sample tracking and data management systems; include consideration of the need for additional staff, including night shifts, to fully utilize existing agency lab equipment and facilities; and fully explore the use of lab capacity possessed by other agencies and the use of contract labs before recommending establishment of new lab facilities.

Ecology shall biennially submit to the Puget Sound Council and Action Team an updated laboratory plan that includes:

a. A revised estimate of the number and types of analyses needed to support Ecology programs;

b. A review of the services provided by Ecology laboratories, including holding and sample turnaround times, data quality and data management, during the preceding two years; and

c. An updated analysis of the additional laboratory capacity needed to carry out these analyses within the target turnaround times that Ecology shall specify.

In preparing the laboratory plan, Ecology shall consult with other state agencies, including the departments of Health, Agriculture, Fish and Wildlife and Labor and Industries, and tribal and local governments to incorporate their laboratory needs and capabilities related to the *Puget Sound Management Plan* in the reports.

Target Dates for L-1.2: Ecology shall submit biennial updates to the laboratory plan.

L-2. Quality Assurance/Quality Control

L-2.1. Puget Sound Protocols and Guidelines

The Action Team shall develop and implement a process for the review and adoption of Puget Sound

Protocols and Guidelines. The process shall provide for development of new protocols and guidelines, for review and revision of existing protocols and guidelines, for assignments to agencies with expertise, and for formal adoption of the protocols and guidelines.

The development and review of the protocols and guidelines shall be assigned to agencies and organizations with technical expertise in fields relevant to the individual protocols and guidelines. The technical experts shall prepare recommendations that shall undergo extensive peer review. Experts from federal and state agencies, local and tribal governments, the private sector, the academic community and the public shall review protocol development and revisions. In addition, the review group shall outline Quality Assurance/Quality Control (QA/QC) needs for the use of each updated protocol. The Action Team support staff shall recommend the Puget Sound Protocols and Guidelines to the Action Team for adoption.

New protocols and guidelines shall be developed and existing protocols and guidelines revised as needed and reviewed biennially.

The Puget Sound Protocols and Guidelines include "Recommended Quality Assurance and Quality Control Guidelines for the Collection of Environmental Data in Puget Sound." This guideline addresses quality assurance and quality control issues related to the collection of environmental data in support of Puget Sound monitoring and research and other programs in the *Puget Sound Management Plan*. The guideline shall be used to ensure that uniform quality assurance practices are incorporated into all activities to develop data on environmental conditions in Puget Sound.

L-2.2. Quality Management Plans

Action Team agencies should develop and implement plans, such as Ecology's Quality Management Plan, that describe requirements for QA project plans; training in and technical assistance with QA/QC principles and practices; and QA audits of selected projects. QA project plans shall require the use of Puget Sound Protocols and Guidelines where appropriate.

Action Team agencies' QA/QC programs shall include the following:

a. Establishment of guidelines for the preparation of quality assurance project plans (QAPP), including establishment of project-specific objectives and development of sampling and analysis plans commensurate with objectives for major surveys.
b. Audits of data quality (based on selected QAPPs), including checks that sampling and analytical procedures have been correctly performed, and reviews of data to verify that they meet user requirements including data-quality objectives.
c. Training for staff, including training needed to determine the appropriate number and type of samples and analyses for areas of investigation commonly encountered. Training needs will build upon information gained during the planning process and during implementation and oversight of the resulting program.
d. QA/QC assistance to staff, including technical guidance concerning QA/QC in general.
e. Other appropriate measures resulting from issues identified during the planning process.

Target Dates for L-2.2: Agencies shall provide biennial reports on the implementation of their quality management plans to the Puget Sound Council and Action Team beginning July 1, 2001.

Monitoring Program

Directory of Program Elements

Problem Definition

The Puget Sound Water Quality Action Team and Puget Sound Council require information about the condition of the Puget Sound environment to evaluate progress towards meeting the *Puget Sound Management Plan*'s goals. The information is also needed to identify problems that might require new or amended protection or restoration efforts.

To appropriately characterize Puget Sound and human interactions with the ecosystem, a great diversity of scientific information is required, and consistent measurements are needed over time to provide information on trends and other changes in conditions.

The Monitoring Program is designed to efficiently gather and communicate information from a broad array of scientific disciplines utilizing the expertise of multiple state and federal agencies, local governments and citizens.

Institutional framework

The Monitoring Program is built around the Puget Sound Ambient Monitoring Program (PSAMP) and efforts to coordinate citizens' and pesticide monitoring. Each of these elements is designed to coordinate existing data collection efforts and to build networks and systems that address the monitoring needs of Puget Sound decision-makers.

The PSAMP is a coordinated, interagency effort to collect, assess and communicate information on baseline conditions and trends in Puget Sound. The PSAMP develops reports on the status and trends of conditions related to the "health" of Puget Sound, including water and sediment quality; fish contamination and its effects; fish, bird and harbor seal abundance; and nearshore habitat quality. The studies are conducted by the departments of Ecology, Fish and Wildlife, Health and Natural Resources; U.S. Fish and Wildlife Service; and the King County Department of Natural Resources. They're built upon a set of studies that these agencies could conduct, or were conducting, to meet their own mandates and to make use of their various areas of expertise.

Action Team support staff work with scientists and managers representing the agencies that conduct PSAMP monitoring, the Environmental Protection Agency (EPA) and the National Marine

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

Fisheries Service to coordinate the PSAMP's studies and to communicate their findings to decisions-makers and the public.

With its focus on monitoring ambient conditions in the Puget Sound environment, the Monitoring Program provides one facet of information needed for adaptive management. As described in this Estuary Management Program, the management direction set forward in this management plan and in the *Puget Sound Water Quality Work Plan* are based in part on results of selected environmental indicators and long-term monitoring. Adaptive management of this management plan's many programs is achieved through program-specific evaluation. Program evaluation relies on environmental monitoring data provided through the Monitoring Program. It also requires information about the implementation of the program and the effectiveness of program actions and strategies.

Program Goal

To assess the health of Puget Sound and its resources and to communicate information on Puget Sound's conditions in order to promote informed choices for the environmental management of Puget Sound.

Program Strategy

The strategy for achieving this goal is to: (1) implement the Puget Sound Ambient Monitoring Program; (2) develop a citizens' monitoring program; and (3) coordinate pesticide monitoring activities in Puget Sound.

M-1. Puget Sound Ambient Monitoring Program

The Puget Sound Ambient Monitoring Program (PSAMP) conducts long-term monitoring and coordinates the dissemination of information about the condition of Puget Sound. The goals of the PSAMP are to:

a. Assess the health of Puget Sound and its resources and document geographic patterns in the condition of the Sound and its resources.
b. Document natural and human caused changes over time in the ecological components of Puget Sound.
c. Through ongoing monitoring programs, identify existing, emerging or anticipated environmental problems and, where possible, identify the reasons for these problems.
d. Provide data and other information to assist the Puget Sound Action Team and others in measuring the success of environmental programs.
e. Support research activities by making available scientifically valid data.

M-1.1. PSAMP Management Structure

The PSAMP is a complex interagency program, requiring coordination among many parties.

The Puget Sound Water Quality Action Team defines the direction, scope and design of the PSAMP, considering recommendations from PSAMP committees, Action Team support staff and others.

Action Team support staff shall include a PSAMP Science Coordinator who serves as an interdisciplinary and inter-program science advocate, interpreter, representative and convener. The coordinator chairs the PSAMP Steering Committee and provides staff support to the PSAMP Management Committee.

The PSAMP is implemented through monitoring tasks performed by state, federal and local agencies and coordinated by interagency committees.

The Management Committee directs and oversees program planning, budgeting, staffing, implementation, data management, external relations and evaluation, and ensures that the PSAMP draws from PSAMP and non-PSAMP data to develop a comprehensive picture of Puget Sound ambient conditions.

The Steering Committee coordinates planning and implementation of monitoring components and topics, and collaborates with the Management Committee and Topic Groups on program design and implementation. The committee includes principal investigators of PSAMP's monitoring components and other members appointed by the Action Team Chair. The committee is chaired by the PSAMP Science Coordinator.

Topic Groups determine how to answer integrated monitoring questions derived from PSAMP's conceptual model and relate to general monitoring

topics, such as toxics, nutrients, fecal bacteria, habitat, etc. The groups include PSAMP principal investigators and other scientists and are chaired by Steering Committee members.

M-1.2. PSAMP Coordination Activities

The PSAMP Science Coordinator and PSAMP committees shall:

a. Review the PSAMP's goals and recommend changes to the Council and Action Team;
b. Develop, review and revise a conceptual model that describes the cause-and-effect links between human activity and anticipated environmental change;
c. Develop, review and revise integrated monitoring questions that are derived from the PSAMP's conceptual model;
d. Convene regional scientists as "Topic Groups" to develop and maintain interdisciplinary topic plans that describe how sampling activities from one or more monitoring tasks will answer the integrated questions for each topic;
e. Prepare topic reports and a biennial *Puget Sound Update* that integrates and summarizes program findings and findings from related non-PSAMP studies;
f. Maintain a meta-database inventory of non-PSAMP data for use by PSAMP and outside investigators;
g. Convene annual PSAMP Science meetings and biennial reviews to present and review program findings, discuss progress on biennial work plans, and invite comments on the program from interested parties;
h. Recommend to the Council and Action Team priority enhancements or adjustments for the next biennial work plan; and
i. Share Puget Sound scientific information by: promoting external use of PSAMP data and acquire non-PSAMP data; obtaining independent scientific advice and peer review of products; coordinating with related monitoring programs; and keeping the public informed about the condition of Puget Sound.
j. Evaluate the gaps in the breadth of monitoring activities, in terms of species or habitats covered, and temporal continuity.
k. Coordinate inventories of wetlands, flood plains, intact riparian areas and marine nearshore habitats as described in Element MFH-4.1d of this plan.

Roles and responsibilities for the implementation and coordination of the PSAMP shall be more fully specified in a program description document.

Principal investigators of PSAMP monitoring components shall:

a. Prepare implementation plans that define the field activities and the procedures and measures for quality assurance and quality control;
b. Implement monitoring activities;
c. Manage data generated with PSAMP funding to:
   i. address the needs of the users,
   ii. facilitate efficient sharing of data, including easy, low-cost access for other interested parties, and
   iii. completely and unambiguously archive data and allow for long-term retrieval;
d. Prepare reports on sampling activity and monitoring results; and
e. Invite non-PSAMP scientists to participate in peer review of implementation plans and task reports.

M-2. Citizens' Monitoring

The Puget Sound Action Team shall develop a citizens' monitoring program to collect data that supplements information provided by the PSAMP and to act as an educational and public involvement tool. At least one citizens' monitoring project shall be carried out each year.

Citizen monitors shall be asked to carry out monitoring activities deemed appropriate by Action Team support staff in consultation with the PSAMP Steering Committee and/or staff of local governments, state agencies and tribal governments. Staff from Action Team agencies shall provide technical support and oversight for citizens' monitoring projects funded under this element. Action Team staff shall provide volunteer-management support for citizens' monitoring projects funded under this element.

Data collected under citizens' monitoring programs shall be subject to appropriate protocols and quality assurance checks. To the extent possible, citizens' monitoring efforts should follow Puget

Sound Protocols and Guidelines. If necessary, citizens' monitoring protocols should be developed to describe appropriate and acceptable approaches to data collection.

M-3. Pesticides Monitoring

The Action Team support staff will convene a technical committee, consisting of representatives with expertise in pesticides from: the departments of Ecology, Health, Fish and Wildlife, Agriculture, Transportation and Natural Resources; the University of Washington, Washington State University and Western Washington University research faculty; the Environmental Protection Agency (EPA); the U.S. Geological Survey; the U.S. Fish and Wildlife Service; the National Oceanographic and Atmospheric Administration; the Natural Resources Conservation Service; conservation districts; public and private interests; and other organizations. The technical committee will (1) coordinate and focus ongoing pesticides monitoring activities in Puget Sound; (2) evaluate the need for additional monitoring of pesticides in Puget Sound; and (3) make recommendations to the Action Team for the inclusion of pesticides monitoring in selected tasks of the PSAMP and other ongoing monitoring efforts.

Some pesticides monitoring needs that the technical committee should consider include:

a. The monitoring of potential point and non-point sources of pesticides including sewer and storm drain out-falls and highway, forestry and agricultural runoff.

b. The monitoring of ambient levels of pesticides in Puget Sound sediments and organisms to determine long-term changes in environmental concentrations.

Target Dates for M-3**:** The technical committee shall be convened by January 2002, and shall make recommendations on pesticides monitoring to the Action Team by November 2002.

Research Program

Directory of Program Elements

Problem Definition

Research provides a basic understanding of the underlying physical, chemical, biological, sociological and technological processes that form and affect the Puget Sound ecosystem. This understanding of Puget Sound and its associated watersheds is essential for evaluating and adapting management actions to protect the Sound in the future.

Research discoveries have their most positive and timely effect when they are communicated to people who can use the information. Too often, research results are disseminated to limited audiences within the scientific community, or in a form or time frame that prevents their usefulness to resource managers, policy-makers and the general public. The Puget Sound Research Program attempts to address this problem by calling for efforts to translate and disseminate research information.

Research in the Puget Sound region has typically consisted of a patchwork of single organization-sponsored, short-term studies. When coordinated research projects do occur, they often lack a basin-wide focus. The *Puget Sound Management Plan's* research strategy and program elements reflect an attempt to move beyond reactive, narrowly focused (e.g., "single-species") research and management perspectives to a broader consideration of systems, and specifically, to provide a research focus on the Puget Sound ecosystem.

Institutional Framework

The Research Program is intended to meet society's expectations of highly focused, applied research that helps to solve the complex problems of environmental protection and restoration. The program attempts to (1) ensure that the effort and resources devoted to research are appropriate to and commensurate with problems that are confronted in protecting and restoring the biological health and diversity of Puget Sound and (2) ensure that that the results of research are understood and incorporated into the decision-making process at all levels.

The Research Program supports and complements other management plan programs—such as the Estuary Management Program and other programs that address pollution sources and protection of resources. Through an adaptive manage-

What does "shall" mean?

The Action Team has determined that the actions in this plan are needed to protect and restore Puget Sound. Consistent with the importance of these actions, this plan says that appropriate implementers "shall" perform the actions. However, implementation of many of these actions is a long-term process. The Action Team's work plans will identify the actions that need to be taken each biennium to implement this management plan. Implementation of actions in the work plans is subject to the availability of funds and public input into the decision-making processes of implementing entities. When an action is included in a biennial work plan, the Action Team expects that it will be implemented in accordance with the relevant provisions of the Puget Sound management plan, in accordance with Chapter 90.71 RCW.

ment feedback system, research can be directed to address questions raised by management programs and can provide information about the validity of the management plan programs' underlying assumptions and the effectiveness of programs and individual actions.

The Research Program is closely aligned with the management plan's Monitoring Program. Research studies can explore findings made through monitoring to identify causes of problems and relations among the complex array of factors that affect conditions in Puget Sound. In addition, research helps develop accurate, practical and cost-effective methods for monitoring and analyzing samples.

The design of the Research Program acknowledges and builds upon other efforts to coordinate research. Several regional and national research coordination efforts support and complement the Research Program.

The University of Washington has undertaken a research and educational effort termed the "Puget Sound Regional Synthesis Model" to develop and maintain a dynamic and integrated understanding and description of the environmental and societal factors that will shape the Puget Sound region as it moves into the 21st century.

In 1993, the National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA) established the Pacific Northwest Regional Marine Research Program (RMRP) to identify research needs and set priorities for research in the region encompassing Washington, Oregon and part of northern California. With funding, the RMRP would serve as a program of ecosystem-oriented research to coordinate existing efforts and fund new research. Unfortunately, the RMRP has not been funded and the need for a coordinated regional research program still exists.

In 1999, NOAA, EPA and the U.S. Geological Survey proposed a coastal research and monitoring strategy. The proposed strategy recommends a coastal research program that would (1) identify priority regional and national issues that need additional research to improve future integrated assessments and (2) develop interagency opportunities for soliciting, reviewing and supporting research proposals targeted to priority needs. As of the middle of 2000, this strategy has not been adopted in final form and has not received federal funding.

Program Goal

To establish and maintain a system of priorities and funding for, and dissemination of, research that adds to our knowledge of the physical and biological systems of Puget Sound, identifies causes and solutions of pollution problems, and assists decision-making activities of regulatory and management agencies while stimulating creativity and excellence in research.

Program Strategy

The strategy for achieving this goal is to:

a. Maintain the Puget Sound Research Program in order to promote the coordination and funding of Puget Sound research;

b. Maintain a renewable list of priorities for the program; and

c. Assist in making the results of research available for use in making decisions.

[Note: Portions of the Research Program are identified in elements of other programs of the *Puget Sound Management Plan*, including the Wetlands and Habitat Protection Program, the Nonpoint Source Pollution Program, the Shellfish Protection Program, the Spill Prevention and Response Program, and the Stormwater and Combined Sewer Overflows Program.]

R-1. Puget Sound Research Program

The Puget Sound Water Quality Action Team shall maintain the Puget Sound Research Program in order to provide a regional focus for the setting of research priorities, research sponsorship and the dissemination of research findings related to Puget Sound and its watersheds. This task shall be carried out with the assistance of a Research Advisory Committee composed of representatives from academic institutions; state, federal, regional and local agencies; the business and consulting community; and private research organizations.

The Action Team shall ensure that Puget Sound research and monitoring activities are coordinated. This includes reviewing the integrated technical report of the Puget Sound Ambient Monitoring Program (PSAMP) to identify research needs related to developing analytical and sampling methodologies or investigating questions raised by the monitoring results. In addition, the program shall coordinate, to the greatest extent possible, with other

research and monitoring efforts, including the National Oceanic and Atmospheric Association's programs (Northwest Fisheries Science Center studies, activities of the Pacific Northwest Restoration Center and the National Estuarine Research Reserve, and the National Marine Sanctuary Program), the Pacific Northwest Regional Marine Research Program, watershed monitoring programs, the Timber/Fish/Wildlife Agreement process, and other grant programs.

R-1.1. Puget Sound Research Priorities

The Research Advisory Committee shall review, revise and recommend to the Action Team a list of research priorities to serve as a guide to the Action Team in decisions to fund research pertinent to Puget Sound. The advisory committee shall consider needs and priorities for research identified by other research and monitoring programs, such as the Pacific Northwest Regional Marine Research Program and the PSAMP, by other management plan programs, and by other conservation, recovery and management plans and activities, such as salmon recovery plans, marine fish conservation plans, the Washington State aquatic nuisance species management plan, and action plans of the Puget Sound/Georgia Basin International Task Force and the Northwest Straits Commission and its marine resource committees. The Action Team shall encourage agencies, industry and other organizations that fund research to consider the list of research priorities in their own processes for allocating research funds.

R-1.2. Puget Sound Research Grants

The Action Team shall establish and manage a competitive program for research grants to support high-priority research that is not adequately funded by government agencies or other sources. The Action Team shall seek funding for research projects and award grants biennially based on the recommendations of the Research Advisory Committee. In making its recommendations, the committee shall evaluate project quality, significance of the project's expected scientific contribution, and importance of the project to an affected Puget Sound resource. The Action Team shall pursue the development of a permanent and stable funding base from industry and other private sources as well as from federal and state entities for support of the Research Program, including basic or process-oriented research that may not be within a particular agency's mission but that is required to understand and use the results of applied research.

The Action Team shall seek to fund two students each year to enable them to pursue research related to Puget Sound resources and water quality issues.

Support to scientists for research shall include appropriate funding and encouragement to ensure that research findings are communicated and translated into a form that is usable by decision-makers. This should be accomplished through prompt publication of research reports (including short, non-technical summaries containing implications for management issues) in technical journals and in publications that are accessible to local government planners, agency staff and others.

R-1.3. Dissemination of Research Results

The Action Team shall support timely dissemination and translation of Puget Sound research results useful to the public and resource managers. Specifically, the Action Team shall:

a. Sponsor conferences on Puget Sound research that include presentations on current research, discussion of the implications of the research, and an assessment of research priorities for the coming year;

b. Sponsor technical forums for discussion of the scientific interpretation and management implications of research results; the forums should be designed to increase communication among researchers, resource managers, and other decision makers;

c. Communicate and provide educational opportunities to increase public understanding of the ways in which research contributes to the resolution of current and future issues related to water quality in Puget Sound;

d. Establish a policy that research supported by the Puget Sound Research Program should undergo peer review and, where appropriate, be published in technical and scientific journals;

e. Support preparation of synthesis or review papers on key issues in Puget Sound;

f. Urge the preparation of short summaries for non-technical audiences of all reports arising from Puget Sound-related research;

g. Support the distribution and archiving of research findings by requesting the submis-

sion of all research reports to recognized repositories and by updating and managing Sound Access, a computerized bibliography of Puget Sound literature; and

h. Publish an annual report summarizing progress on research supported by the Puget Sound Research Program and on other activities.

The Action Team shall facilitate access to information dealing with Puget Sound that is not readily available through the open literature, particularly unpublished research and data. The Action Team shall act as a broker between those having information and those needing it, including the public, the scientific community, regulatory and resource management agencies, and environmental and community groups.

R-2. Research Reserves

Agencies, universities and other scientific organizations shall seek opportunities to identify and establish additional research reserves if specific ecosystems or reference areas are missing or underrepresented. Such reserves may be intended for research or as reference areas for monitoring. The Action Team encourages any organization active in this area to prepare an inventory of existing reserves and to share that inventory with other organizations and the research and monitoring committees established under the *Puget Sound Management Plan*.

Appendix A:

Chapter 90.71 RCW Puget Sound Water Quality Protection

(As amended in 1999)

Sections

RCW 90.71.005 Findings.

(1) The legislature finds that:

(a) Puget Sound and related inland marine waterways of Washington state represent a unique and unparalleled resource. A rich and varied range of marine organisms, comprising an interdependent, sensitive communal ecosystem reside in these sheltered waters. Residents of this region enjoy a way of life centered around the waters of Puget Sound, featuring accessible recreational opportunities, world-class port facilities and water transportation systems, harvest of marine food resources, shoreline-oriented life styles, water-dependent industries, tourism, irreplaceable aesthetics, and other activities, all of which to some degree depend upon a clean and healthy marine resource;

(b) The Puget Sound water quality authority has done an excellent job in developing a comprehensive plan to identify actions to restore and protect the biological health and diversity of Puget Sound;

(c) The large number of governmental entities that now have regulatory programs affecting the water quality of Puget Sound have diverse interests and limited jurisdictions that cannot adequately address the cumulative, wide-ranging impacts that contribute to the degradation of Puget Sound; and

(d) Coordination of the regulatory programs, at the state and local level, is best accomplished through the development of interagency mechanisms that allow these entities to transcend their diverse interests and limited jurisdictions.

(2) It is therefore the policy of the state of Washington to coordinate the activities of state and local agencies by establishing a biennial work plan that clearly delineates state and local actions necessary to protect and restore the biological health and diversity of Puget Sound. It is further the policy of the state to implement the Puget Sound water quality management plan to the maximum extent possible. To further the policy of the state, a recovery plan developed under the federal endangered species act for a portion or all of the Puget Sound shall be considered for inclusion into the Puget Sound water quality management plan. [1996 c 138 º 1, 1998]

RCW 90.71.010 Definitions.

Unless the context clearly requires otherwise, the definitions in this section apply throughout this chapter.

(1) "Action team" means the Puget Sound water quality action team.

(2) "Chair" means the chair of the action team.

(3) "Council" means the Puget Sound council created in RCW 90.71.030.

(4) "Puget Sound management plan" means the 1994 Puget Sound water quality management plan as it exists June 30, 1996, and as subsequently amended by the action team.

(5) "Support staff" means the staff to the action team.

(6) "Work plan" means the work plan and budget developed by the action team. [1996 c 138 º 2.]

RCW 90.71.020 Puget Sound action team.

(1) The Puget Sound action team is created. The action team shall consist of: The directors of the departments of ecology; agriculture; natural resources; fish and wildlife; and community, trade, and economic development; the secretaries of the departments of health and transportation; the director of the parks and recreation commission; the director of the interagency committee for outdoor recreation; the administrative officer of the conservation commission designated in RCW 89.08.050; one person representing cities, appointed by the governor; one person representing counties, appointed by the governor; one person representing federally recognized tribes, appointed by the governor, and the chair of the action team. The action team shall also include the following ex officio nonvoting members: The regional director of the United States environmental protection agency; the regional administrator of the national marine fisheries service; and the regional supervisor of the United States fish and wildlife service. The members representing cities and counties shall each be reimbursed for travel expenses as provided in RCW 43.03.050 and 43.03.060.

(2) The action team shall:

(a) Prepare a Puget Sound work plan and budget for inclusion in the governor's biennial budget;

(b) Coordinate monitoring and research programs as provided in RCW 90.71.060;

(c) Work under the direction of the action team chair as provided in RCW 90.71.040;

(d) Coordinate permitting requirements as necessary to expedite permit issuance for any local watershed plan developed pursuant to rules adopted under this chapter;

(e) Identify and resolve any policy or rule conflicts that may exist between one or more agencies represented on the action team;

(f) Periodically amend the Puget Sound management plan;

(g) Enter into, amend, and terminate contracts with individuals, corporations, or research institutions for the purposes of this chapter;

(h) Receive such gifts, grants, and endowments, in trust or otherwise, for the use and benefit of the purposes of the action team. The action team may expend the same or any income therefrom according to the terms of the gifts, grants, or endowments;

(i) Promote extensive public participation, and otherwise seek to broadly disseminate information concerning Puget Sound;

(j) Receive and expend funding from other public agencies;

(k) To reduce costs and improve efficiency, review by December 1, 1996, all requirements for reports and documentation from state agencies and local governments specified in the plan for the purpose of eliminating and consolidating reporting requirements; and

(l) Beginning in December 1998, and every two years thereafter, submit a report to the appropriate policy and fiscal committees of the legislature that describes and evaluates the successes and shortcomings of the current work plan relative to the priority problems identified for each geographic area of Puget Sound.

(3) By July 1, 1996, the action team shall begin developing its initial work plan, which shall include the coordination of necessary support staff.

(4) The action team shall incorporate, to the maximum extent possible, the recommendations of the council regarding amendments to the Puget Sound management plan and the work plan.

(5) All proceedings of the action team are subject to the open public meetings act under chapter 42.30 RCW. [1996 c 138 3, 1998]

RCW 90.71.030 Puget Sound council.

(1) There is established the Puget Sound council composed of eleven members. Seven members shall be appointed by the governor. In making these appointments, the governor shall include representation from business, the environmental community, agriculture, the shellfish industry, counties, cities, and the tribes. Two members shall be members of the senate selected by the president of the senate with one member selected from each caucus in the senate, and two members shall be members of the house of representatives selected by the speaker of the house of representatives with one member selected from each caucus in the house of representatives. The legislative members shall be nonvoting members of the council. Appointments to the council shall reflect geographical balance and the diversity of population within the Puget Sound basin. Members shall serve four-year terms. Of the initial members appointed to the council, two shall serve for two years, two shall serve for three years, and two shall serve for four years. Thereafter members shall be appointed to four-year terms. Vacancies shall be filled by appointment in the same manner as the original appointment for the remainder of the unexpired term of the position being vacated. Nonlegislative members shall be reimbursed for travel expenses as provided in RCW 43.03.050 and 43.03.060. Legislative members shall be reimbursed as provided in RCW 44.04.120.

(2) The council shall:

(a) Recommend to the action team projects and activities for inclusion in the biennial work plan;

(b) Recommend to the action team coordination of work plan activities with other relevant activities, including but not limited to, agencies' activities other than those funded through the plan, local plan initiatives, and governmental and nongovernmental watershed restoration and protection activities; and

(c) Recommend to the action team proposed amendments to the Puget Sound management plan.

(3) The chair of the action team shall convene the council at least four times per year and shall jointly convene the council and the action team at least two times per year. [1999 241:3]

RCW 90.71.040 Chair of action team.

(1) By June 1, 1996, the governor shall appoint a person in the governor's office to chair the action team. The chair shall serve at the pleasure of the governor.

(2) The chair shall be responsible for:

(a) Organizing the development of the council recommendations;

(b) Organizing the development of the work plan required under RCW 90.71.050;

(c) Presenting work plan and budget recommendations to the governor and the legislature;

(d) Overseeing the implementation of the elements of the work plan that receive funding through appropriations by the legislature; and

(e) Serving as chair of the council.

(3) The chair of the action team shall be a full-time employee responsible for the administration of all functions of the action team and the council, including hiring and terminating support staff, budget preparation, contracting, coordinating with the governor, the legislature, and other state and local entities, and the delegation of responsibilities as deemed appropriate. The salary of the chair shall be fixed by the governor, subject to RCW 43.03.040. [1996 c 138 5.]

NOTES: Effective date—1996 c 138 5: "Section 5 of this act is necessary for the immediate preservation of the public peace, health, or safety, or support of the state government and its existing public institutions, and shall take effect immediately [March 25, 1996]." [1996 c 138 19.]

RCW 90.71.050 Work plans.

(1)(a) Each biennium, the action team shall prepare a Puget Sound work plan and budget for inclusion in the governor's biennial budget. The work plan shall prescribe the necessary federal, state, and local actions to maintain and enhance Puget Sound water quality, including but not limited to, enhancement of recreational opportunities, and restoration of a balanced population of indigenous shellfish, fish, and wildlife. The work plan and budget shall include specific actions and projects pertaining to salmon recovery plans.

(b) In developing a work plan, the action team shall meet the following objectives:

(i) Use the plan elements of the Puget Sound management plan to prioritize local and state actions necessary to restore and protect the biological health and diversity of Puget Sound;

(ii) Consider the problems and priorities identified in local plans; and

(iii) Coordinate the work plan activities with other relevant activities, including but not limited to, agencies' activities that have not been funded through the plan, local plans, and governmental and nongovernmental watershed restoration activities.

(c) In developing a budget, the action team shall identify:

(i) The total funds to implement local projects originating from the planning process developed for nonpoint pollution; and

(ii) The total funds to implement any other projects designed primarily to restore salmon habitat.

(2) In addition to the requirements identified under RCW 90.71.020(2)(a), the work plan and budget shall:

(a) Identify and prioritize the local and state actions necessary to address the water quality problems in the following locations:

(i) Area 1: Island and San Juan counties;

(ii) Area 2: Skagit and Whatcom counties;

(iii) Area 3: Clallam and Jefferson counties;

(iv) Area 4: Snohomish, King, and Pierce counties; and

(v) Area 5: Kitsap, Mason, and Thurston counties;

(b) Provide sufficient funding to characterize local watersheds, provide technical assistance, and implement state responsibilities identified in the work plan. The number and qualifications of staff assigned to each region shall be determined by the types of problems identified pursuant to (a) of this subsection;

(c) Provide sufficient funding to implement and coordinate the Puget Sound ambient monitoring plan pursuant to RCW 90.71.060;

(d) Provide funds to assist local jurisdictions to implement elements of the work plan assigned to local governments and to develop and implement local plans;

(e) Provide sufficient funding to provide support staff for the action team; and

(f) Describe any proposed amendments to the Puget Sound management plan.

(3) The work plan shall be submitted to the appropriate policy and fiscal committees of the legislature by December 20th of each even-numbered year.

(4) The work plan shall be implemented consistent with the legislative provisos of the biennial appropriation acts. [1996 c 138 6., 1998]

RCW 90.71.060 Puget Sound research and monitoring.

In addition to other powers and duties specified in this chapter, the action team shall ensure implementation and coordination of the Puget Sound ambient monitoring program established in the Puget Sound management plan. The program shall include, at a minimum:

(1) A research program, including but not limited to methods to provide current research information to managers and scientists, and to establish priorities based on the needs of the action team;

(2) A monitoring program, including baselines, protocols, guidelines, and quantifiable performance measures. In consultation with state agencies, local and tribal governments, and other public and private interests, the action team shall develop and track quantifiable performance measures that can be used by the governor and the legislature to assess the effectiveness over time of programs and actions initiated under the plan to improve and protect Puget Sound water quality and biological resources. The performance measures shall be developed by June 30, 1997. The performance measures shall include, but not be limited to a methodology to track the progress of: Fish and wildlife habitat; sites with sediment contamination; wetlands; shellfish beds; and other key indicators of Puget Sound health. State agencies shall assist the action team in the development and tracking of these performance measures. The performance measures may be limited to a selected geographic area. [1996 c 138 7.]

RCW 90.71.070 Work plan implementation.

(1) Local governments are required to implement local elements of the work plan subject to the availability of appropriated funds or other funding sources.

(2) The council shall review the progress of work plan implementation. Where prescribed actions have not been accomplished in accordance with the work plan, the responsible agency shall submit to the council written explanations for the shortfalls, together with proposed remedies. [1996 c 138 8.]

RCW 90.71.080 Public participation. The chair of the action team shall hold public hearings to solicit public comment on the work plan. [1996 c 138 9.]

RCW 90.71.090 Senior environmental corps— Authority powers and duties.

(1) The *Puget Sound water quality authority shall have the following powers and duties in carrying out its responsibilities for the senior environmental corps created under RCW 43.63A.247:

Appoint a representative to the coordinating council;

Develop project proposals;

Administer project activities within the agency;

Develop appropriate procedures for the use of volunteers;

Provide project orientation, technical training, safety

training, equipment, and supplies to carry out project activities;

Maintain project records and provide project reports;

Apply for and accept grants or contributions for corps approved projects; and

With the approval of the council, enter into memoranda of understanding and cooperative agreements with federal, state, and local agencies to carry out corps approved projects.

(2) The authority shall not use corps volunteers to displace currently employed workers. [1992 c 63 15. Formerly RCW 90.70.027.]

NOTES: *Reviser's note: The Puget Sound water quality authority and its powers and duties, pursuant to the Sunset Act, chapter 43.131 RCW, were terminated June 30, 1995, and repealed June 30, 1996. See 1990 c 115 11 and 12. Powers, duties, and functions of the Puget Sound water quality authority pertaining to cleanup and protection of Puget Sound transferred to the Puget Sound action team by 1996 c 138 11. See RCW 90.71.903.

Severability—1992 c 63: See note following RCW 43.63A.240.

RCW 90.71.900 Short title—1996 c 138.

This act may be known and cited as the Puget Sound water quality protection act. [1996 c 138 15.]

RCW 90.71.901 Captions not law.

Captions used in this chapter do not constitute any part of the law. [1996 c 138 14.]

RCW 90.71.902 Implementation and requirements of plan not affected by repeal—1990 c 115.

Nothing in RCW 43.131.370 shall affect the implementation and requirements of the Puget Sound water quality management plan existing on June 30, 1995, or such other effective date of repeal of the laws referenced in RCW 43.131.370. The implementation of the plan on and after that date shall be the responsibility of such entities as are provided by the legislature. [1990 c 115 13. Formerly RCW 90.70.902.]

RCW 90.71.903 Transfer of powers, duties, and functions—References to executive director or Puget Sound water quality authority.

(1) The powers, duties, and functions of the Puget Sound water quality authority pertaining to the cleanup and protection of Puget Sound are transferred to the Puget Sound action team. All references to the executive director or the Puget Sound water quality authority in the Revised Code of Washington shall be construed to mean the chair of the action team or the action team when referring to the functions transferred in this section.

(2)(a) All reports, documents, surveys, books, records, files, papers, or written material in the possession of the authority pertaining to the powers, functions, and duties transferred shall be delivered to the custody of the action team. All cabinets, furniture, office equipment, motor vehicles, and other tangible property employed by the authority in carrying out the powers, functions, and duties transferred shall be made available to the action team. All funds, credits, or other assets held in connection with the powers, functions, and duties transferred shall be assigned to the action team.

(b) Any appropriations made to the authority for carrying out the powers, functions, and duties transferred shall, on June 30, 1996, be transferred and credited to the action team.

(c) Whenever any question arises as to the

transfer of any personnel, funds, books, documents, records, papers, files, equipment, or other tangible property used or held in the exercise of the powers and the performance of the duties and functions transferred, the director of financial management shall make a determination as to the proper allocation and certify the same to the state agencies concerned.

(3) All rules and all pending business before the authority pertaining to the powers, functions, and duties transferred shall be continued and acted upon by the action team. All existing contracts and obligations shall remain in full force and shall be performed by the action team.

(4) The transfer of the powers, duties, functions, and personnel of the authority shall not affect the validity of any act performed before June 30, 1996.

(5) If apportionments of budgeted funds are required because of the transfers directed by this section, the director of financial management shall certify the apportionments to the agencies affected, the state auditor, and the state treasurer. Each of these shall make the appropriate transfer and adjustments in funds and appropriation accounts and equipment records in accordance with the certification. [1996 c 138 11.]

[The following section is in statute but has not been codified into Chapter 90.71 RCW.]

Sec. 10. RULE MAKING. By January 1, 1997, the action team shall adopt chapter 400-12 WAC with revisions that:

(1) Direct counties to develop a prioritized list of watershed improvement projects; and

(2) Identify all funding sources that can be used to implement local plans. [1996 c 138]

Appendix B:

Acronyms and Abbreviations

AKART—all known, available, and reasonable treatment

Agriculture—Washington State Department of Agriculture

APWA—American Public Works Association

BMPs—best management practices

BOD—biochemical oxygen demand

CAO—critical areas ordinance

CCMP—Comprehensive Conservation and Management Plan

CERCLA—Comprehensive Environmental Response, Compensation, and Liability Act (also known as "Superfund")

CFR—Code of Federal Regulations

Conservation Commission—Washington State Conservation Commission

Cooperative Extension—Washington State University (WSU) Cooperative Extension

Corps—U.S. Army Corps of Engineers

CSO—combined sewer overflow

CWA—Clean Water Act

CZARA—Coastal Zone Act Reauthorization Amendments

CZM—coastal zone management

CZMA—Coastal Zone Management Act

DMMP—Dredged Disposal Management Program

DNMPs—Dairy Nutrient Management Plans

DNR—Washington State Department of Natural Resources

DOD—U.S. Department of Defense

DOH—Washington State Department of Health

EEZ—Exclusive Economic Zone

EIS—environmental impact statement

EPA—U.S. Environmental Protection Agency

ESA—Endangered Species Act

ESU—Evolutionarily Significant Unit

FDA—U.S. Food and Drug Administration

FTE—full-time equivalent

FY—fiscal year

GCEE—Governor's Council on Environmental Education

GIS—geographic information system

GMA—Growth Management Act

HCCC—Hood Canal Coordinating Council

HCP—Habitat Conservation Plan

HPA—Hydraulic Project Approval

IAC—Washington State Interagency Committee for Outdoor Recreation

IPM—Integrated Pest Management

ITAT—Interagency Technical Assistance Team

K-12—kindergarten through 12th grade

MGD—million gallons per day

MOU—memorandum of understanding

MSD—marine sanitation device

MTCA—Model Toxics Control Act

NEP—National Estuary Program

NEPA—National Environmental Policy Act

NISA—National Invasive Species Act

NOAA—U.S. National Oceanic and Atmospheric Administration

NPDES—National Pollutant Discharge Elimination System

NPS—U.S. National Park Service

NMFS—U.S. National Marine Fisheries Service

NRCS—U.S. Natural Resource Conservation Service

OCD—Washington State Office of Community Development

OFM—Washington State Office of Financial Management

OCS—outer continental shelf

PAH—polycyclic (polynuclear) aromatic hydrocarbon

Parks—Washington State Parks and Recreation Commission

PCB—polychlorinated biphenyl

PCHB—Pollution Control Hearings Board

PIE Fund—Public Involvement and Education Fund

POTW—publicly-owned treatment works (a wastewater treatment facility)

PSAMP—Puget Sound Ambient Monitoring Program

PSC—Puget Sound Council

PSP—Paralytic Shellfish Poisoning

QA/QC—quality assurance and quality control

QAPP—Quality Assurance Project Plan

RCRA—Resource Conservation and Recovery Act

RCW—Revised Code of Washington

RMRP—(Pacific Northwest) Regional Marine Research Program

SAO—sensitive areas ordinance

Sea Grant—Washington Sea Grant Program

SEPA—State Environmental Policy Act

SMA—Shoreline Management Act

TAC—technical advisory committee

TFW—Timber/Fish/Wildlife Agreement

TMDL—total maximum daily load

UBAT—urban bay action team

USC—United States Code

USFS—U.S. Forest Service

USFWS—U.S. Fish and Wildlife Service

UW—University of Washington

WAC—Washington Administrative Code

WDFW—Washington State Department of Fish and Wildlife

WDIS—Wastewater Discharge Information System

WSDOT—Washington State Department of Transportation

WPLCS—Wastewater Permit Life Cycle System

WSU—Washington State University

Appendix C:

Glossary

ACUTE TOXICITY
Any toxic effect that is produced within a short period of time, generally 96 hours or less. Although the effect most frequently considered is mortality, the end result of an acute effect could be any harmful biological effect.

AEROBIC
Living, active or occurring only in the presence of oxygen. For example, soil microorganisms which degrade sewage effluent from septic systems need oxygen in order to function.

ALGAE
Aquatic, nonflowering plants that lack roots and use light energy to convert carbon dioxide and inorganic nutrients such as nitrogen and phosphorus into organic matter by photosynthesis. Common algae include dinoflagellates, diatoms, seaweeds and kelp. An algal bloom can occur when excessive nutrient levels and other physical and chemical conditions enable the algae to reproduce rapidly.

AMBIENT MONITORING
Monitoring that is done to determine existing environmental conditions, contaminant levels, rates, or species in the environment, against which future conditions can be compared. This type of monitoring occurs in waters not located in close proximity to direct discharges of pollutants.

ANADROMOUS FISH
Species, such as salmon, which hatch in fresh water, spend a large part of their lives in the ocean, and return to freshwater rivers and streams to reproduce.

ANTHROPOGENIC
Effects or processes that are derived from human activity, as opposed to natural effects or processes that occur in the environment without human intervention.

AQUACULTURE
The controlled cultivation and harvest of aquatic plants or animals (e.g., edible marine algae, clams, oysters and salmon).

AQUIFER
The underground layer of rock or soil in which ground water resides. Aquifers are replenished or recharged by surface water percolating through soil. Wells are drilled into aquifers to extract water for human use.

AROMATIC
A chemical substance characterized by the presence of at least one benzene ring. These substances may have a strong smell and are often persistent in the environment due to the stability of the benzene ring.

BASELINE STUDY
A study that documents the existing state of an environment to serve as a baseline against which future changes are measured.

BENTHIC ORGANISMS
Organisms that live in or on the bottom of a body of water.

BEST MANAGEMENT PRACTICE (BMP)
A method, activity, maintenance procedure, or other management practice for reducing the amount of pollution entering a water body. The term originated from the rules and regulations developed pursuant to Section 208 of the federal Clean Water Act (40 CFR 130).

BIENNIUM
The Washington State Biennium. WA adopts a two-year budget, which runs from July 1 of odd-numbered years to June 30 of the next odd-numbered year.

BIOACCUMULATION
The process by which a contaminant accumulates in the tissues of an organism. For example, certain chemicals in food eaten by a fish tend to accumulate in its liver and other tissues.

BIOASSAY
A test procedure that measures the response of living plants, animals or tissues to potential contaminants. For example, marine worms have been exposed to the sediments of Puget Sound, and their responses have been used to determine areas in the Sound where the sediments may be harmful to life.

BIOCHEMICAL OXYGEN DEMAND (BOD)
The quantity of oxygen-demanding materials present in a sample as measured by a specific test. A major objective of conventional wastewater treatment is to reduce the biochemical oxygen demand so that the oxygen content of the water body will not be significantly reduced. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

BIODEGRADATION
The conversion of organic compounds into simpler compounds through biochemical activity. Toxic compounds can sometimes be converted into nontoxic compounds through biodegradation. In some cases complex compounds are first converted into intermediate substances that can be more toxic than the original substance.

BIOMAGNIFICATION
The process by which concentrations of contaminants increase (magnify) as they pass up the food web such that each animal in the food web has higher tissue concentrations than did its food. For example, concentrations of certain contaminants can increase as they are passed from plankton to herring to salmon to seals.

BIOTA
The animals, plants and microbes that live in a particular location or region.

CANDIDATE SPECIES
A species proposed to be listed as threatened or endangered under the Endangered Species Act by the U.S. Secretary of the Interior.

CARCINOGENIC
Capable of causing cancer.

CENTENNIAL CLEAN WATER FUND (CCWF) also known as the **WATER QUALITY ACCOUNT**
In 1986, legislation was passed creating the Water Quality Account in the state treasury (RCW 70.146). The purpose of the account is to provide financing of water pollution-control facilities and activities. The account receives revenue from a tax on tobacco products. The Department of Ecology, in adopting rules for administration of the account, has named it the Centennial Clean Water Fund.

CERTIFIED SHELLFISH BED
An area where commercial shellfish harvesting is approved by the Washington Department of and Health (DOH), based on measurements of fecal coliform bacteria in the overlying waters. Fecal coliform bacteria are used as an indicator of pathogens that could pose a human-health risk.

CHRONIC TOXICITY
Any toxic effect on an organism that results after exposure of long duration (often 1/10th of the life span or more). The end result of a chronic effect can be death, although the usual effects are sublethal (e.g., inhibited reproduction or growth). These sublethal effects may be reflected by changes in the productivity and population structure of the community.

CLEAN WATER ACT (CWA)
Also known as the federal Water Pollution Control Act (33 U.S.C. 1251 et seq.).

CLEANUP ACTIVITIES
Actions taken by a public agency or a private party to correct an environmental problem. Activities generally consist of the treatment or removal from the environment of contaminants introduced by past practices (for example, capping part of a public park contaminated with carcinogenic compounds or digging up and incinerating soil contaminated with dioxin).

CODE OF FEDERAL REGULATIONS (CFR)
The compilation of federal regulations adopted by federal agencies through the rule-making process. For example, pretreatment regulations are found in 40 CFR 403.

COLIFORM BACTERIA
A type of bacteria that is coil or helix shaped. Fecal coliform bacteria are those coliform bacteria that are found in the intestinal tracts of mammals. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated waste water and/or the presence of animal feces. These organisms may also indicate the presence of pathogens that are harmful to humans. High numbers of fecal coliform bacteria therefore

limit beneficial uses of water such as swimming and shellfish harvesting.

COMBINED SEWER OVERFLOW (CSO)
A pipe that discharges untreated waste water during storms from a sewer system that carries both sanitary waste water and storm water. The overflow occurs because the system does not have the capacity to transport, store or treat the increased flow caused by stormwater runoff.

COMBINED SEWER SYSTEM
A wastewater collection and treatment system where domestic and industrial waste water is combined with storm runoff. Although such a system does provide treatment of storm water, in practice the systems may not be able to handle major storm flows. As a result, untreated discharges from combined sewer overflows may occur.

CONFINED DISPOSAL
A dispositional method that isolates dredged material from the environment. Confined disposal may be in aquatic, nearshore, or upland environments.

CONTAMINANT
A substance that is not naturally present in the environment or is present in amounts that can, in sufficient concentration, adversely affect the environment.

CONVENTIONAL POLLUTANT
Conventional pollutants as specified under the Clean Water Act are total suspended solids, fecal coliform bacteria, biochemical oxygen demand, pH, and oil and grease. Today a large number of nonconventional and toxic contaminants are of concern in addition to the conventional pollutants.

CRITICAL HABITAT
The minimum habitat that an endangered species needs to ensure its survival.

CUMULATIVE EFFECTS
The combined environmental impacts that accrue over time and space from a series of similar or related individual actions, contaminants, or projects. Although each action may seem to have a negligible effect, the combined effect can be severe.

DETENTION
The process of collecting and holding back storm water for delayed release to receiving waters.

DISCHARGE, DIRECT OR INDIRECT
The release of waste water or contaminants to the environment. A direct discharge of waste water flows directly into surface waters while an indirect discharge of waste water enters a sewer system.

DISINFECTION
The destruction of infectious agents such as bacteria or viruses. Most wastewater treatment plants use chlorine or bromine for disinfection.

DISPOSAL
Methods by which unwanted materials are relocated, contained treated, or processed. Unless contaminants are converted to less harmful forms or removed from the material before disposal, they may be released again into the environment.

DISSOLVED OXYGEN
Oxygen that is present (dissolved) in water and therefore available for fish and other aquatic animals to use. If the amount of dissolved oxygen in the water is too low, then aquatic animals may die. Waste water and naturally occurring organic matter contain oxygen-demanding substances that consume dissolved oxygen.

DOMESTIC WASTEWATER (SEWAGE)
Human-generated waste water that flows from homes, businesses and industries.

DREDGING
Any physical digging into the bottom sediment of a water body. Dredging can be done with mechanical or hydraulic machines, and it changes the shape and form of the bottom. Dredging is routinely done in many parts of Puget Sound in order to maintain navigation channels that would otherwise fill with sediment and block ship passage.

ECOSYSTEM
A community of living organisms interacting with one another and with their physical environment, such as a rain forest, pond or estuary. Damage to any part of a complex system, such as Puget Sound, may affect the whole. A system such as Puget Sound can also be thought of as the sum of many interconnected ecosystems such as the rivers, wetlands, and bays. Ecosystem is thus a concept applied to communities of different scale, signifying the interrelationships that must be considered.

EFFLUENT
The liquid that flows out of a facility or household into a water body or sewer system. For example, the treated liquid discharged by a wastewater treatment plant is the plant's effluent.

ENDANGERED SPECIES
A plant or animal species or subspecies that is determined by the Endangered Species Act listing process to be in danger of extinction

ENDANGERED SPECIES ACT (ESA)
A federal law that governs actions that may affect a plant or animal species thought to be in danger of extinction throughout all or a significant portion of its range.

EVOLUTIONARILY SIGNIFICANT UNIT (ESU)
A term that describes a distinct population segment of a species or subspecies. A population within an ESU is both reproductively isolated and genetically unique.

ENVIRONMENTAL IMPACT STATEMENT (EIS)
A document that discusses the likely significant impacts of a development project or a planning proposal, ways to lessen the impacts, and alternatives to the project or proposal. EISs are required by the national and Washington state environmental policy acts.

EROSION
Wearing away of rock or soil by the gradual detachment of soil or rock fragments by water, wind, ice and other mechanical and chemical forces.

ESTUARY
A coastal water body where ocean water is diluted by out-flowing fresh water.

FECAL COLIFORM (*see* **COLIFORM BACTERIA)**

FECES
Waste excreted from animals.

FOREST PRACTICE
Any activity conducted on or directly pertaining to forestland related to growing, harvesting or processing timber. These activities include but are not limited to: road and trail construction, final and intermediate harvesting, precommercial thinning, reforestation, fertilization, prevention and suppression of disease and insects, salvage of trees, and brush control. Forest practices are subject to regulation by the Washington Department of Natural Resources.

FUNGICIDE
A substance that destroys or inhibits growth of fungus.

GEOGRAPHIC INFORMATION SYSTEM (GIS)
A computer system that allows the display and analysis of geographic information. A GIS could, for example, display wetland boundaries on a city map.

GROUNDFISH
Fish (also known as bottomfish) that live on or near the bottom of water bodies, for example, English sole.

GROUND WATER
Underground water supplies stored in aquifers. Ground water is created by rain that soaks into the ground and flows down until it is collected at a point where the ground is not permeable. Groundwater then usually flows laterally toward a river, lake or the ocean. Wells tap the ground water for use. (See AQUIFER)

GROWTH MANAGEMENT ACT
The state law (RCW 36.70A) that directs local governments to adopt revised comprehensive land-use plans and development regulations. Local governments can incorporate many water quality and habitat protections into their growth management program.

HABITAT
The specific area or environment in which a particular type of plant or animal lives. An organism's habitat must provide all the basic requirements for life and should be free of harmful contaminants. Typical Puget Sound habitats include beaches, marshes, rocky shores, the bottom sediments, intertidal mudflats, and the water itself.

HABITAT CONSERVATION PLAN (HCP)
An environmental planning document that outlines how critical habitat for a species listed as threatened or endangered under the Endangered Species Act will be protected and/or improved, usually as part of an incidental takings mitigation plan.

HAZARDOUS WASTE
Any solid, liquid or gaseous substance which, because of its source or measurable characteristics, is classified under state or federal law as hazardous and is subject to special handling, shipping, storage and disposal requirements. Washington state law identifies two categories, dangerous and extremely hazardous. The latter category is more hazardous and requires greater precautions.

HERBICIDE
A substance used to destroy or inhibit growth of vegetation.

HOLDING TANK
An enclosed container used as part of a sewage disposal system on a boat. The tank is used to temporarily store sewage for later pumpout at a marina pumpout facility.

HUMAN-HEALTH RISK
The risk or likelihood that human health will be adversely affected. Estimating health risks is a complex and inexact practice.

HYDRAULIC PROJECT APPROVAL (HPA)
Under the Hydraulic Code Rules, approval is required from Washington State Department of Fish and Wildlife for certain activities in state waters that support fish life. A project approval is required for activities affecting state waters such as certain forest practices; culvert construction; bridge, pier, and piling construction; bulkheads; boat launches; dredging; etc.

HYDROCARBON
An organic compound composed of carbon and hydrogen; for example, petroleum compounds.

HYDROLOGIC CYCLE
The continual cycling of water between the land, the sea and the atmosphere through evaporation, condensation, precipitation, absorption into the soil, and stream runoff.

IMPERVIOUS SURFACE
A surface that cannot be easily penetrated. For instance, rain does not readily penetrate asphalt or concrete pavement.

INCIDENTAL TAKE
Harm that may come to a listed species indirectly, through acts not intended to maliciously or purposely harm the species.

INSECTICIDE
A substance, usually a chemical, that is used to kill insects.

INTERFERENCE
A contaminant can interfere with the normal sewage treatment plant process by diminishing the efficiency of the treatment process. For example, a toxic chemical can kill the beneficial bacteria in a treatment plant and interfere with the biological treatment process, thus causing the release of excessively contaminated effluent.

INTERTIDAL AREA
The area between high and low tide levels. The alternate wetting and drying of this area makes it a transition between land and water and creates special environmental conditions and habitats.

LAND USE
The way land is developed and used in terms of the types of activities allowed (agriculture, residences, industries, etc.) and the size of buildings and structures permitted. Certain types of pollution problems are often associated with particular land-use practices, such as sedimentation from construction activities.

LEACHATE
Water or other liquid that has washed (leached) from a solid material, such as a layer of soil or debris. Leachate may contain contaminants such as organics or mineral salts. Rainwater that percolates through a sanitary landfill and picks up contaminants is called the leachate from the landfill.

LISTING
The research, determination and publication in the Federal Register of the name and critical habitat (if public knowledge of its critical habitat will not make it more vulnerable to unscrupulous collectors) of a threatened or endangered species

LIVEABOARD
Those using a boat, other than a houseboat, as a primary dwelling.

LOADING
The total amount of material entering a system from all sources.

MARINE SANITATION DEVICE (MSD)
A device installed on a boat to treat or hold sewage. Section 312 of the federal Clean Water Act requires all vessels with installed toilets to have approved MSDs. Federal regulations describe three types of MSDs: Type I and Type II MSDs are treatment devices, while Type III MSDs are holding tanks.

MARSH
A wetland where the dominant vegetation is non-woody plants such as grasses and sedges, as opposed to a swamp where the dominant vegetation is woody plants like trees.

METABOLISM
All chemical processes occurring within an organism, including both synthesis and breakdown of organic materials.

METALS
Metals are elements found in rocks and minerals that are naturally released to the environment by erosion, as well as generated by human activities. Certain metals, such as mercury, lead, nickel, zinc and cadmium, are of environmental concern because they are released to the environment in excessive amounts by human activity. They are generally toxic to life at certain concentrations. Since metals are elements, they do not break down in the

environment over time and can be incorporated into plant and animal tissue.

MICROLAYER, SEA-SURFACE MICROLAYER
The extremely thin (usually estimated as 50 microns) layer at the top of the water. Contamination of this layer is of concern because many contaminants, such as oil, grease, organic toxicants and pathogens, are buoyant in seawater and therefore may concentrate at much higher concentrations in the microlayer than in the water column. The atmospheric deposition of toxicants into the microlayer is also of concern. These contaminant concentrations may pose a danger to fish eggs and other organisms that may come into contact with the water surface.

MICROORGANISMS
Microscopic organisms, (e.g., bacteria, viruses and protozoans) that are not visible to the unaided eye. Some cause diseases in humans, animals and plants; some are important because they are involved in breaking down and stabilizing sewage and solid waste.

MODEL ORDINANCE
A sample ordinance which contains elements and language necessary to achieve a desired regulatory effect.

MONITOR
To systematically and repeatedly measure conditions in order to track changes. For example, dissolved oxygen in a bay might be monitored over a period of several years in order to identify trends in concentration.

MUNICIPAL DISCHARGE
Effluent from a municipal sewage treatment plant.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
A part of the federal Clean Water Act, which requires point-source dischargers to obtain discharge permits. These permits are referred to as NPDES permits and are administered by the Washington Department of Ecology.

NONPOINT SOURCE POLLUTION
Pollution that enters water from dispersed and uncontrolled sources (such as surface runoff) rather than through pipes. Nonpoint sources (e.g., forest practices, agricultural practices, on-site sewage disposal, and recreational boats) may contribute pathogens, suspended solids, and toxicants. While individual sources may seem insignificant, the cumulative effects of nonpoint source pollution can be significant.

NUTRIENTS
Essential chemicals needed by plants or animals for growth. If other physical and chemical conditions are optimal, excessive amounts of nutrients can lead to degradation of water quality by promoting excessive growth, accumulation, and subsequent decay of plants, especially algae. Some nutrients can be toxic to animals at high concentrations.

OXYGEN-DEMANDING MATERIALS
Materials such as food waste and dead plant or animal tissue that use up dissolved oxygen in the water when they are degraded through chemical or biological processes. Biochemical oxygen demand (BOD) is a measure of the amount of oxygen consumed when a substance degrades.

PARALYTIC SHELLFISH POISONING (PSP)
An illness, sometimes fatal to humans and other mammals, caused by a neuro-toxin produced by a type of plankton called Gonyaulax. During certain times of the year and at certain locations, these organisms proliferate in "blooms" (sometimes called red tides) and can be concentrated by clams, mussels, and other bivalves. The nervous system of affected shellfish is unaffected. Consumption of the shellfish can cause acute illness in humans and other mammals.

PARAMETER
A quantifiable or measurable characteristic. For example, height, weight, sex and hair color are all parameters that can be determined for humans. Water quality parameters include temperature, pH, salinity, dissolved oxygen concentration, and many others.

PATHOGEN
An agent such as a virus, bacterium or fungus that can cause diseases in humans. Pathogens can be present in municipal, industrial and nonpoint-source discharges to the Sound.

PELAGIC
Associated with or living in the water column as opposed to the bottom or the shoreline.

PERCOLATE
To pass through a permeable substance. For instance, septic effluent and rainfall percolates through soil.

PERSISTENT
Compounds that are not readily degraded by physical, chemical, or biological processes.

PERSISTENT MARINE DEBRIS (PMD)
Plastic, glass, metal, rags and other refuse accidentally or purposely put into the marine environment.

The plastic component is often referred to as Marine Plastic Debris (MPD). Marine debris can injure or kill marine life and threatens the safety of swimmers, divers and watercraft..

PESTICIDE
A general term used to describe chemical substances that are used to destroy or control pest organisms. Pesticides include herbicides, insecticides, algicides, fungicides, and others. Many of these substances are manufactured and are not naturally found in the environment. Others, such as pyrethrum, are natural toxins which are extracted from plants and animals.

pH
The degree of alkalinity or acidity of a solution. A pH of 7.0 indicates neutral water while a pH of 5.5 is acid. A reading of 8.5 is alkaline or basic. The pH of water influences many of the types of chemical reactions that will occur in it. For instance, a slight decrease in pH may greatly increase the toxicity of substances such as cyanides, sulfides and most metals. A slight increase may greatly increase the toxicity of pollutants such as ammonia.

PHOTOSYNTHESIS
The process by which plants use light energy to make simple sugars and carbohydrates from carbon dioxide and water.

PLANKTON
Small plants (phytoplankton) and animals (zooplankton) that are suspended in the water and either drift with the currents or swim weakly.

POINT SOURCE
A source of pollutants from a single point of conveyance such as a pipe. For example, the discharge pipe from a sewage treatment plant or a factory is a point source.

POLLUTANT
A contaminant that adversely alters the physical, chemical or biological properties of the environment. The term includes pathogens, toxic metals, carcinogens, oxygen-demanding materials, and all other harmful substances. With reference to nonpoint sources, the term is sometimes used to apply to contaminants released in low concentrations from many activities which collectively degrade water quality. As defined in the federal Clean Water Act, pollutant means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal and agricultural waste discharged into water.

POLYCHLORINATED BIPHENYLS (PCBs)
A group of manufactured chemicals including about 70 different but closely related compounds made up of carbon, hydrogen and chlorine. If released to the environment, they persist for long periods of time and can biomagnify in food webs because they have no natural usage in the food web. PCBs are suspected of causing cancer in humans. PCBs are an example of an organic toxicant.

POLYCYCLIC or POLYNUCLEAR AROMATIC HYDROCARBONS (PAHs)
A class of complex organic compounds, some of which are persistent and cancer-causing. These compounds are formed from the combustion of organic material and are ubiquitous in the environment. PAHs are commonly formed by forest fires and by the combustion of gasoline and other petroleum products. They often reach the environment through atmospheric fallout and highway runoff.

PRETREATMENT
The treatment of industrial wastewater to remove contaminants prior to discharge into municipal sewage systems.

PRIMARY TREATMENT
A wastewater treatment method that uses settling, skimming and (usually) chlorination to remove solids, floating materials, and pathogens from waste water. Primary treatment typically removes about 35 percent of the BOD and less than half of the metals and toxic organic substances.

PRIORITY POLLUTANTS
Substances listed by the EPA under the federal Clean Water Act as toxic and having priority for regulatory controls. The list currently includes 12 metals, two inorganic compounds, and a 111 natural and artificial organic compounds (111). The list of priority pollutants includes some substances which are not of immediate concern in Puget Sound, and it does not include all known harmful compounds.

PROTOCOL
A standardized procedure for field collection, laboratory analysis, and/or interpretation of samples. Good protocols improve the quality of data and make data from different sources comparable. The Puget Sound Estuary Program protocols were developed under contract to EPA to standardize

sample collection and analysis within the Sound, allowing for comparability of data and determination of long-term environmental trends.

PUGET SOUND, WATERS OF
As defined in RCW 90.70.005, all salt waters of the state of Washington inside the international boundary line between Washington and British Columbia, and lying east of 123° 24' west longitude (east of Port Angeles).

PUGET SOUND WATER QUALITY ACTION TEAM (ACTION TEAM)
A body representing state and federal agencies and tribal and local governments that is responsible for amending the Puget Sound Management Plan and adopting biennial work plans to implement the management plan. (See RCW 90.71)

***PUGET SOUND WATER QUALITY WORK PLAN* (WORK PLAN)**
Biennial work plans that define specific actions that government entities will take to protect and restore Puget Sound each state biennium. The work plans are short-term steps towards implementing the long-range management plan. (See RCW 90.71)

THE PUGET SOUND COUNCIL
A body representing certain groups that have an interest in Puget Sound, including shellfish growers, agriculture, business, cities, counties, tribal governments, the environmental community and the legislature. that advises the Action Team on developing the management plan, coordinates efforts to implement the management plan and the work plan, and tracks plan implementation. (See RCW 90.71)

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)
The federal law that classifies and regulates solid and hazardous waste.

REVISED CODE OF WASHINGTON (RCW)
The compilation of the laws of the state of Washington published by the Statute Law Committee. For example, the law that created the Puget Sound Water Quality Action Team is Chapter 90.71 RCW.

RIPARIAN HABITAT
Riparian ecosystems include the transitional areas between aquatic and terrestrial environments and contains all of the environmental elements that directly contribute to the structural and functional processes of a body of water.

SALINITY
A measure of the quantity of dissolved salts in water.

SALMONID
A fish of the family Salmonidae. Fish in this family include salmon and trout. Most Puget Sound salmonids are anadromous.

SANITARY WASTE WATER
Waste water which includes domestic sewage and may contain pathogens. Sanitary waste water is not sanitary.

SECONDARY TREATMENT
A wastewater treatment method that usually involves the addition of biological treatment to the settling, skimming, and disinfection provided by primary treatment. Secondary treatment may remove up to 90 percent of BOD and significantly more metals and toxic organics than primary treatment.

SEDIMENT
Material suspended in or settling to the bottom of a liquid, such as the sand and mud that make up much of the shorelines and bottom of Puget Sound.

SEPARATED SEWER SYSTEM
A wastewater collection and treatment system where domestic and industrial waste water is separated from storm runoff. A separated system consists of independent sanitary wastewater and stormwater systems. The storm water is generally discharged directly into open water and the sanitary waste water goes to a treatment plant.

SEPTAGE
The sludge and scum material that is pumped out of a septic tank.

SHELLFISH
An aquatic animal, such as a mollusc (clams and snails) or crustacean (crabs and shrimp), having a shell or shell-like exoskeleton.

SHELLFISH CONTAMINATION
The contamination of certain bivalves (clams, mussels, oysters) which filter water to feed and tend to collect or concentrate waterborne contaminants in their tissues.

SHORELINE DEVELOPMENT
As regulated by the Shoreline Management Act (Chapter 90.58 RCW) the construction over water or within a shoreline zone (generally 200 feet landward of the water) of structures such as buildings, piers, bulkheads, and breakwaters, including

environmental alterations such as dredging and filling, or any project which interferes with public navigational rights on the surface waters.

SHORELINE MANAGEMENT ACT (SMA)
The state law (90.58 RCW) that requires local governments to develop a shoreline master program, and requires permits for water and associated land uses. Many local governments promote the protection of wetlands, habitat, and water quality through their shoreline master program.

SLUDGE, WASTEWATER TREATMENT SLUDGE
Semi-solid matter resulting from the treatment of waste water. Some of the contaminants (especially toxic metals) that were in the waste water remain in the sludge after treatment. The treated waste water can be discharged to the Sound, but the sludge must be disposed of elsewhere. Sludge is usually at least partially dried before disposal and if relatively uncontaminated may be added to soil to increase plant growth.

SOLE-SOURCE AQUIFER
The single source of ground water for human use in any one area. Areas with a sole source aquifer have no other source of ground water; any contamination of the aquifer could contaminate the entire water supply.

SOURCE CONTROL
A practice, method or technology that is used to reduce pollution from a source; for example, best management practices or end-of-pipe treatment.

STATE ENVIRONMENTAL POLICY ACT (SEPA)
A state law (Chapter 43.21C RCW) that requires state agencies and local governments to consider environmental factors when making decisions on activities, such as development proposals over a certain size, and comprehensive plans. As part of this process, environmental impacts are documented and opportunities for public comment are provided.

STORM DRAIN
A system of gutters, pipes or ditches used to carry storm water from surrounding lands to streams, lakes or Puget Sound. In practice storm drains carry a variety of substances such as sediments, metals, bacteria, oil and antifreeze which enter the system through runoff, deliberate dumping or spills. This term also refers to the end of the pipe where the storm water is discharged.

STORMWATER
Water that is generated by rainfall and is often routed into drain systems in order to prevent flooding.

SUSPENDED SOLIDS
Organic or inorganic particles that are suspended in and carried by the water. The term includes sand, mud and clay particles as well as solids in waste water.

TAKE
Any attempt to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect individuals of a species listed under the Endangered Species Act, or attempt to engage in such conduct.

TECHNOLOGY-BASED STANDARDS
Technology-based effluent standards are developed by considering the effluent quality that can be achieved using various process or treatment technologies, and the costs of those technologies, rather than basing effluent standards on the environmental effects of different loadings of pollutants.

THREATENED SPECIES
A plant or animal species or subspecies that could become endangered in the forseeable future if appropriate measures are not taken to protect and restore its habitat.

TIMBER/FISH/WILDLIFE AGREEMENT (TFW)
An agreement between timber, fish and wildlife interests that promotes the monitoring and protection of fish and wildlife resources as an integral component of forestry management practices.

TOTAL MAXIMUM DAILY LOAD (TMDL)
The amount of a pollutant a waterway can assimilate without harming beneficial uses. Once a TMDL is determined, it is divided among the existing point and nonpoint sources, with a portion reserved for scientific uncertainty and future growth.

TOTAL SUSPENDED SOLIDS (TSS)
The weight of particles that are suspended in water. Suspended solids in water reduce light penetration in the water column, can clog the gills of fish and invertebrates, and are often associated with toxic contaminants because organics and metals tend to bind to particles.

TOXIC
Poisonous, carcinogenic or otherwise directly harmful to life.

TOXIC SUBSTANCES AND TOXICANTS
Chemical substances such as pesticides, plastics, detergents, chlorine and industrial wastes that are poisonous, carcinogenic or otherwise directly harmful to life.

TREATMENT
Chemical, biological or mechanical procedures applied to an industrial or municipal discharge or to other sources of contamination to remove, reduce or neutralize contaminants.

TURBIDITY
A measure of the amount of material suspended in the water. Increasing the turbidity of the water decreases the amount of light that penetrates the water column. High levels of turbidity are harmful to aquatic life.

UNCONFINED, OPEN-WATER DISPOSAL
Discharge of dredged material into an aquatic environment, usually by discharge at the surface, without restrictions or confinement of the material once it is released.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA)
The federal agency which administers many federal environmental laws. EPA Region 10, which includes Puget Sound, is headquartered in Seattle.

UPLAND MANAGEMENT AREA
A mandatory unharvested area for wildlife use and protection in a forest clearcut. These areas typically represent two percent or more of the clearcut area. This term originated from the Timber/Fish/Wildlife Agreement.

VOLATILE
Can be readily vaporized at a relatively low temperature.

WASHINGTON ADMINISTRATIVE CODE (WAC)
Contains all state regulations adopted by state agencies through the rulemaking process. For example, Chapter 173-201 WAC contains water quality standards.

WATER COLUMN
The water in a lake, estuary or ocean which extends from the bottom sediments to the water surface. The water column contains dissolved and particulate matter, and is the habitat for plankton, fish and marine mammals.

WATER QUALITY ACCOUNT *see* **CENTENNIAL CLEAN WATER FUND**

WATER TABLE
The upper surface of ground water or the level below which the soil is saturated with water.

WATERSHED
The geographic region within which water drains into a particular river, stream or body of water. A watershed includes hills, lowlands and the body of water into which the land drains. Watershed boundaries are defined by the ridges of separating watersheds.

WATERSHED PLANNING ACT
The 1998 Watershed Planning Act (Chapter 90.82 RCW) is also called the "2514" process after its bill number (HB2514). The Act provides guidance and funding for watershed plans primarily intended to address water quantity but the planning entities may choose to include water quality and habitat issues.

WELLHEAD
The immediate area around the top of a well. Contamination of the aquifer may occur from surface water if the wellhead is not sealed to prevent flow down the well casing.

WETLANDS
Wetlands are defined in the Addendum of the Marine and Freshwater Habitat Program.

ZONING
Leagal designation of areas of land that are reserved and regulated for different land uses.