PUGET SOUND WATER QUALITY AUTHORITY

1994 PUGET SOUND WATER QUALITY MANAGEMENT PLAN

Adopted May 18, 1994

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January 1995

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

Publication of the 1994 Puget Sound Water Quality Management Plan launches us into our second decade of bringing the diverse interests in the region together to protect water quality in the Sound. This Plan reflects the fact that much has changed since we issued the first Plan in 1987. Needed improvements make the Plan more effective in guiding federal and state agencies, local governments and tribes as they take the steps necessary to resolve difficult water quality issues facing the region and its citizens. In response to comments from the public, cities and counties, we made the 1994 Plan more efficient, and we streamlined many of the programs, focusing our recommendations on practical solutions that build upon local efforts to protect Puget Sound.

Representing diverse perspectives, our unanimous support of the 1994 Plan is an important indication of the hard work, compromises and spirit of cooperation embodied in it. We are particularly appreciative of the outstanding work of local governments, tribal governments, federal agencies, businesses, organizations and individuals, both in taking actions called for in the 1991 Plan and in helping us to evaluate and improve the Plan.

The coming years will bring many challenges as we move forward in protecting water quality. A lack of funding coupled with public concern over how government can and should protect the environment have already slowed progress. We ask your full support as state, local and tribal governments face these challenges and carry out the recommendations in this Plan.

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STATE AND FEDERAL AUTHORITY FOR THIS PLAN

RCW 90.70.055 requires the Authority to prepare and adopt a comprehensive Puget Sound water quality management plan, as defined in RCW 90.70.060. Implementation of the plan is called for by RCW 90.70.070, which states, " (1) In conducting planning, regulatory, and appeals actions, the state agencies and local governments identified in the plan must evaluate, and incorporate as applicable, subject to the availability of appropriated funds or other funding sources, the provisions of the plan, including any guidelines, standards, and timetables contained in the plan."

The Authority is scheduled to sunset on June 30, 1995. Legislation to extend the Authority may be considered during the 1995 legislative session. Regardless, RCW 90.70.902 provides that the scheduled sunset of the Authority "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."

In March 1988 the Administrator of the Environmental Protection Agency formally designated Puget Sound as an estuary of national significance under Section 320 of the Clean Water Act, as amended by P.L. 100-4 (the Water Quality Act of 1987). This made Puget Sound part of a nationwide program to develop management plans for the protection of the nation's estuaries. The Puget Sound Water Quality Authority, together with EPA Region 10 and the Washington Department of Ecology, co-manage the Puget Sound Estuary Program. Section 320 requires the development of a comprehensive conservation and management plan (CCMP) for each designated estuary. This Puget Sound plan is the CCMP for Puget Sound.

ACKNOWLEDGEMENT

The Puget Sound Water Quality Authority acknowledges financial and technical support from EPA's Office of Marine and Estuarine Protection and the Region 10 Office of Puget Sound. These funds provided support for technical studies, development of management tools, and other projects which helped provide the basis for developing the Puget Sound Water Quality Management Plan. This support was provided under the authority of Section 320 (the National Estuary Program) of the Clean Water Act of 1987, as well as through Congressional appropriations in previous years to support the Puget Sound effort.

Summary

Since 1987, the Puget Sound Water Quality Management Plan has guided the water quality protection efforts of state and local governments. The result has been a more comprehensive and effective strategy for preventing and managing pollution sources in Puget Sound.

The goal of the Puget Sound Water Quality Management Plan is to restore and protect the biological health and diversity of Puget Sound. The strategy for achieving this purpose is to protect and enhance Puget Sound's water and sediment quality; its fish and shellfish; and its wetlands and other habitats.

The 1985 statute directed the Authority to revise the Puget Sound Water Quality Management Plan (Plan) every two years, and to include within it an evaluation of progress toward achieving the Plan's goals and a discussion of additional concerns. The 1991 Plan originally was scheduled to be the final project for the Authority, which would cease to exist after June 1991. However, legislation approved by the 1990 Washington State Legislature (Chapter 115, Laws of 1990) retained the Authority as an independent agency; extended its work through June 1995; and changed the schedule for reviewing the Plan to a four-year cycle, with a review due by July 1994.

In 1991, the Plan was approved as the Comprehensive Conservation and Management Plan (CCMP) for the Puget Sound Estuary Program, as authorized by the federal Clean Water Act. As a CCMP, the Plan addresses federal actions affecting Puget Sound. The Puget Sound Plan has become a national model, providing a vision for other estuaries as they create their own plan.

Revisions to this Plan were necessary not only because of statutory requirements, but also because conditions that determine how governments protect water quality have changed. The revisions better reflect, among other things, public expectations and political and budgetary concerns.

The 1994 PLAN

This 1994 Plan is the first in which no new programs were added. In fact, the program that called for establishing a Puget Sound Foundation has been eliminated due to the inability to secure funding from private or public sector sources. Other amendments incorporated into the 1994 Plan include making due dates in the Stormwater and Combined Sewer Overflows Program consistent with the state's Growth Management Act (GMA); coordinating other parts of the Plan with the GMA; requiring the Department of Ecology to develop a policy on alternatives to discharging sewer wastes into marine waters; coordinating the Plan with the federal Coastal Zone Act Reauthorization Amendments; expanding the role of local governments in managing nonpoint pollution; and updating and refining a number of program elements.

The Puget Sound Plan assigns local governments major roles in protecting wetlands, preventing water pollution, controlling storm water and protecting shellfish. These assignments include planning, regulation, education, remediation and enforcement activities.

Plan Organization

Previous versions of the Puget Sound Plan recognized the connection between land use and water quality, and assigned major roles to local governments for implementing the Plan. The Growth Management Act (GMA), which was adopted in 1990 and amended in 1991, further strengthened these linkages and required that local land-use plans include provisions for protecting water quality. The 1994 Plan clarifies and enhances local governments' opportunities for protecting water quality through GMA activities.

The 1994 Plan builds on the progress made in carrying out the 1987, 1989 and 1991 Puget Sound plans. The Plan updates and refines existing Plan programs to reflect the experience to date in implementing them. Status sections under each program have been eliminated in an effort to streamline the 1994 Plan. Instead, the Authority will periodically issue Plan status reports.

State law calls for the Puget Sound Water Quality Authority to terminate on June 30, 1995, but the Puget Sound Plan specifically is exempted from this "sunset." Unless the state Legislature directs otherwise, the 1994 Puget Sound Plan will become the final comprehensive plan for protecting Puget Sound, and "the implementation of the plan...shall be the responsibility of such entities as are provided by the Legislature" (RCW 90.70.902).

The Plan is organized into four chapters. Chapter 1 provides an introduction to the Plan, discusses strategies for Plan implementation, and describes coordination with other planning programs. Chapter 1 provides a characterization of Puget Sound's health based on data from the Puget Sound Ambient Monitoring Program. The expanded and updated action plan, and priorities for the Plan, are contained in Chapter 2. Chapter 3 discusses the unfinished agenda. A glossary, list of acronyms, key to program element numbers and index are provided at the end of the document.

PLAN HISTORY

The Authority based previous plans on a number of key findings about Puget Sound's water quality. Programs were developed to address major concerns,

such as pollution from point and nonpoint pollution sources, loss of wetlands, and shellfish protection. While much progress has been made in implementing these programs, the Sound's problems are long term and the solutions will necessarily be long term as well. A list of key findings is included here as a reminder of the problems in Puget Sound that require continued attention.

Key findings upon which the Plan is based include:

- Most pollution is not "flushed" from the Puget Sound system. Water and pollutants are recirculated within Puget Sound, and some inlets and bays experience only limited tidal exchange.

- Since the Authority began its work in the mid-1980s, population in the Puget Sound region has grown by more than half a million people. By the year 2010, population is expected to grow by another million. Roughly 60 percent of this growth will come from in-migration and 40 percent from natural increase.

- Land-use forecasts suggest an increase of 62 percent for urban use and 73 percent for rural non-farm use by the year 2000. Most of this intensively used land is projected to be in the central Puget Sound region.

- Toxic contaminants bind to particles and settle out of sediments. Concentrations of toxicants in sediments in the Sound's urban bays are elevated 100 times or more over the levels in the cleanest rural bays.

- High concentrations of toxic contaminants in sediments have been associated with adverse biological effects in fish in urban bays, including fin erosion, liver tumors and reproductive failures.

- While substantial progress has been made toward limiting conventional pollutants in discharges, and progress is beginning to be made toward limiting toxic pollutants, the discharge of toxic substances is not yet effectively controlled.

- More than 1.5 trillion gallons of mostly untreated stormwater runoff flows into Puget Sound each year—five times the volume of treated discharges from sewage and industrial treatment plants. With the storm water comes approximately 4,800 tons of toxic substances. In addition, high volumes of storm water and the excess sediments it carries can wipe out fish habitat and bury shellfish beds.

- In the last decade, pollution claimed close to 40 percent of Puget Sound's commercial shellfish beds. Pollution sources include failing on-site sewage (septic) systems, animal wastes and contaminated storm water. The Department of Health estimates that there may be well over 450,000 on-site sewage systems in the Puget Sound basin; more than 10,000 are being added each year.

- Over half of the Sound's original wetlands have been lost. The Department of Ecology estimates that between 716 and 2,034 acres of wetlands

are lost each year in Washington state. The rapid rate of population growth in the Puget Sound basin poses a great threat to remaining wetlands. In some watersheds, the only developable land left is not land at all—it is wetland.

MANAGEMENT SUCCESSES

Despite the problems cited, there are significant success stories where water quality has been improved around the Sound. Industrial and municipal pollution controls have had dramatically positive results. Individual and local efforts have also begun to reduce sources of nonpoint pollution in some areas. There has been considerable progress in implementing the Puget Sound Water Quality Management Plan. As a result:

- We are starting to see a turnaround in the health of shellfish beds; this after years of watching the Sound's valuable shellfish resources being lost to pollution.
- Nine cities are implementing programs to reduce overflows from combined sewers, which will significantly reduce pollution entering Puget Sound during storms. The results are clearly evident in the less contaminated sediments associated with these discharges.
- Stable, long-term sources of funding, such as clean water districts and stormwater utilities, are making it possible for cities and counties to abandon piecemeal efforts to protect water quality for a much more comprehensive approach.
- Prior to 1987, storm water was barely considered a threat and very little effort was made to manage it. By the end of 1994, 101 of the more than 120 jurisdictions in Puget Sound had started to control storm water.
- Local communities have taken charge of their watersheds and, as a result, we are starting to get a good handle on sources of nonpoint pollution from the watersheds that surround Puget Sound.

STATE OF THE SOUND

Nestled between the Cascade and Olympic Mountains in northwest Washington, the Puget Sound basin covers more than 16,000 square miles. Eighty percent of the area is land and the rest water. Puget Sound was carved by glaciers to depths of over 900 feet and has close to 2,250 miles of shoreline. The Sound receives its deep, salty water from the Pacific Ocean. Circulation is driven by an average annual fresh water input of 39 million acre-feet and mixed by a daily tide range of almost 12 feet.

The overall health of Puget Sound has not changed much since 1991. The fact that water quality, in general, has not worsened is due largely to the ongoing efforts of state and local governments, citizens, tribes, businesses and others to manage and prevent pollution sources. Left unprotected, the Sound's water quality would no doubt have continued the downward spiral it was in when the Authority was formed in 1985.

This does not mean, however, that Puget Sound is free of problems. The Puget Sound Ambient Monitoring Program (PSAMP) has found that, as the human population expands, signs of contamination are emerging in places that were once considered immune to pollution—areas such as rural bays and the deep basins of the Sound. Closures of shellfish beds to harvesting, diseases in bottomfish, and decreases in the abundance of some seabirds and fish—it is hard to ignore the cumulative effects of human activities on Puget Sound's resources.

Chemical Contamination — Past monitoring has shown that chemical contamination poses a serious threat to Puget Sound. For example, birds show significant increases in tissue contaminants when feeding in Commencement Bay sediments, and salmon migrating through urban estuaries may retain toxic contaminants for considerable periods of time, leading to lowered growth and survival rates.

The worst chemical contamination occurs in the sediments of urbanized bays. Sediments in portions of four urban bays—Commencement Bay, Eagle Harbor Elliott Bay, and the area near the Naval Shipyard in Sinclair Inlet—are so contaminated that they have been declared Superfund sites by the Environmental Protection Agency (EPA). Throughout the Sound, most urbanized bays violate some sediment standards for metal or organic contaminants.

Fecal Contamination – Fecal coliform bacteria, found in mammal feces, indicate the possible presence of disease-causing bacteria and viruses in marine and fresh waters. Improperly sited or maintained on-site sewage systems (septic systems), sewage treatment plant malfunctions and combined sewer overflows, untreated boat-waste discharges, urban stormwater runoff, and marine mammal, improperly managed waste from pets and farm animals all have the potential to introduce fecal matter into nearby waters.

Fecal contamination is a tremendous problem that affects every part of the Sound, and sources of fecal coliform bacteria can be expected to increase as the population continues to grow. Increased monitoring in recent years has greatly expanded our knowledge of fecal contamination, enabling state, local and tribal governments to more effectively address problems in their communities. One of the first upgrades of shellfish beds closed during the past decade occurred in 1992 at North Bay in Case Inlet. Several other recent upgrades seem to mark a turning point in the struggle to reduce fecal contamination. Since 1989, the state Department of Health has upgraded more than 6,500 acres of commercial shellfish beds in Puget Sound.

Nearshore Habitat Composition and Coverage – Nearshore habitats are critical to the health of Puget Sound and its marine life. They provide shelter, and are used as spawning, rearing and feeding grounds for species that live in and around the Sound—including fish, shellfish, birds and marine mammals. In addition, nearshore habitats protect the shoreline from erosion, filter pollutants from the water, and, in the case of salt marshes, they reduce flooding by retaining storm water during high flow periods.

Although not much data exists regarding the types and amounts of nearshore habitats, or the rate at which they are being destroyed, studies have documented a 73 percent decline in the area of Puget Sound covered by salt marshes, and that nearly all salt marsh habitats have been destroyed in river deltas within major urban areas.

Abundance of Biological Resources – Monitoring the abundance of biological resources is in the early stages. The limited data available, however, suggest that there is a wide degree of variation in the health of Puget Sound's marine populations. Salmon populations, for example, are seriously threatened by human activities, and require immediate protection. Nine Puget Sound salmon stocks have gone extinct, and many more are threatened. Many Puget Sound populations, such as the marbled murrelet, are on the federal endangered species list. On the other hand, a few populations are undergoing dramatic improvements in response to protection and management programs. The number of young bald eagles born each year in the Puget Sound basin has increased by over 400 percent since 1980.

Conventional Water Quality – Conventional water quality problems are generally caused by contaminants other than toxic compounds such as metals and organic chemicals. They include oxygen depletion, sedimentation, excessive acidity or alkalinity, and high water temperatures.

One of the most prevalent conventional water quality problems is eutrophication. In simple terms, eutrophication is the excessive organic enrichment, or overfertilization, of a water body. Fortunately, the large degree of water movement in Puget Sound has kept eutrophication to a minimum. In the open bays and basins of the Sound, waters tend to be well-mixed and exchange freely with the Pacific Ocean via the Strait of Juan de Fuca.

Within Puget Sound, signs of eutrophication are evident primarily in poorly-mixed bays, such as Budd Inlet and Hood Canal, and in some shallow nearshore areas. Evidence of eutrophication in these water bodies is primarily reflected in low dissolved oxygen concentrations.

THE ACTION PLAN

The purpose of this Plan is to restore and protect the biological health and diversity of Puget Sound. The strategy for achieving this purpose is to protect and enhance the Sound's water and sediment quality, its fish and shellfish, and its wetlands and other habitats.

Priorities

The Authority has established broad priorities for the Plan which are listed in alphabetical order:

- Assess the environmental conditions of Puget Sound, its resources, and the effects of human activities on them.
- Clean up existing toxic contamination where sources are controlled.

- Continue Plan programs that have been started and maintain current funding levels for them.
- Control sources of toxic contaminants to Puget Sound.
- Enhance the protection of shellfish beds.
- Ensure the protection of wetlands and aquatic habitat. Stop losses of wetlands and other aquatic habitat.
- Improve the control and cleanup of nonpoint source pollution in the Sound.
- Prevent spills in the Sound and enhance the capability to respond to spills when they occur.
- Provide long-term support for research and education.
- Support and improve education and public involvement programs in order to inform, educate and involve citizens of the region and the state in the cleanup and protection of Puget Sound.

The Authority has also initiated the *Action for Puget Sound* campaign, which focuses additional attention on issues which require immediate action, such as degraded water quality in watersheds, failing on-site sewage systems, storm-water runoff and the loss of valuable wetlands. This campaign complements the 1994 Plan priorities.

PLAN PROGRAMS

The Plan's programs, and significant changes to the 1991 version of each program, are summarized below.

Estuary Management and Plan Implementation

Managing and protecting an estuary like Puget Sound is a complex undertaking. Federal, state, local and tribal governments, businesses, individuals and organizations all have roles, responsibilities and interests.

The Estuary Management and Plan Implementation Program establishes the framework coordinating this challenging task. It: (1) formalizes the existing Puget Sound Estuary Program management structure; (2) proposes several new financing options to provide adequate funding for the Puget Sound Estuary Program and the Plan; (3) requires accountability by implementing agencies; (4) provides for strong enforcement at all levels of government; and (5) seeks to ensure that federal activities, including the operation of large federal facilities, are consistent with the Plan.

The 1994 Plan makes the Puget Sound Plan's implementation tracking system more efficient and improves coordination of funding efforts.

Fish and Wildlife Habitat Protection

No less than 22 federal and 20 state laws, along with tribal treaty rights, local laws and ordinances, and private programs help protect non-wetland aquatic fish and wildlife habitat. The Fish and Wildlife Habitat Protection Program attempts to coordinate these laws and ordinances. Program elements call for interagency sharing of habitat data, a broad-based education strategy, increased field investigations, and greater public involvement.

The 1994 Plan articulates the role of the Growth Management Act in protecting habitat at the local level; eliminates the habitat task force, but provides for an alternative method of coordination; and eliminates the call for public forums for hydraulic project approval permits.

Spill Prevention and Response

Modern industrial societies depend 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 when accidents happen. Puget Sound is no stranger to spills of oil and other hazardous substances. In addition to occasional large spills, such as the *Nestucca* spill in 1988, numerous small spills occur in the Sound every year.

The Spill Prevention and Response Program: (1) identifies the tools and resources needed to protect Puget Sound from spills and (2) sets forth a comprehensive spill prevention and response program using current regulations and enacting new legislation if necessary. Passage of the 1991 Oil Spill Prevention Act fulfilled several key elements of the Plan's spills program. The act established the Office of Marine Safety and the Marine Oversight Board, improving the state's expertise on vessel safety issues.

Numerous elements have been merged in the 1994 Plan to reflect completed assignments and ongoing activities that have been reassigned to newly established programs or agencies. The element addressing offshore oil and gas leasing was deleted, since no leasing can occur until at least the year 2000.

Monitoring

To assess the effects of human activities on Puget Sound and its resources, it is necessary to collect baseline and long-term data on the Sound's water, sediments, biological populations and habitat. Resource managers need accurate, up-to-date information on present conditions and changes over time to protect the resources from harm.

At the heart of the monitoring program is the Puget Sound Ambient Monitoring Program, which: (1) establishes an institutional structure to manage the monitoring program; (2) implements the monitoring program design, data management system and quality assurance plan recommended by the Monitoring Management Committee in April 1988; (3) collects, analyzes, interprets and reports data in a manner that is useful to water quality managers and to the public; and (4) reviews the monitoring program to ensure that the most appropriate and cost-effective monitoring elements are included.

Changes from the 1991 Plan include: (1) restating program goals more clearly and include support of research as a goal; (2) amending language pertaining to the Monitoring Management Committee's involvement in the program; (3) clarifying procedures for revising implementation plans; (4) directing agency-intensive survey groups to use Puget Sound Ambient Monitoring Program data as a resource in defining problem areas in need of study; and (5) expanding the participants in the pesticides monitoring subcommittee.

Research

Research is essential for understanding Puget Sound and its associated watersheds, and for developing management options to protect the Sound in the future. The need to develop a comprehensive, coordinated program of research for Puget Sound was recognized in the earliest stages of developing the first Plan.

Current Research Program efforts: (1) maintain the Puget Sound Research Program in order to promote the coordination and funding of Puget Sound research; (2) establish a list of research priorities for Puget Sound which are periodically updated; and (3) assist in making the results of research available to decision-makers.

In the 1991 Plan, achieving the goals of the Research Program hinged on the establishment of the Puget Sound Foundation as the long-term means of funding and implementing program functions. The 1994 Plan replaces the Puget Sound Foundation with the Authority as an implementor of the program and reassigns to the Authority responsibilities for setting priorities and raising funds for the program. The 1994 Plan establishes a research grants program and calls for the continuation of results dissemination. It also expands the program to include research elements of other Plan programs.

Education and Public Involvement

Education and public involvement are necessary components of a long-term management strategy for Puget Sound because they inform and enable individuals to make choices about how to protect water quality. The Education and Public Involvement Program includes: (1) a public-involvement policy to be followed by agencies and local governments; (2) increased resources to state agencies and tribal governments for coordinated education programs on marine and freshwater habitats, on water quality policy issues, and on volunteer action; (3) field agents to coordinate among local and regional education and public involvement programs; and (4) a Public Involvement and Education Fund (PIE Fund) to support short-term public involvement and education efforts of both private and public sectors.

The 1994 Plan includes a number of changes to the Education and Public Involvement Program. The education guidelines and public involvement policy have been changed to reflect the need for greater racial and cultural representation. Field assignments have been simplified and the coordinated training teams have been eliminated. Roles for the Governor's Council on Environmental Education and the Office of the Superintendent of Public Instruction have been updated. A new element has been added for coordination of federal agencies.

Puget Sound Foundation

Efforts to establish the Puget Sound Foundation have been unsuccessful and the Puget Sound Foundation Program has been removed from this Plan. Refer to the Research Program for more information.

Household Hazardous Waste

The Household Hazardous Waste Program, which seeks to ensure full implementation of the Hazardous Waste Management Act, including waste reduction through oil recycling and conservative use of pesticides, has been incorporated in the Nonpoint Source Pollution Program.

Nonpoint Source Pollution

Nonpoint sources of pollution are on the rise in Puget Sound. They include failing on-site sewage (septic) systems, improper agricultural and forest practices, boating activities and marinas, stormwater runoff, and other sources. This program addresses nonpoint pollution sources through two approaches: (1) cooperative watershed planning at the local level, and (2) basinwide by pollution source.

Four major categories of changes have been made to the local watershed action program portion of the Nonpoint Source Pollution Program. The first involves separating and adding a specific goal and strategy for the watersheds, on-site sewage systems, agricultural practices, forest practices and marina/boater portions of this program. The second involves refinements to the local watershed action program to facilitate planning and implementation. The third gives new assignments to local governments regarding local programs for operation and maintenance of on-site sewage systems and marine sewage disposal facilities, and regarding assistance to commercial and noncommercial farmers, watershed monitoring, and private forestlands. The fourth set of changes adds new policies and language on integrating new federal legislation and Growth Management Act requirements with nonpoint source pollution and prevention in Puget Sound.

Local Watershed Action Program

The 1994 Plan encourages counties to cluster their remaining watersheds for planning and to initiate countywide monitoring programs. There are two new elements on integrating efforts to control nonpoint source pollution with growth management planning and the Section 6217 coastal nonpoint program, and new language calling for restoration and protection of salmon habitat, riparian areas and wetlands in watershed plans.

On-Site Sewage Systems

The 1994 Plan calls for local implementation of the revised state on-site sewage regulations, developing local programs for operating and maintaining on-site systems, increased emphasis on alternative technologies, establishing operational permit programs for large systems, and developing rules for managing biosolids.

Agricultural Practices

Revisions have broadened the emphasis to management of animal waste and other farming practices on commercial and noncommercial farms. The program continues to promote technical assistance and education programs

through conservation districts, the WSU Cooperative Extension and the Natural Resources Conservation Service (formerly the Soil Conservation Service).

Pest Management
The Puget Sound Plan first addressed pesticides in 1991 with a call for pesticide-usage surveys and a pest-management information program, including research and education on integrated pest management. The 1994 Plan acknowledges the Urban Pesticides Initiative, an association of state and federal agencies concerned with the issues of pesticide use in urban settings.

Forest Practices
Several new major state and federal forestry watershed initiatives have been started since 1991. The Department of Natural Resources, with the Department of Ecology, is administering the Jobs for the Environment Program. The DNR is collaborating with the Department of Fish and Wildlife on the Watershed Restoration Partnership, a multi-million dollar grants program focused on salmon restoration. The Timber/Fish/Wildlife Agreement has improved agency coordination and serves as a continuing forum for addressing remaining issues. The 1994 Plan calls for local governments to address forestland conversion as well as technical assistance for small-forestland owners on best management practices.

Marinas and Recrational Boating
Changes to the 1994 Plan expand sewage disposal concerns in marinas to include waste recycling, clarify requirements for boater education, ensure coordination of programs that place pumpout stations around the Sound, improve effectiveness of the monitoring program, and increase awareness of no-discharge area designations.

Household Hazardous Waste
Formerly a separate program, household hazardous waste is now included in the Nonpoint Source Pollution Program. Under the program, local governments are required to have a management plan for household hazardous wastes, although the specifics are left to the discretion of local governments.

Shellfish Protection

Puget Sound is one of the most productive shellfish growing areas in the country. This program focuses on better protection of both recreational and commercial shellfishing. The Shellfish Protection Program includes: (1) adopting shellfish policies that will ensure that programs aimed at controlling sources of pollution protect shellfish; (2) responding to existing and potential shellfish contamination with aggressive restoration and protection programs; (3) monitoring commercial and recreational shellfish areas for toxic contaminants and indicators of pathogenic organisms; and (4) increasing public involvement and education in shellfish protection.

Several changes have been made to the Shellfish Protection Program. References to the "shellfish protection and closure response strategy" (required when shellfish growing areas are downgraded) have been deleted and replaced with language that clarifies assignments and better targets efforts at priority shellfish areas. The element discussing closure-response also has been updated

to reflect a memorandum of agreement between the departments of Health and Ecology for closure response strategies, and to reflect the passage of the 1992 shellfish protection legislation. In addition, the recreational shellfish program has been updated to emphasize implementation of the Recreational Shellfish Action Plan. New language has been added that places equal emphasis on protection and restoration of both commercial and recreational shellfish resources. The funding source assessment has been deleted, since it is complete.

Wetlands

Wetlands are economically, biologically and physically valuable. They provide critical habitat for Puget Sound's marine life, including salmon. They can prevent flooding in watersheds, and they act as natural filters that cleanse storm water before it enters Puget Sound. Despite their value, more than half the wetlands along the coasts and riverbanks of Puget Sound have been destroyed or degraded by human activity, including farming and urbanization. The greatest threat to wetlands is the rapid rate of population growth—as more people move to the region, development will be necessary to accommodate the growth.

The program in the 1991 Plan called for protection of significant wetlands through: (1) preservation (purchase and other mechanisms); (2) local government regulatory programs that meet minimum state standards; and (3) a program for protecting wetlands on state-owned uplands and aquatic lands.

The 1994 Plan combines three elements to make it easier to fund administration and to promote preservation activities; encourage greater flexibility in mitigation projects to better compensate for wetlands impacts; assign new tasks relating to wetlands inventories and tracking; encourage greater consistency in the design and monitoring of compensatory mitigation projects; and update and clarify the wetlands restoration program.

Municipal and Industrial Discharges

Industries and municipal sewage treatment plants release about 900 million gallons of waste water, or effluent, into Puget Sound every day. Municipal and industrial wastewater discharges are often referred to as point sources of pollution because they are discharged to water bodies at a specific point by a pipe or ditch.

The Municipal and Industrial Discharges Program calls for extensive improvement in the effectiveness of the state's program to control point sources of pollution (including the pretreatment program) and emphasizes control of toxicants from both industrial and municipal discharges. The program: (1) requires that all waste discharge permits include appropriate monitoring requirements and limitations on toxicants and other pollutants of concern, and (2) devotes substantially increased resources to the inspection and enforcement of waste discharge permits for industrial and municipal discharges throughout the Puget Sound basin and to the discovery and control of unpermitted or illegal discharges.

There are a number of changes from the 1991 Plan. In some cases, requirements, such as the adoption of sediment standards, and changes in waste-discharge permit fees and pretreatment, are substantially under way or were completed. Other changes update tasks or clarify assignments. These include effluent limits, public notice, urban bay action teams, data management, enforcement, training, public outreach, and technical outreach to dischargers. Portions of two elements have been merged to more efficiently address industry self-monitoring. A new element that addresses alternatives to sanitary discharge to marine waters has been added.

Contaminated Sediments and Dredging

Toxic contaminants accumulate in sediments in the Puget Sound basin, causing harm to bottom-dwelling organisms and threatening the rest of the food web. Dredging to maintain navigation channels spreads and relocates these contaminated sediments.

The Contaminated Sediments and Dredging Program includes: (1) classifying sediments that cause adverse biological effects; (2) implementing Sound-wide controls on sources of contaminants causing sediments to fail the sediment standards; (3) providing rules and sites for disposal of dredged materials; and (4) expanding the Urban Bay Action Program to provide additional source control and consideration of cleanup actions for existing areas of high sediment contamination levels.

Changes to the 1991 Plan provide additional flexibility in establishing standards for confined disposal, direct the Department of Ecology to further investigate the feasibility of multi-user access to large disposal projects, and direct urban bay action team efforts to be coordinated with baywide planning initiatives.

Storm Water and Combined Sewer Overflows

Stormwater runoff is a widespread pollution problem. As urbanization of the Puget Sound basin continues, the problem is increasing. Pollutants in storm water can include sediments, nutrients, bacteria, oils, grease, metals and other toxicants.

The Stormwater and Combined Sewer Overflows Program includes: (1) development of stormwater programs in urbanized areas of Puget Sound in a phased program starting with the largest cities; (2) requirements for all cities and counties to develop operation and maintenance programs, adopt ordinances for new development, and develop programs to educate people about storm water; (3) development of stormwater controls for state highways and federal facilities; and (4) requirements for all cities with combined sewer overflows (CSOs) in the Puget Sound basin to develop and implement plans providing for the greatest reasonable reduction of CSO events.

A number of key changes have been made to the 1991 Plan. The program has been edited overall for cost effectiveness, regulatory coordination and streamlining. Cross-programmatic coordination within watersheds is enhanced, as are links with the Growth Management Act. Habitat protection is emphasized and the need for vactor-waste disposal solutions is strengthened. Performance

criteria for best management practices are added. And the departments of Fish and Wildlife and Natural Resources are required to approve the stormwater manual and identify the most critical watersheds for fish protection.

Laboratory Support

Many of the Plan's programs, such as monitoring and shellfish protection, depend on accurate and timely laboratory analyses. The Laboratory Support Program includes: (1) establishing a laboratory certification program administered by the Department of Ecology; (2) assuring that adequate laboratory support exists for agency and other sampling programs; (3) developing, updating and encouraging the use of protocols and guidelines to standardize data collection, analysis and transfer within Puget Sound; and (4) developing and encouraging the use of uniform quality assurance guidelines for data collected under all Puget Sound programs, including formation of a quality assurance/quality control working group.

The only change to the 1991 Plan assigns update and maintenance of Puget Sound protocols and guidelines to agencies and organizations with expertise. The Department of Ecology is assigned oversight responsibility.

PLAN FUNDING

Fully implementing the 1994 Puget Sound Plan would cost federal and state agencies and tribal and local governments approximately $251 million during the 1995-97 Biennium, and $291 million during the 1997-99 Biennium.

The cost projections for the 1994 Plan represent a significant increase over the projections that were included in the 1991 Plan. Most of the increase can be found in the Stormwater and Combined Sewer Overflow Program and the Nonpoint Source Pollution Program. Within these programs most of the increase is attributed to activities to be undertaken by local governments and the state Department of Transportation.

The Authority is concerned about continued funding shortages at all levels of government, which could hamper efforts to protect water quality. As protection efforts continue to be delayed and pollution continues to flow into Puget Sound, the future cost of cleaning and protecting the Sound continues to increase.

Much of the money for implementing the Puget Sound Plan comes from the state's General Fund. During the early years of the Plan, state funding gradually increased, but the economic recession of the 1990s took its toll on state revenues, leading to a series of budget cuts that have reduced appropriations for water quality programs. Successfully restoring and protecting water quality in Puget Sound will require new or additional financial resources at the state level.

The Puget Sound Plan calls for significant participation by local and tribal governments to achieve the Plan's goals, including developing and implementing watershed action plans and on-site sewage system programs, controlling stormwater runoff, and protecting wetlands and shellfish resources.

Local and tribal governments require a long-term commitment of staff and funding for these programs. Local governments, in particular, are hampered in meeting these goals by local opposition to increased taxes and fees and by competition from other programs such as crime control, the justice system and public schools. Local activities do receive funds through state programs, such as the Centennial Clean Water Fund, but these generally are provided as seed money to allow local governments to initiate programs that will be supported using local resources.

Chapter 1. Introduction

What is Puget Sound?

Puget Sound is an estuary—a semi-enclosed, glacial fjord where salt water from the ocean is mixed with fresh water that falls as direct precipitation or drains from the surrounding land. Made up of a series of underwater valleys and ridges called basins and sills, Puget Sound is deep, with an average depth of 450 feet. Its maximum depth (930 feet) occurs just north of Seattle. A relatively shallow sill at Admiralty Inlet separates the waters of the Strait of Juan de Fuca from the waters of Puget Sound proper.

While salt water enters primarily through the Strait of Juan de Fuca, freshwater sources include surface runoff, groundwater discharge and direct precipitation. A network of more than 10,000 streams and rivers drain into Puget Sound. Nearly 85 percent of the basin's annual surface water runoff comes from 10 rivers: the Nooksack, Skagit, Snohomish, Stillaguamish, Cedar/Lake Washington Canal, Green/Duwamish, Puyallup, Nisqually, Skokomish, and Elwha.

The waters of Puget Sound move in a typical estuarine pattern—seaward at the surface and landward at the lower depths. Fresh water from land enters the estuary and tends to flow over the denser seawater. Friction and turbulence cause the two to mix, creating a brackish (moderately salty) layer at the surface. The two-layer circulation system is disturbed by shallow sills that circulate water from the surface back into the depths of the basin; islands, narrow passages and a substantial tidal range of about 12 feet also influence circulation in the Sound. While the waters eventually move seaward (it takes about 150 days to replace the waters around Admiralty Inlet and as many as 300 days for the Hood Canal to flush out), most particles are permanently trapped in the basin and eventually fall to the bottom of the Sound.

Puget Sound is bordered by about 1,300 miles of shoreline, with a mix of beaches, bluffs, deltas, mudflats and wetlands. Estuarine shorelines form a bridge between land and ocean and are among the most productive systems in nature, providing food and shelter for a wide variety of species, filtering pollutants from land runoff, storing flood waters, and recharging groundwater supplies.

STATE OF THE SOUND

Keeping Puget Sound healthy is a difficult job in the best of circumstances. But we are not dealing with the best of circumstances. The Puget Sound region is witnessing tremendous change. Between 1991 and 1993 the region's population grew by almost eight percent—from 3.3 million to 3.56 million residents. Another million people are expected to settle along the shores of Puget Sound in the next 20 years. This population growth has not been without consequence. Rural settings are being overwhelmed by housing and commercial developments. Forests and meadows are being replaced by roads, homes, office buildings and shopping malls.

How is Puget Sound doing under this pressure? Although virtually no area of the basin has escaped the effects of contamination and degradation, the overall health of Puget Sound has not changed much since 1991. The fact that water quality, in general, has not worsened is due largely to the ongoing efforts of state and local governments, citizens, tribes, businesses and others to manage and prevent pollution sources. Left unprotected, the Sound's water quality would no doubt have continued the downward spiral it was in when the Authority was formed in 1985.

This does not mean, however, that Puget Sound is free of problems. The Puget Sound Ambient Monitoring Program (PSAMP) has found that, as the human population expands, signs of contamination are emerging in places that were once considered immune to pollution—areas such as rural bays and the deep basins of the Sound. Closures of shellfish beds to harvesting, diseases in bottomfish, and decreases in the abundance of some seabirds and fish—it is hard to ignore the cumulative effects of human activities on Puget Sound's resources.

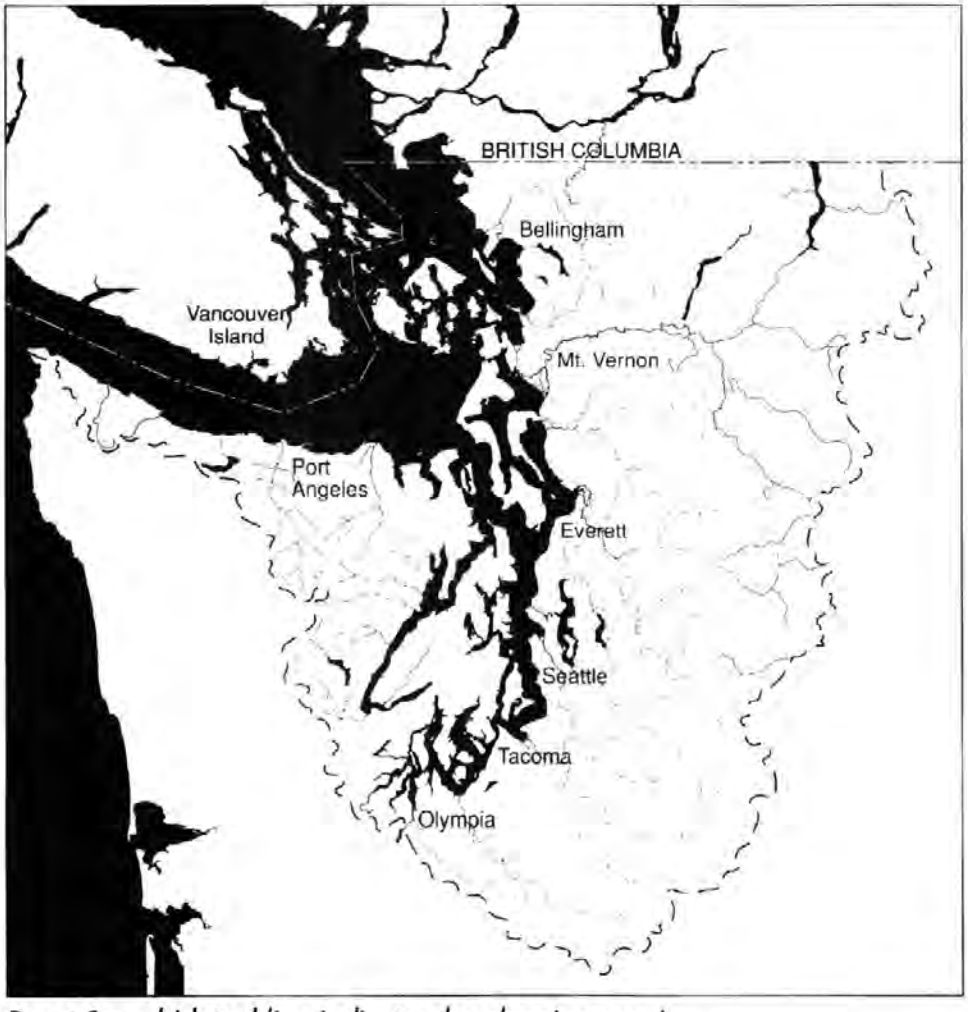
The PSAMP has been gathering information about the Sound's health for the past five years. These data are not enough to draw conclusions about changes in the health of Puget Sound, but over the next decade PSAMP will provide crucial measurements about the long-term trends in pollution and habitat loss throughout the Sound.

Following is a brief summary of important findings from the PSAMP. Findings are based on annual monitoring of five key indicators which measure the extent to which human activities adversely affect different parts of Puget Sound's ecosystem.

Chemical Contamination

Past monitoring has shown that chemical contamination poses a serious threat to Puget Sound. For example, birds show significant increases in tissue contaminants when feeding in Commencement Bay sediments, and salmon migrating through urban estuaries may retain toxic contaminants for considerable periods of time, leading to lowered growth and survival rates.

Although municipal and industrial discharges contribute significantly less chemical contaminants today than two decades ago, no treatment method can completely remove all traces of pollutants. For example, the best available technologies cannot remove highly toxic chlorinated dioxins, produced during



Puget Sound (dotted line indicates the planning area)

the paper bleaching process, in waste water to levels that are completely safe for the environment.

Improved environmental monitoring of potential chemical sources has revealed that many activities other than municipal and industrial discharges send significant amounts of metals and organic chemicals into Puget Sound every day. Improper disposal of household hazardous wastes and improper application of household pesticides and herbicides can contaminate the water. One of the biggest culprits is the automobile. Leaking oil, gasoline drips and spills, zinc and other metals contained in tires, and numerous compounds contained in exhaust are all deposited on roads and driveways. Rains then wash these compounds into storm drains, streams, and out to Puget Sound.

The worst chemical contamination occurs in the sediments of urbanized bays. Sediments in portions of four urban bays—Commencement Bay, Eagle Harbor Elliott Bay, and the area near the Naval Shipyard in Sinclair Inlet—are so contaminated that they have been declared Superfund sites by the Environmental Protection Agency (EPA). Throughout the Sound, most urbanized bays violate some sediment standards for metal or organic contaminants.

Chemical contamination of these bays is especially troublesome because contaminants tend to settle rapidly, accumulating in sediments close to their sources. Contamination can be severe and long lasting in these areas because the toxic chemicals, for the most part, are not dissipating. However, because concentrations of contaminants diminish rapidly with distance from their source, the effects of toxic chemicals on the overall health of Puget Sound are not as severe. In recent years, however, PSAMP monitoring has found that low levels of contaminants are dispersing to sites far removed from their sources.

Another significant finding in recent years is that plant and animal life in Puget Sound can accumulate contaminants from sediments and in some cases experience adverse affects. Puget Sound harbor seals at one time had the highest measured levels of PCBs and DDTs (synthetic pesticides) in the world. These levels have decreased, but still remain high. English sole from several urban bays have an alarming prevalence of liver diseases. Birds wintering in Commencement Bay show significant increases in tissue contaminants over the four months in which they feed in Commencement Bay sediments.

Fecal Contamination

Fecal contamination is a tremendous problem that affects every part of the Sound, and sources of fecal coliform bacteria can be expected to increase as the population continues to grow. Fecal contamination has already claimed over 40 percent of Puget Sound's commercial shellfish beds. More than half of the harvest restrictions in commercial beds occurred during the last decade. Many of the recent shellfish bed closures or downgrades occurred because improved monitoring detected a problem that has existed for some time.

Fecal coliform bacteria, found in mammal feces, indicate the possible presence of disease-causing bacteria and viruses in marine and fresh waters. Improperly sited or maintained on-site sewage systems (septic systems), sewage treatment plant malfunctions and combined sewer overflows, untreated waste discharges from boats, urban stormwater runoff, and marine mammal, pet and farm animal wastes all have the potential to introduce fecal matter into nearby waters.

Increased monitoring in recent years has greatly expanded our knowledge of fecal contamination, enabling state, local and tribal governments to more effectively address problems in their communities. One of the first upgrades of shellfish beds closed during the past decade occurred in 1992 at North Bay in Case Inlet. Several other recent upgrades seem to mark a turning point in the struggle to reduce fecal contamination. Since 1989, the state Department of Health has upgraded more than 6,500 acres of commercial shellfish beds in Puget Sound.

The fact that many areas of Puget Sound continue to show historic levels of fecal coliform bacteria, however, indicates that contamination is still a problem. In a few of the 10 major rivers entering Puget Sound, bacteria levels are decreasing over time, but these decreases are not occurring in the rivers with the most serious, ongoing fecal contamination problems—the Nooksack River

at Brennan, the Stillaguamish River at Silvana, the Sammamish River at Bothell, the Green River at Tukwila, and the Puyallup River at Tacoma.

Nearshore Habitat Composition and Coverage

Nearshore habitats are critical to the health of Puget Sound and its marine life. They provide shelter, and are used as spawning, rearing and feeding grounds for species that live in and around the Sound—including fish, shellfish, birds and marine mammals. In addition, nearshore habitats protect the shoreline from erosion, filter pollutants from the water, and, in the case of salt marshes, they reduce flooding by retaining storm water during high flow periods. Early in 1994, the marine science panel—a technical advisory panel to the governor of Washington and premier of British Columbia—ranked loss of nearshore habitats as the single highest priority affecting the health of Puget Sound.

Although not much data exists regarding the types and amounts of nearshore habitats, or the rate at which they are being destroyed, studies have documented a 73 percent decline in the area of Puget Sound covered by salt marshes, and that nearly all salt marsh habitats have been destroyed in river deltas within major urban areas.

While such studies provide important information about the extent of nearshore habitat losses in localized areas, there are still vast areas for which the present status of nearshore habitat coverage is unknown. The Washington Department of Natural Resources has been collecting data since 1991. As the information is processed and analyzed, a more comprehensive evaluation of Sound-wide habitat coverage will emerge, along with information about how this coverage changes over time.

Abundance of Biological Resources

Monitoring the abundance of biological resources is in the early stages. The limited data available, however, suggest that there is a wide degree of variation in the health of Puget Sound's marine populations. Salmon populations, for example, are seriously threatened by human activities, and require immediate protection. Nine Puget Sound salmon stocks have gone extinct, and many more are threatened. Many Puget Sound populations, such as the marbled murrelet, are on the federal endangered species list. Harbor porpoise—once abundant throughout the Sound—are rarely, if ever, seen in the central and southern portions of Puget Sound.

On the other hand, a few populations are undergoing dramatic improvements in response to protection and management programs. The number of young bald eagles born each year in the Puget Sound basin has increased by over 400 percent since 1980.

Conventional Water Quality

Conventional water quality problems are generally caused by contaminants other than toxic compounds such as metals and organic chemicals. They include oxygen depletion, sedimentation, excessive acidity or alkalinity, and high water temperatures.

One of the most prevalent conventional water quality problems is eutrophication. In simple terms, eutrophication is the excessive organic enrichment, or overfertilization, of a waterbody. It is caused by excessive amounts of nutrients and organic matter, which stimulate the growth of algae or phytoplankton. When phytoplankton populations become very dense and die off, they may create problems such as depleted oxygen, fish kills and foul odors.

Fortunately, the large degree of water movement in Puget Sound has kept eutrophication to a minimum. In the open bays and basins of the Sound, waters tend to be well-mixed and exchange freely with the Pacific Ocean via the Strait of Juan de Fuca. Large tidal currents and the presence of sills prevent stratification (layering due to density differences) of the water column that promotes eutrophication.

Within Puget Sound, signs of eutrophication are evident primarily in poorly mixed bays, such as Budd Inlet and Hood Canal, and in some shallow nearshore areas. Evidence of eutrophication in these waterbodies is primarily reflected in low dissolved oxygen concentrations.

The rivers and streams within Puget Sound are highly susceptible to low concentrations of dissolved oxygen as well as other conventional water quality problems such as sediment loading, or high water temperatures. These problems take a high toll on salmon and trout populations, which are very sensitive to changes in water conditions.

Over the last several years, the Department of Ecology has found that many rivers in the Puget Sound basin do not comply with state water quality standards. However, Ecology also has evaluated the long-term trends in conventional water quality parameters, and found a number of improvements in the water quality of Puget Sound rivers over the last ten years.

MANAGEMENT EFFORTS

The 1980s marked a turning point for managing Puget Sound. After decades of rapid development, extensive habitat destruction, pollution-laden discharges, a population boom, and fragmented management efforts, the public became alarmed about the toll on the Sound.

Tumors and lesions were found in bottom-dwelling fish as sediments showed high levels of toxic contamination, particularly in urban bays. Salmon stocks were declining, or even becoming extinct, as crucial habitat and migration routes were altered or destroyed. Shellfish beds were closed due to bacterial pollution. Wetlands important for providing habitat, absorbing flood waters and recharging ground water were lost at alarming rates as land grew scarcer and more valuable.

Compounding the problem was a poorly coordinated management framework in which numerous governmental agencies had resource management responsibilities in Puget Sound, but no single agency coordinated these activities. It was becoming increasingly clear that, despite significant public and private investment during the preceding decades, both a change in citizen behavior and a new management framework were needed.

In 1983, the governor appointed a 21-member board (known as the Puget Sound Water Quality Authority) to identify pollution-related threats to Puget Sound marine life, evaluate pollution threats to human health, and investigate the need to improve coordination among agencies responsible for protecting the quality of water in Puget Sound. In its 1984 annual report, the board recommended developing "a long-range coordinated plan...to protect and improve water quality throughout the Sound." In 1985, the Puget Sound Water Quality Act (Chapter 90.70 RCW) established the Authority as a state agency, restructured its board, and charged it with developing and overseeing implementation of a comprehensive management plan for Puget Sound and its related waterways.

In establishing the Puget Sound Water Quality Authority (the Authority), the Legislature found that:

- Puget Sound and related inland marine waterways of Washington state represent a unique and unparalleled resource.
- The consequences of carelessly handling estuarine resources have been dramatically illustrated elsewhere in the nation.
- The costs of restoring aquatic resources, where such restoration is possible, greatly exceed the costs of responsible preservation.
- Use of the Puget Sound resource carries a custodial obligation for preserving it.
- The large number of governmental entities that affect the water quality of Puget Sound have diverse interests and limited jurisdictions which cannot adequately address the cumulative, wide-ranging effects that contribute to the degradation of Puget Sound.

The goal of the Puget Sound Water Quality Management Plan is to restore and protect the biological health and diversity of Puget Sound. The strategy for achieving this purpose is to protect and enhance Puget Sound's water and sediment quality; its fish and shellfish; and its wetlands and other habitats.

The planning area includes Puget Sound south of Admiralty Inlet (including Hood Canal and Saratoga Passage); the waters north to the Canadian border, including portions of the Strait of Georgia; the Strait of Juan de Fuca south of the Canadian border; and all of the land draining into these waters. There are 12 counties in the planning area.

The 1985 statute directed the Authority to revise the Puget Sound Water Quality Management Plan (Plan) every two years, and to include within it an evaluation of progress toward achieving the Plan's goals and a discussion of additional concerns. The 1991 Plan originally was scheduled to be the final project for the Authority, which would cease to exist after June 1991. However, legislation approved by the 1990 Washington State Legislature (Chapter 115, Laws of 1990) retained the Authority as an independent agency; extended its work through June 1995; and changed the schedule for Plan review to a four-year cycle, with a review due by July 1994. Upon reviewing the Plan, it is up to the Authority board to decide whether revisions are necessary.

The 1990 legislation expanded the Authority board to 11 members, all with voting privileges. Nine of the members are appointed by the governor, including one representative each from city, county and tribal governments, and one representative from each of the six Puget Sound-area congressional districts that existed prior to the 1992 redistricting. The director of Ecology, who presides at board meetings, and the commissioner of public lands are ex-officio members. The executive director is appointed by the governor and supervises the work of Authority staff, but no longer serves as a board member.

The 1990 statute also changed the structure of the Authority board. Previously, the board had nine members: seven voting members appointed by the governor (these included the executive director of the Authority and representatives of each of Puget Sound's six congressional districts), and two ex-officio, nonvoting members (the Department of Ecology's director and the commissioner of public lands). The executive director presided over board meetings.

HISTORY OF THE PUGET SOUND PLAN

The first Puget Sound Plan was adopted on December 17, 1986 (known as the 1987 Plan) and revised in 1989, 1991 and 1994.

Each edition of the Plan is developed with an extensive planning process that includes as many interested parties as possible. Informal consultations are held with representatives from local and tribal governments, state and federal agencies, industry, trade groups, community groups, environmental organizations, and citizens. Numerous public hearings and meetings are scheduled throughout each Plan-adoption period.

Some of the major issue areas addressed in the 1987 Plan included contaminated sediments and dredging, stormwater, protection of wetlands and shellfish, education and public involvement, and "point" and "nonpoint" sources of pollution. (Point sources generally come out of a pipe, nonpoint refers to pollution that comes from other sources, such as runoff, on-site sewage systems and boats.) A section was devoted to examining the "unfinished agenda"—issues for which the Authority lacked the time and resources to develop Plan programs. In 1987, those issues ranged from transboundary pollution to the effects of air pollution on the Sound.

The 1987 Plan also directed the Authority to develop three new programs that were crucial to implementing the Puget Sound Plan: 1) a comprehensive,

ambient monitoring program for the Sound; 2) a long-range strategy for education and public involvement related to Puget Sound; and 3) a system of priorities and funding for research. The 1989 Plan, adopted on October 19, 1988, added these three issues as new Plan programs. Existing programs continued with minor modifications.

The 1991 Plan, adopted on November 21, 1990, built on the progress achieved under the 1987 and 1989 plans. Programs were added to address overall estuary management and to protect fish and wildlife habitat. In addition, the Plan called for creating a non-profit Puget Sound Foundation to provide centralized, long-term support for research and educational strategies.

This 1994 Plan is the first in which no new programs were added. In fact, the program that called for establishing a Puget Sound Foundation has been eliminated due to the inability to secure funding from private or public sector sources. Other amendments incorporated into the 1994 Plan include making due dates in the Stormwater Program consistent with the state's Growth Management Act (GMA); coordinating other parts of the Plan with the GMA; requiring the Department of Ecology to develop a policy on alternatives to discharging sewer wastes into marine waters; coordinating the Plan with the federal Coastal Zone Act Reauthorization Amendments; expanding the role of local governments in managing nonpoint pollution sources; and updating and refining a number of program elements.

State law calls for the Puget Sound Water Quality Authority to terminate on June 30, 1995, but the Puget Sound Plan specifically is exempted from this "sunset." Unless the state Legislature directs otherwise, the 1994 Puget Sound Plan will become the final comprehensive plan for protecting Puget Sound, and "the implementation of the plan...shall be the responsibility of such entities as are provided by the Legislature" (RCW 90.70.902).

NATIONAL ESTUARY PROGRAM

Puget Sound has long been considered a national treasure, and the degradation of its waters and resources has been of concern not just locally, but at the federal level as well.

In 1986, the U.S. Environmental Protection Agency (EPA), the Department of Ecology and the Authority formed the Puget Sound Estuary Program (PSEP), through which the three agencies co-manage protection efforts in the Sound. In 1987, Congress created the National Estuary Program in the Federal Clean Water Act to provide a framework for protecting significant estuaries throughout the country. In March 1988, Puget Sound was designated by EPA as a member of the National Estuary Program (NEP), and the PSEP was designated as the management body for NEP efforts in the Sound. Those efforts initially were to focus on developing a Comprehensive Conservation and Management Plan (CCMP) for Puget Sound.

The state-mandated Puget Sound Water Quality Management Plan, which had already been developed by the Authority, became the basis for the federal plan. After additional improvements were incorporated into the Authority's Plan in 1991, the EPA approved it as the federal CCMP for Puget Sound, making it

the first estuary plan in the country to receive federal approval. Few estuaries encompass as many political jurisdictions (more than 120 cities and counties and 16 tribes in the Puget Sound basin), or involve as many different types and sources of pollution.

Puget Sound also is unique in having a state agency develop and oversee the comprehensive protection plan; the other NEP programs are coordinated by the EPA, with less state involvement. The Authority has pioneered programs for addressing the Sound's complexities. As a result, the Puget Sound Plan and the Authority have become models for other estuary programs, and Authority staff members frequently are called on to advise officials at those programs.

The PSEP committee continues to meet every other month. Federal law requires using a management group only for developing the management plan, but the Authority believes the committee has an important role in overseeing implementation and ensuring ongoing communications between the three lead agencies.

THE PLANNING FRAMEWORK

The Puget Sound Water Quality Management Plan is developed by the Puget Sound Water Quality Authority, but it is implemented by state and federal agencies, Indian tribes, and local governments. All are given specific assignments in the Plan, based on the nature of their missions and institutional authority. They work with industry, businesses, organizations, schools and private citizens to collectively achieve the goals of reducing pollution and protecting biological resources in Puget Sound.

There is a growing appreciation for how environmental issues are interconnected. Water quality is difficult to separate from issues related to water quantity, air quality, growth and development, endangered species, habitat preservation, farm practices, forest management, and hazardous wastes. The challenges to achieving the goals of the Puget Sound Plan are to gain the cooperation of the various government agencies and other groups, and to coordinate Plan actions with their ongoing related activities.

As a matter of practice, the Authority seeks to coordinate with other planning programs on issues that affect the overall water quality of Puget Sound (e.g., the Puget Sound Dredged Disposal Analysis, the Timber/Fish/Wildlife Agreement, and the proposal to establish a marine sanctuary in the northern waters of Puget Sound). Since adopting the 1991 Plan, the Authority has worked to coordinate with federal and state watershed initiatives, growth management, and efforts to control nonpoint pollution sources in coastal areas.

Watershed Management

In recent years, many agencies and governments have realized that they need better processes for making decisions about resources, including water quality. Primarily, their decisions and activities need to be better coordinated to reduce duplication and to provide comprehensive, rather than fragmented, protection for natural resources. In the search for common ground, agencies and governments are looking beyond the bounds of political jurisdictions and instead

using nature's own watershed borders as the basis for planning and making decisions.

Watersheds provide a geographic, resource-based focus that often crosses political jurisdictions and encourages cooperation. Furthermore, "watershed-based management" can be used to address a number of resource issues, not just water quality. Using watersheds as the decision-making unit offers certain advantages:

- Watershed boundaries relate to major resource issues, such as habitat, water quality and quantity, fish and wildlife migration, and sediment flow and accumulation.
- Watersheds can provide a common basis for making decisions across agency, government and program lines, and for recognizing their cumulative effects.
- Watersheds present a logical basis for fostering citizen understanding and stewardship for their environment.

Using watersheds also presents a number of challenges:

- New, interagency planning and agreement processes are needed to support decision making across political jurisdictions.
- Citizens and governments may feel excluded by resource management processes that don't have clear lines of accountability and responsibility.
- Characterizing resources and their conditions, and sharing program data within watersheds, may require that common assessment methodologies and data management systems be developed (existing programs use a variety of assessment and characterization protocols).
- Watersheds are not natural units for dealing with some resources, such as groundwater aquifers, which can cross watersheds.
- Islands have many small drainages, rather than a few major watersheds.
- Existing program standards may prevent trade-offs between competing resource protection goals, such as wetlands versus stormwater management.
- Funding sources often are dedicated to specific solutions and may not support administering, monitoring, evaluating and refining a watershed-based program
- The term "watershed" is defined differently by each program, so the size of the analysis unit varies greatly.

Water quality is managed by a mix of federal, state and local authorities. In some cases, separate federal, state and local programs address similar water

quality issues. Some programs address multiple issues, including water quality.

The Puget Sound Plan itself is a "watershed plan," encompassing the entire watershed draining into Puget Sound. As one of the tools to help implement the Plan, the Authority adopted a rule in 1988 calling on local communities to identify their watersheds, rank them in order of importance, and develop and implement "action plans" for each of them to protect water quality. The Authority works closely with local governments to support these processes and to help coordinate their efforts with state activities.

As state and federal agencies become more involved in watershed management, the Authority must participate in their discussions, both to ensure that local watershed efforts are appropriately recognized and respected and to adapt the Plan to make the most of new watershed-based decision-making opportunities. Since 1991, state and federal agencies have launched or continued a number of significant watershed-related efforts[1]:

- Integrated landscape management for fish and wildlife—launched by the Department of Wildlife (now the Department of Fish and Wildlife) to replace the agency's species-by-species management approach. Watersheds are being used as the geographic boundaries for assessing the needs of priority habitats, fish and wildlife.

- State Wetlands Integration Strategy—the departments of Ecology and Community, Trade and Economic Development received a grant from the EPA in 1992 to coordinate wetlands protection among federal, state and local agencies.

- Department of Ecology's watershed approach to resource management—intergovernmental teams are being convened in selected watersheds to develop planning processes appropriate to the issues in those watersheds.

- Total maximum daily load (TMDL)—in accordance with federal law, the Department of Ecology will establish limits for how much pollution can be discharged into streams that violate water quality standards. Ecology plans to conduct the TMDL review process within the framework of its watershed approach (see above).

- Chelan Agreement—the 1990 agreement established a Water Resources Forum, which selected the Methow and Dungeness-Quilcene as pilot planning areas for which Ecology is developing regional water-use plans.

- Wild stock initiative—launched in 1992 by the now combined Department of Fish and Wildlife to encourage restoration of fish stocks and their habitats. Recovery options are being prepared for priority basins.

1 Briefing papers that describe most of these projects in more detail may be obtained from the Authority.

- Closure response strategy for shellfish bed downgrades—the Puget Sound Plan directs the departments of Ecology and Health to work with local communities to develop a closure response strategy whenever a shellfish growing area is downgraded.

- Stormwater basin planning—three different efforts exist in the Puget Sound basin, one launched by local governments, one established by the Authority under state rule (400-12 WAC), and one achieved by Ecology through National Pollutant Discharge Elimination System permits. The goals and activities required under each effort differ somewhat.

- Landscape planning—launched in 1992 by the Department of Natural Resources to establish timber and nontimber management objectives for landscapes, and to analyze the effects of past, present and foreseeable activities on water quality and quantity.

- Forest Practices Act watershed analysis—adopted by the Washington Forest Practices Board in 1992 (under legislative mandate) to provide a means for assessing the potential or cumulative effects of forestry activities within a watershed.

- Central Puget Sound water planning—initiated by the Governor's Office in 1993 to recommend ways to manage water resources in King, Pierce, Snohomish and Kitsap counties.

- Federal forest plan—the U.S. Forest Service has formed provincial teams (with representatives of federal, tribal, state and local governments and interest groups) to implement President Clinton's forest plan in targeted, forested watersheds.

- Puget Sound 400-12 Watershed Action Program—established by the Authority in 1987 and administered by the Department of Ecology. The 12 counties bordering Puget Sound have identified 131 local watersheds as priorities for protection, and gradually "action plans" are being developed and implemented for each of them. By December 1994, 20 plans had been approved by Ecology for implementation, and another 17 were being developed.

- Puget Sound Plan—the Nonpoint Source Pollution Program contains a watershed-based management program for reducing pollution in runoff; the Contaminated Sediments and Dredging and the Municipal and Industrial Discharges use "urban bay action teams" to control sediment contamination in urban bays; and the Stormwater and Combined Sewer Overflows Program recommends local basin planning for managing storm water.

While water quality is not the primary focus of all of the efforts listed above, each will directly affect water quality. The continuing challenge for the Authority is to ensure that new approaches to watershed management are coordinated with the Plan. The Plan should play a strong role in guiding and coordinating processes that take a watershed-based approach to protecting water quality.

For example, water quantity is an emerging issue that has strong connections to water quality. Interbasin transfers, in-stream flows, and using conservation rather than reappropriation to enhance stream flows are all water quantity issues that directly affect water quality. The Authority will participate in new watershed programs and forums like these as appropriate.

The Authority is a member of the Watershed Coordinating Council that was established by the Legislature in 1994. The council is to present recommendations to the Legislature by December 15, 1994, on coordinating watershed planning and activities. Based on the council's recommendations and any legislative action on watershed management, the Authority will consider the need to revise the Plan before July 1995.

Growth Management

Local land-use decisions control where, what, when and how new development will occur, and they significantly influence water quality—in rivers, lakes, aquifers and Puget Sound. Given the growth trends in the Puget Sound basin, managing the effects of new development is critical to protecting or improving water quality in Puget Sound.

Previous versions of the Puget Sound Plan recognized the connection between land use and water quality, and assigned major roles to local governments for implementing the Plan. The Growth Management Act (GMA), which was adopted in 1990 and amended in 1991, further strengthened these linkages and required that local land-use plans include provisions for protecting water quality. The 1994 Plan clarifies and enhances local governments' opportunities for protecting water quality through GMA activities.

The GMA process directly and indirectly benefits water quality:

- The GMA requires that zoning and other development regulations be consistent with local governments' comprehensive plans. Consistency between planning and implementation will encourage consideration of the cumulative effects of development.

- The land-use elements of comprehensive plans are required to "...review drainage, flooding and stormwater runoff in the area and nearby jurisdictions and provide guidance for corrective actions to mitigate or cleanse those discharges that pollute waters of the state, including Puget Sound or waters entering Puget Sound." (RCW 36.70A.070)

- The GMA requires that critical areas and natural resource lands be protected. GMA regulations define critical areas to include wetlands, aquifer recharge areas, frequently flooded areas, geologically hazardous areas (including erosion hazard areas), and fish and wildlife habitat-conservation areas (including shellfish beds).

- The GMA requires that urban growth areas be established to control sprawl and to encourage cities and counties to coordinate their planning decisions. This will better protect open space and critical wetlands.

- The GMA requires local governments to show how they will finance the level of development proposed in their comprehensive plans, including paying for stormwater controls.

The Puget Sound Plan assigns local governments major roles in protecting wetlands, preventing water pollution, controlling storm water and protecting shellfish. These assignments include planning, regulation, education, remediation and enforcement activities. Appendix D illustrates the link between the GMA process and Plan assignments.

The Puget Sound Water Quality Authority coordinates the Plan with the GMA process in several ways:

- Educating local governments about their Plan assignments and their relationship with the GMA process.
- Providing informal review and comment to local governments on preliminary GMA products.
- Coordinating with other state agencies to provide technical assistance to local governments.
- Providing formal comments on GMA products submitted to the Department of Community, Trade and Economic Development (DCTED) for state review.
- Helping the DCTED develop model comprehensive plans.

Coastal Zone Act Reauthorization Amendments (Section 6217)

In 1990, Congress revised the federal Coastal Zone Management Act (CZMA) through the Coastal Zone Act Reauthorization Amendments (CZARA). The amended law requires states with federally approved coastal zone management programs to develop additional programs for controlling nonpoint pollution sources in coastal areas. The purpose is to restore and protect coastal waters from pollution by implementing economically achievable management measures.

The EPA and the National Oceanic and Atmospheric Administration (NOAA) have provided official guidance to states describing what should be contained in their "coastal nonpoint pollution programs" and the process that will be followed in reviewing and approving them. States have until July 1995 to submit their implementation programs to the EPA and NOAA for review and approval. States that do not establish the programs will lose a percentage of their federal funding that is available through the federal Clean Water Act and the CZMA.

Implementation will be phased in over several years. Initially, the management measures are to be achieved by applying the best available technologies, practices, processes, siting criteria, operating methods or other alternatives. Six categories of management measures are covered by the EPA guidance: agriculture, forestry, urban (which includes storm water, on-site sewage

systems, pesticides and household hazardous wastes), marinas and recreational boats, hydromodification (e.g., dams, dikes and measures to prevent bank erosion), and wetlands. In areas where the initial management measures fail to protect water quality or designated uses, the federal law calls for using additional management measures.

The Department of Ecology is responsible for developing Washington state's program and coordinating its implementation. The department also will assess the opportunities for using existing programs and whether new implementing authority is needed. At a minimum, Washington must show how the management measures will be implemented (the EPA encourages using technical assistance and public education rather than relying entirely on regulatory oversight); provide for using more stringent controls where the water quality standards and designated uses are not being adequately protected; and show that the state has the legal authority to ultimately enforce compliance.

The state's coastal nonpoint-pollution program will rely on a mix of state and local programs, including a wide variety of activities called for by the Puget Sound Plan. These activities are primarily in the Nonpoint Source Pollution, Stormwater and Combined Sewer Overflows, Wetlands Protection, and Public Involvement and Education programs.

The Puget Sound Plan's approach to nonpoint source pollution already has many similarities to the federal requirements, including an emphasis on using best available technologies in combination with technical assistance and public education. Appendix E illustrates which Plan program elements address the management measures called for by the CZARA. Many of the elements would directly implement the related management measure, some would indirectly implement them, and some would go beyond what is specified in EPA's management-measure guidance (e.g., extensive public education and involvement programs). Only a few of the management measures, such as dams, are not addressed at all by the Plan. It is expected that the state will rely on the Plan and other programs to implement the management measures.

The federal requirements apply statewide. The Puget Sound Water Quality Authority participates on Ecology's advisory committee and will recommend implementing the CZARA requirements in the Puget Sound basin through the Plan. Once the state finishes developing its program for protecting coastal areas from polluted runoff, the Authority will amend the Plan, if necessary, to improve consistency and coordination. Until the state's coastal nonpoint pollution program is in place, state and local agencies should consider incorporating the management measures into their land-development and land-use regulatory programs and watershed management efforts.

SUCCESSES FOR PUGET SOUND

Since the 1991 Puget Sound Water Quality Management Plan was adopted, the region has witnessed good news and bad news about Puget Sound. For example, shellfish harvesting has reopened in some areas, thanks to aggressive efforts by neighboring communities. In other areas, pollution has increased, causing shellfish beds to be closed. These events have illustrated the need for implementing the Plan throughout the Puget Sound basin, because the manage-

ment and response strategies that have been linked most closely with upgraded water quality are contained in the Plan.

Numerous programs and activities to protect water quality have been launched during the past four years. Many are called for in the Plan, but some are "trickle-down" successes—legacies of the extensive public involvement and education efforts launched under the Plan that have raised public awareness about protecting Puget Sound. Following are many of the accomplishments of the past four years.

Laws, Regulations and Ordinances

- In 1991, the Legislature passed the Oil Spill Prevention and Response Act, requiring that plans be developed for preventing and, if necessary, quickly responding to spills in Washington's marine waters. The statewide Spill Contingency Plan was revised later that year; a damage assessment rule was adopted in 1992; and a policy on using oil dispersants was completed in 1993.

- To reduce the likelihood of boating and shipping accidents that could cause spills, regional marine-safety plans have been drafted and are being reviewed by the Office of Marine Safety. Also, the U.S. Coast Guard is preparing to adopt regulations that would allow "regulated navigation areas" to be established.

- In 1992, the Legislature adopted the Shellfish Protection Act, which was sponsored by the Authority. Among other things, the law requires that a county create a shellfish protection district any time a shellfish bed is downgraded. Within the district, property owners pay for services to eliminate sources of pollution and protect local waters. Several shellfish protection districts have been established, some voluntarily and others triggered by a shellfish bed closure.

- The Forest Practices Board, in 1992, revised its Forest Practices Rule to incorporate a new watershed analysis process, provisions to protect wetlands and streams, and limitations on the size and timing of clearcuts.

- In March 1994, the state Board of Health revised its regulations for on-site sewage systems. The new rules set standards for proper design, siting and installation of systems; call for installers and inspectors to be certified; and require that local governments establish programs to ensure that systems are routinely inspected and properly maintained.

- The Department of Ecology has improved its permits for point sources of pollution and its monitoring requirements, thereby reducing the amount of pollutants flowing into Puget Sound.

- As a Plan assignment, the Department of Ecology established state standards for sediments. They are the first of their kind in the country and are being used as a model in other states.

- In accordance with the Plan, many local governments have strengthened their enforcement of existing water quality laws and have adopted new ordinances to protect water quality and wetlands, to control storm water, and to reduce pollution in runoff. The Growth Management Act has played a large role in stimulating action.

Funding

- The Office of the Superintendent of Public Instruction received $250,000 from the EPA to develop materials for environmental education in public schools.

- In 1993, Washington's congressional delegation won approval of a special $800,000 federal appropriation to implement actions called for in the Plan. The Authority distributed about half the money to local governments as Puget Sound Action Grants; the remaining money was distributed to state agencies to provide pass-through grants for specific activities to support the Plan.

- In compliance with the 1990 law that reauthorized the Authority, the agency developed a process to set funding priorities each biennium for all of the elements contained in the Puget Sound Plan.

Education and Technical Assistance

- The Authority has continued administering the Public Involvement and Education (PIE) Fund Program, which supports projects that educate and involve people in protecting water quality. More than $2 million was awarded to 106 projects during the 1991-93 and 1993-95 bienniums. More than 200 projects have been launched during the eight-year history of the program. A citizen advisory committee helped review and select the projects, and the Authority published two volumes of case studies about the results.

- Five water quality field agents have been hired to provide coordination and technical assistance to local governments and citizens to carry out the Puget Sound Plan. The program is managed jointly by the Washington State University Cooperative Extension, the University of Washington's Sea Grant and the Puget Sound Water Quality Authority.

- The Authority developed guidance for local governments to use in developing wetlands protection programs. This guidance builds on Ecology's model ordinance, and provides more detail about non-regulatory measures that can be taken.

- Ecology produced a guidebook and offers ongoing assistance to advise local governments and land trusts about their options for preserving wetlands.

- Ecology issued a revised Shoreline Master Program Handbook in September 1993. Ecology and the State Parks and Recreation Commission have developed design standards for boat pumpout facilities. The Department of Health is developing guidance for disposing of sewage at marinas.

- The Authority updated the directory of water quality resources and programs in Puget Sound, and now makes it available on computer disk or hard copy.

- Ecology completed its permit writers manual to improve the consistency of discharge permits issued by the department, and increased public outreach to encourage dischargers to obtain the necessary permits. Technical assistance for dischargers is being developed.

- Ecology completed a stormwater manual and offered workshops to help local governments develop stormwater programs and ordinances called for by the Plan.

- The Authority developed handouts to describe how local governments can incorporate actions called for under the Puget Sound Plan into the county wide policies, comprehensive plans and development regulations required by the state Growth Management Act.

- The Authority and the Washington Department of Transportation cooperated in a pilot project to present water quality information aboard Washington ferries.

- Information about issues related to protecting Puget Sound are reported by the Authority throughout the year in the *Sound Waves* and *Puget Sound Notes* newsletters.

- The Authority developed and distributed a guidebook and offered workshops to local governments on how to finance water quality programs.

- The Authority maintained its commitment to education and outreach by devoting considerable staff time to working with local governments, community groups and businesses to educate them about the Plan and how to implement it.

Local Communities

- Since the 1991 Plan was adopted, 11 more local watershed committees have begun developing protection plans for their local watersheds, and the Department of Ecology has approved another nine for implementation. A total of 36 watersheds are being addressed under the Authority's Nonpoint Source Pollution Program. Nearly half have plans that are being implemented.

- About 65 percent of the more than 120 local governments in the Puget Sound basin have established stormwater programs.

- Restoration work is under way at three sites in the Duwamish River and on Spencer Island in Snohomish County. More than 50 acres of intertidal wetlands will be restored, using funds that were leveraged from federal, state, local and private sources.

- Water quality improved in Burley Lagoon (Kitsap/Pierce counties), North Bay (Mason County), Dosewallips State Park, and South Skagit Bay, thus allowing commercial shellfish harvesting to reopen. Several more shellfish beds were reopened after potential pollution threats were eliminated.

State Agencies

- During the 1991-93 Biennium, the Department of Natural Resources acquired approximately 96 acres of wetlands using money appropriated for implementing the Plan.

- Ecology established a process for accrediting laboratories. More than 200 labs have applied to Ecology for accreditation, and major dischargers are now using accredited labs.

- Urban bay action teams established by Ecology have completed plans for addressing water quality and habitat problems in Elliott Bay, Commencement Bay, Sinclair and Dyes inlets, Port Gardner, Bellingham Bay and Budd Inlet. However, budget cuts have hampered efforts to implement those plans.

- The Department of Health annually produces an inventory of commercial and recreational shellfish areas in Puget Sound, but until this year had not issued classifications for the recreational beds. In May 1994, the department issued classifications for 71 of the 140 recreational shellfish beds located in Puget Sound.

- In accordance with the Plan, the departments of Ecology and Health completed an interagency agreement in January 1993 for responding to downgrades of shellfish beds. Under this system, strategies were completed for the lower Nisqually and lower Hood Canal watersheds in 1993.

- The State Parks and Recreation Commission is gradually installing boat waste pumpouts in state parks around Puget Sound, and is managing grant programs to install pumpouts in public and private marinas. The Authority, through the PIE Fund, supported a project to invent portable pumpouts to make it easier for boaters to dispose of their wastes properly. State Parks also conducts an ongoing education program. The Department of Health has conducted some monitoring to assess the effects of boating activities, and in 1993 completed a survey of the effectiveness of pumpout facilities.

The Authority

- In accordance with a requirement of the 1990 law that reauthorized the Authority, the agency coordinates the Puget Sound Ambient Monitoring Program and has published five annual reports (*Puget Sound Update*) on data that has been gathered. An advisory committee helps manage the program.

- A geographic information system (GIS) for centrally storing data about Puget Sound has been established and is being upgraded. So far, the

Puget Sound Environmental Atlas and information about sediments, fish and shellfish have been loaded into the database.

- In June 1994, the Authority established a Puget Sound Hero awards program to recognize successful efforts to protect Puget Sound.
- The Authority developed a process for budgeting and reporting by state agencies; the process requires the agencies to prepare implementation plans and to report to the Authority every year on their progress in carrying out those plans. Compliance by the affected agencies has been mixed.
- The Authority started a project to gauge how much of the Puget Sound Plan has been implemented (the Measuring Results Project). The information was used by the board in deciding how to amend the 1994 Plan, how to set priorities as required by state statute, and how to best achieve implementation.
- In January 1994, the Authority adopted *Action for Puget Sound*, establishing an agenda of four priority issues that will be the focus of the agency's attention for the next two years. Through *Action for Puget Sound*, the Authority will seek progress toward repairing and eliminating failing on-site sewage systems, preserving wetlands, establishing stormwater programs, and implementing watershed plans and urban bay action plans.
- In 1992, the Authority created a citizens advisory committee to address marina and boating issues in Puget Sound.
- The Authority annually co-sponsors Washington Coastweeks (now Washington WaterWeeks), and sponsored a mini-grants program in 1993 and 1994 to help citizens carry out action-oriented projects as part of the month-long event ($6,000 was awarded over the two-year period).
- In accordance with state law, the Authority published a *State of the Sound Report* in June 1992.
- In 1993, the Authority produced a survey of citizen monitoring programs around Puget Sound.
- Key Bank and the Authority co-hosted a reception in December 1993 to celebrate the reopening of commercial shellfish harvesting in Burley Lagoon (Kitsap/Pierce County). The reopening was possible because water quality had improved following a 12-year effort by the community and local and state agencies to stem the flow of pollution into the lagoon.

Conferences

- In November 1992, the Authority hosted a conference about the Public Involvement and Education Fund (PIE Fund).
- In February 1993, the Authority hosted a conference on local watershed programs and how to improve planning and implementation. An advisory committee was formed to help plan the conference.

- In January 1991, more than 1,000 people attended a Puget Sound research conference that was organized and hosted by the Authority. Another is scheduled in January 1995.

- The Authority, in cooperation with the law firm Heller, Ehrman, White & McAuliffe, hosted two Clean Water Act conferences, in June 1993 and June 1994.

- In 1992, the Authority helped organize a scientific conference in Bellingham entitled "Across the Border," addressing marine environmental conditions in Washington and British Columbia.

- The Authority helped organize the January 1994 "British Columbia/Washington Symposium on the Marine Environment," in Vancouver, B.C.

Other Accomplishments

- In 1991, the Puget Sound Water Quality Management Plan was approved by the U.S. Environmental Protection Agency as the Federal Comprehensive Conservation and Management Plan, making it the first estuary plan in the country to receive federal approval.

BARRIERS TO SUCCESS

Progress occurs one small step at a time, especially when it comes to protecting Puget Sound. Laws, programs and agencies already exist to control many of the principal sources of pollution and to protect wetlands and shellfish areas in Puget Sound. These efforts have reaped some success. For example, industry has significantly reduced its polluted discharges, families are doing a better job of properly disposing their household hazardous wastes, and the Legislature has authorized the use of shellfish protection districts to pay for eliminating pollution that harms local shellfish beds.

For the most part, the regulatory or statutory aspects of preventing pollution or protecting habitat have been enacted, and they have been used effectively to stanch the "easy" sources of pollution. But pollution continues to enter Puget Sound from many other sources, and habitat continues to be lost or degraded throughout the basin under the onslaught of rapid development.

Lack of funding continues to be a significant barrier. State support for implementing the Puget Sound Plan has dwindled as the state budget has shrunk. And although local governments have several options for generating revenues for water quality programs, such proposals frequently meet with opposition from local residents.

Such opposition is indicative of another major barrier: people's misperceptions. For example, there is a lingering belief that industry and oil tankers are the primary threats to Puget Sound; individuals frequently are unaware that their own daily activities collectively generate a large amount of the pollution that enters Puget Sound. Another example involves the salmon crisis; many people continue to blame the decline of salmon on overfishing, not understanding that habitat destruction also is a major factor. These misperceptions

often manifest themselves in opposition to programs and policies (e.g., growth management, shellfish protection areas, stormwater programs, critical areas ordinances and forest-practices rules) that are designed to minimize or reverse the harm from these activities.

Education is critical to protecting Puget Sound—to help people understand the true causes of water pollution and the results of habitat destruction, to build a sense of personal responsibility among those who are privileged to live in the Puget Sound basin, and to generate long-term support for efforts to protect water quality and habitat.

The Authority devotes a significant portion of its resources to education and outreach, in addition to administering the innovative Public Involvement and Education (PIE) Fund Program (see "Successes" section on page 16). Other state and local agencies and community groups have sponsored educational efforts as well. But much more is needed on all fronts. Continued, or even increased, funding—for education and for implementing other aspects of the Puget Sound Plan—is of paramount importance.

FUNDING FOR THE PUGET SOUND PLAN

Cost Estimates for the 1994 Plan

As part of developing the Puget Sound Water Quality Management Plan, the Puget Sound Water Quality Authority has always developed projections of what it would cost to fully implement the Plan. These projections have included the costs of activities by federal and state agencies and by local and tribal governments. The estimates are developed by Authority employees, working closely with representatives of the various parties that are called on to perform tasks in the Plan.

These cost estimates become an important measure of how well progress is proceeding for implementing the Plan. If funding is far short of the estimate for implementing the Plan, then it is a reasonable conclusion that a significant amount is not being accomplished. Tables 1, 2 and 3 on pages 24 through 26 provide an estimate of Plan implementation costs for the 1995-97 and 1997-99 bienniums.

The cost projections for the 1994 Plan represent a significant increase over the projections that were included in the 1991 Plan. Most of the increase can be found in the Stormwater and Combined Sewer Overflows Program and the Nonpoint Source Pollution Programs; within them, most of the increase is attributed to activities to be undertaken by local governments and the state Department of Transportation. More detail on program costs can be found in the cost-summary narrative and charts that are included with each of the Plan programs.

Table 1
ESTIMATES TO IMPLEMENT THE 1994 PUGET SOUND PLAN
By Program

PROGRAM ACTIVITY	95-97 Biennium	97-99 Biennium
Authority Activities	$ 2,787,444	$ 0
Estuary Management & Plan Implementation	4,117,994	4,267,520
Fish & Wildlife Habitat Protection	4,377,385	4,392,390
Spill Prevention and Response	4,557,875	3,161,801
Monitoring	8,630,629	8,355,988
Research	426,436	576,436
Education and Public Involvement	5,605,988	6,990,163
Nonpoint Source Pollution	72,767,576	75,771,954
Shellfish Protection	11,250,883	11,080,942
Wetlands Protection	26,707,256	26,432,592
Municipal and Industrial Discharges	12,605,920	12,463,709
Contaminated Sediments and Dredging	4,975,904	4,489,432
Stormwater and CSOs	90,834,184	130,771,368
Laboratory Support	1,667,938	1,888,688
PROGRAM TOTALS	$251,313,412	$290,642,983

It is a constant challenge for the Authority to track the amount of money that is spent for implementing the Plan. The task is more easily accomplished for spending by state agencies than for spending by federal agencies and tribal and local governments. It is difficult to collect and analyze budget information from these latter sources.

Funding Sources

Much of the money for implementing the Puget Sound Plan comes from the state's General Fund. During the early years of the Plan, state funding gradually increased, but the economic recession of the 1990s took its toll on state revenues, leading to a series of budget cuts that have reduced appropriations for water quality programs.

Tracking of water quality expenditures has improved somewhat since the 1991-93 Biennium, when the Legislature began specifying (through provisoes) how agencies are to spend their General Fund appropriations for implementing the Plan. The Office of Financial Management and the Legislature's budget committees also assist in the tracking process by keeping records that show how much is spent for implementing the Plan. Figures 1 and 2 show the projected implementation costs for state agencies compared to actual dollars spent by those agencies, for the last two biennia. Table 4 shows direct state and federal expenditures for the Plan since adoption of the 1987 Puget Sound Plan.

Table 2
ESTIMATES TO IMPLEMENT THE 1994 PUGET SOUND PLAN
By Funding Source

FUNDING SOURCE	95-97 Biennium	97-99 Biennium
Aquatic Lands Enhancement Account	$ 10,000,000	$ 10,000,000
Centennial Clean Water Account	36,341,500	46,041,500
Coastal Zone Management grant (federal)	200,000	200,000
Federal Clean Vessel Act	400,000	400,000
Federal Forest Plan Initiative	2,000,000	2,000,000
Federal Funding Sources	3,975,730	3,661,342
Local Funding Sources	79,963,400	96,778,300
Motor Vehicle Fund	1,350,336	1,350,336
Oil Spills Administration Account	2,913,782	2,672,866
Permit Fee	8,349,554	8,714,850
Private Funding Sources	105,300	370,300
Puget Sound Grants Program (EM-6)	14,287,720	14,599,966
Section 319 Nonpoint Grants (Federal)	1,000,000	1,000,000
Special Local Assessent to Fund CDs	4,719,000	4,719,000
State Capital Funds	35,300,000	50,300,000
State General Fund	45,651,942	43,307,215
Toxics Accounts	4,028,548	3,670,708
Tribal Funding Sources	726,600	856,600
Washington Wilderness & Recreation Prog.	0	0
FUNDING TOTALS	$251,313,412	$290,642,983

As these figures demonstrate, funding has fallen far short of cost estimates for full implementation. Successfully cleaning and protecting water quality in Puget Sound will require new or additional financial resources at the state level.

The Puget Sound Plan calls for significant participation by local and tribal governments to achieve the Plan's goals. Their participation is especially critical in four of the Plan's programs: Nonpoint Source Pollution, including developing and implementing watershed action plans and on-site sewage system programs; Stormwater and Combined Sewer Overflows; Wetlands Protection; and Shellfish Protection.

Local and tribal governments require a long-term commitment of staff and funding for these programs. Local governments, in particular, are hampered in meeting these goals by local opposition to increased taxes and fees and competition from other programs such as crime control, the justice system and public schools. To some degree, they are also hampered by limited statutory authority to establish funding sources, although the Legislature has improved

Table 3
ESTIMATES TO IMPLEMENT THE 1994 PUGET SOUND PLAN
By Implementing Agency

IMPLEMENTING AGENCY	95-97 Biennium	97-99 Biennium
Bureau of Land Management	$ 13,000	$ 13,000
Conservation Districts	7,769,000	7,769,000
Cooperative Extension (WSU)	2,245,220	2,557,152
Governor's Council on Env. Education	200,296	219,422
Interagency Comm. for Outdoor Recreation	6,250	6,000
Local Governments	123,162,400	149,677,300
National Marine Fisheries Service	13,000	13,000
Natl. Oceanic and Atmospheric Admin.	54,600	54,600
Northwest Indian Fisheries Commission	6,500	6,500
Office of Marine Safety	1,929,246	1,688,330
Private Groups	105,300	170,300
Puget Sound Water Quality Authority	8,324,062	5,497,254
Tribal Governments	2,125,100	2,385,100
U.S. Army Corps of Engineers	135,069	117,452
U.S. EPA Region 10	1,599,290	1,372,948
U.S. Fish and Wildlife Service	1,293,627	1,322,990
U.S. Forest Service	1,163,842	1,163,842
U.S. Geological Service	130,000	130,000
U.S. Navy	58,726	58,726
U.S. Natural Resources Conservation Service	1,288,300	1,288,300
University of Washington	130,000	130,000
Washington Conservation Commission	904,000	904,000
Washington Conservation Corps	900,000	900,000
WA Department of Agriculture	379,600	347,100
WA Department of Community, Trade & Economic Development	604,667	510,653
WA Department of Ecology	30,089,654	29,615,653
WA Department of Fish and Wildlife	6,154,271	6,080,150
WA Department of Health	6,823,671	6,663,187
WA Department of Labor and Industry	32,500	32,500
WA Department of Natural Resources	24,111,845	23,926,736
WA Department of Transportation	26,512,936	41,512,936
WA Parks and Recreation Commission	1,787,021	2,769,206
Washington Sea Grant	1,092,346	1,564,198
WA Superintendent of Public Instruction	165,473	172,848
Western Washington University	2,600	2,600
AGENCY TOTALS	$251,313,412	$290,642,983

Figure 1. Direct State and Federal Funding Expenditures by Plan Program Activity 1991-93 Biennium

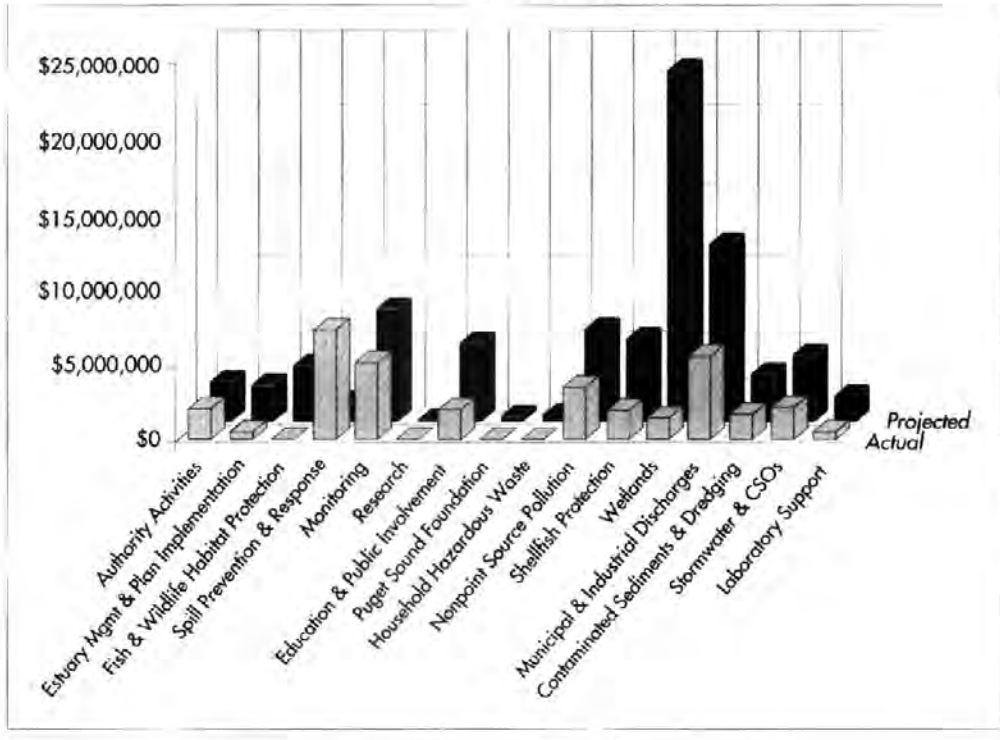
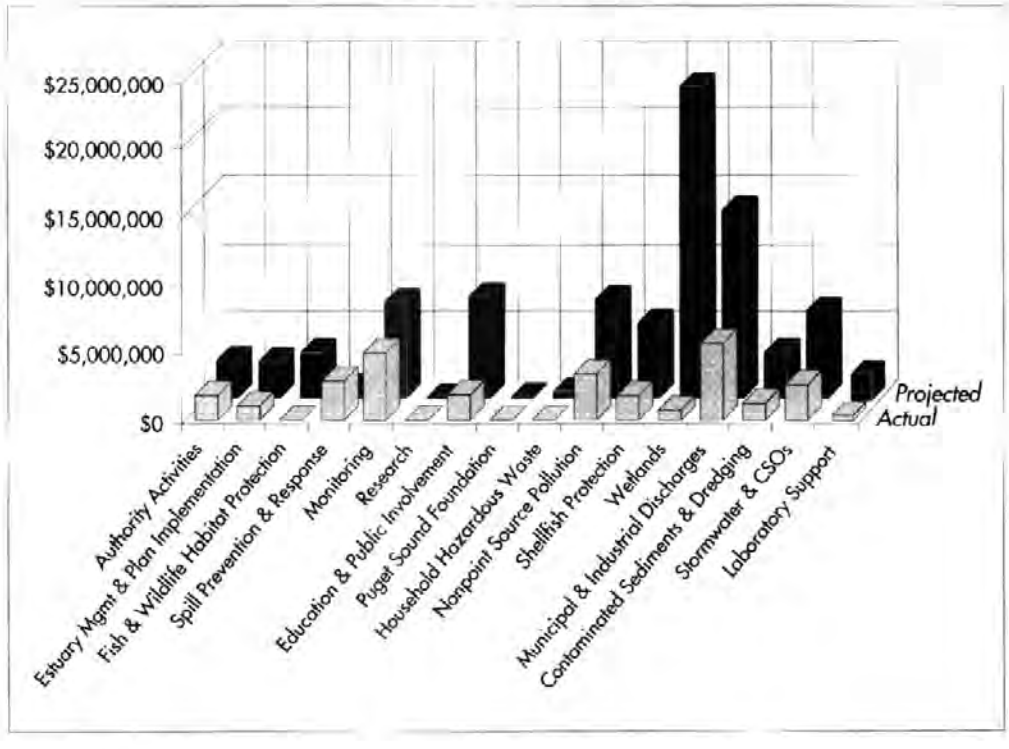


Figure 2. Direct State and Federal Funding Expenditures by Plan Program Activity 1993-95 Biennium



local governments' flexibility in recent years. For example, they may create shellfish protection districts or stormwater utilities to generate funding for water quality programs, and they may levy impact fees on development to defray a variety of costs associated growth. Many local governments have already made use of one or more of these resources.

Local activities do receive funds through state programs, such as the Centennial Clean Water Fund, but these generally are provided as seed money to allow local governments to initiate programs that will be supported using local resources. In order for local governments to successfully pay for their share of implementing the Puget Sound Plan, alternative sources of funding may well be required. These need to include local funding options and additional state water quality grants.

Table 4
PUGET SOUND WATER QUALITY MANAGEMENT PLAN
Direct State and Federal Funding Expenditures by Program Activity

PROGRAM ACTIVITY	1987 - 89 Estimated Actual	1989 - 91 Estimated Actual	1991 - 93 Estimated Actual	1993 - 95 Estimated Actual
Authority Activities	$2,167,500	$2,905,934	$2,076,000	$1,774,400
Estuary Mgmt & Plan Implementation	320,933	439,960	508,036	1,028,680
Fish & Wildlife Habitat Protection	0	0	0	0
Spill Prevention & Response	160,000	129,048	7,233,000	2,903,952
Monitoring	728,608	1,851,025	5,116,411	4,960,757
Research	149,286	0	0	0
Education & Public Involvement	1,596,067	1,910,168	2,028,200	1,831,050
Puget Sound Foundation	0	0	0	0
Household Hazardous Waste	32,000	88,183	0	0
Nonpoint Source Pollution	2,821,863	2,592,715	3,516,460	3,294,993
Shellfish Protection	1,453,518	1,411,752	1,961,217	1,668,917
Wetlands	1,091,176	1,943,592	1,449,491	601,491
Municipal & Industrial Discharges	2,457,067	4,390,369	5,554,204	5,432,370
Contaminated Sediments and Dredging	1,410,546	1,412,176	1,725,250	1,335,924
Stormwater & CSOs	771,750	913,088	2,167,804	2,530,638
Laboratory Support	497,842	933,805	555,905	408,315
PROGRAM TOTALS	$15,160,314	$19,988,010	$33,336,073	$27,771,487

Puget Sound tribal governments play an important role in protecting the natural heritage and environmental resources of the region. Court decisions regarding treaty rights have affirmed that tribes have a right to participate in policy decisions that potentially could affect fish harvests. In this context, they are extremely interested in participating in the implementation of the Puget Sound Plan. They have conducted projects to monitor water quality and

restore shellfish beds, and they have developed management plans for estuaries on their reservations.

However, tribes suffer from extremely limited resources to conduct these projects. Many of them are funded by grants from the state or federal agencies, but grant funds are becoming harder and harder to obtain. If the tribes are going to participate actively in restoring and protecting Puget Sound, they will have to develop new sources with which to finance their efforts.

The federal government, especially the Environmental Protection Agency, has provided money under the National Estuary Program (NEP), as authorized by Section 320 of the Clean Water Act, to support the development of a management plan for Puget Sound. This originally ranged from $1.3 million to $2.4 million annually and was used to fund special technical studies, the development of management tools, and assistance in developing the ambient monitoring program. However, since 1991, when the EPA approved the Puget Sound Plan as a Comprehensive Conservation and Management Plan, there has been less money available under the NEP. Efforts by the Authority did garner a special federal appropriation in 1993 to provide money for implementing the Puget Sound Plan; the EPA also was able to provide additional funds to support Puget Sound protection efforts. Together, these actions allowed the Authority to solicit proposals from state agencies and local and tribal governments to compete for approximately $800,000 that was distributed as "action grants."

Other federal agencies, including the U.S. Forest Service, U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, and the Natural Resources Conservation Service, have funds that can be used to implement the Plan, either as federal grants to state and local agencies or to support federal activities. Puget Sound Plan programs clearly would benefit from more federal funds being made available.

The private sector, including individuals, may incur added costs as plan elements are implemented (e.g., the private costs of upgrading on-site sewage systems). These expenses are broadly identified, where possible, in the text of each program area, but it is not possible for the Authority to track private costs accurately or completely. Some private sector costs will come as direct expenses, and others will be in the form of various fees or other payments to local and state governments.

Private entities also may help finance certain Plan elements. For example, the Nature Conservancy and the Trust for Public Lands regularly assist in acquiring Puget Sound wetlands. Private consulting firms and research institutions helped finance the "First Annual Meeting on Puget Sound Research." Corporations and other private entities have participated extensively in supporting and carrying out public involvement and education activities. This kind of support is expected to continue and to grow.

Strategies to Secure More Funding

Fully implementing the 1994 Puget Sound Plan would cost federal and state agencies and tribal and local governments approximately $251 million during

the 1995-97 Biennium, and $291 million during the 1997-99 Biennium. The Authority is concerned about continued funding shortages at all levels of government, which could hamper efforts to protect water quality. As protection efforts continue to be delayed and pollution continues to flow into Puget Sound, the future cost of cleaning and protecting the Sound continues to increase.

In an era of limited government revenues, it is going to require creativity and perseverance to successfully implement the Plan and protect Puget Sound for future generations. The Authority and the Puget Sound Estuary Program management committee will continue to explore funding options, as called for in the Estuary Management and Plan Implementation Program.

Chapter 2. Action Plan

INTRODUCTION

In the past, the management of Puget Sound was handled by many different government entities with little coordination among each of their programs. Working alone and with inadequate resources and tools, these entities were unable to address the cumulative, wide-ranging impacts to water quality in Puget Sound. In 1985, the Washington State Legislature created the Puget Sound Water Quality Authority, whose main purpose is to develop, adopt and oversee the implementation of a comprehensive strategy to protect Puget Sound. Now guided by this comprehensive management plan, federal and state agencies, businesses, city, county and tribal governments, environmental groups, citizen groups, and individuals are working together to meet the challenges facing Puget Sound.

The Puget Sound Water Quality Management Plan was developed to fulfill the requirements of the Puget Sound Water Quality Act (Chapter 90.70 RCW) and Section 320 of the federal Clean Water Act (33 U.S.C. 1330). The state law calls for a comprehensive, water quality management plan prescribing the needed actions for the maintenance and enhancement of Puget Sound water quality. The federal Clean Water Act calls for a comprehensive conservation and management plan that recommends priority corrective actions and compliance schedules addressing point and nonpoint sources of pollution to restore and maintain the chemical, physical, and biological integrity of the estuary, including restoration and maintenance of water quality, a balanced indigenous population of shellfish, fish and wildlife, and recreational activities in the estuary, and to assure that the designated uses of the estuary are protected.

PLAN GOAL

To restore and protect the biological health and diversity of Puget Sound by preserving and restoring wetlands and aquatic habitats, 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. In seeking to achieve this goal,

federal and state agencies and local and tribal governments shall take into consideration the net environmental effect of their decisions in order to minimize the transfer of pollutants from one environmental medium to another.

The Plan's emphasis on prevention recognizes the simple truth that it will cost far more to clean up pollution later than to prevent it now. The Plan is based on the premise that we all share responsibility for Puget Sound, and recognizes 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. The plan recognizes and includes actions by federal, state, local and tribal governments, the private sector, and citizens.

CRITERIA FOR SETTING PRIORITIES

The Authority has established priorities in the Plan using the following criteria. As in the past, the process of establishing Plan priorities involved considering the severity of the threat posed by different problems within Puget Sound and the options for preventing or curing the problems. The main considerations that were important for this process included:

- What is the magnitude of harm for the environment and human health?
- What is the persistence of the threat and the difficulty of mitigating or resolving the problem?
- How adequate are existing management programs?
- Is there a loss that could be construed as irreversible?
- What is the effect on current uses of the Sound?
- Is the action part of an ongoing Plan program?
- What is the most cost-effective approach to address a problem?

It is also important to ensure that the Puget Sound Plan be comprehensive and effective. This means that good use must be made of all the existing programs, funding sources and efforts that are already occurring. The Plan must also be regionally fair. Conditions vary greatly around the Sound. In one part of the Sound, nonpoint pollution with microorganisms may be the greatest problem; in another, it may be storm water carrying toxic compounds, and in another, loss of wetlands. For these reasons, the Authority considered these additional criteria in setting priorities for this plan:

- Are all threats to the Sound being addressed?
- Are the significant threats in each portion of the Sound being addressed adequately?
- Which programs have long start-up periods, and have these begun yet?

- What funding sources exist to implement programs and are they being fully used?

Finally, the Authority considered the following additional factors when it set priorities within programs:

- Adopting preventive tools, such as standards and procedures for discharge permits, rather than proceeding on a case-by-case basis.
- Taking actions that will have a multiplier effect.
- Taking actions that will increase the likelihood of successful implementation of the Plan.
- Following a particular sequence which is necessary to implement a program's elements.

BROAD PRIORITIES

In general, the Authority believes that it is important to complete work which has been started. Using the criteria described above, the Authority has set broad priorities for the Plan. They are, in alphabetical order:

- Assess the environmental conditions of Puget Sound and its resources, and the effects of human activities on the Sound and its resources.
- Clean up existing toxic contamination where sources are controlled.
- Continue Plan programs that have been started and maintain current funding levels for them.
- Control sources of toxic contaminants to Puget Sound.
- Enhance protection of shellfish beds.
- Ensure the protection of wetlands and aquatic habitat. Stop losses of wetlands and other aquatic habitat.
- Improve the control and cleanup of nonpoint source pollution in the Sound.
- Provide long-term support for research and education.
- Prevent spills in the Sound and enhance the capability to respond to spills when they occur.
- Support and improve education and public involvement programs in order to inform, educate and involve citizens of the region and state in the cleanup and protection of Puget Sound.

Consistent with these broad priorities, the Authority may from time to time select portions of the Plan for additional emphasis. The Authority will seek

public comment as part of its selection process. In addition, element EM-8 directs the Authority to make recommendations on state funding of state agency activities to carry out the Plan as part of each biennial budget process.

THE FINAL 1994 PUGET SOUND PLAN

The 1991 Puget Sound Water Quality Management Plan provided the basis for this final 1994 Plan. The Puget Sound Foundation Program, which was part of the 1991 Plan, was deleted from the 1994 Puget Sound Plan. The Household Hazardous Waste Program of the 1991 Plan has been merged into the Nonpoint Source Pollution Program of the 1994 Plan.

The programs that follow this introduction are organized in a consistent format. Each program is prefaced with a brief statement of the problem that led to the creation of the program. This is followed by the program goal, the strategy for achieving this goal, and the elements comprising the program. For each program, the major actions flowing from the program which the Authority intends to review are listed and any legislation required by the program is specified. Finally, the program's estimated cost is summarized. Chapter 1 contains a discussion of the costs and proposed financing for the Plan as a whole.

SEVERABILITY

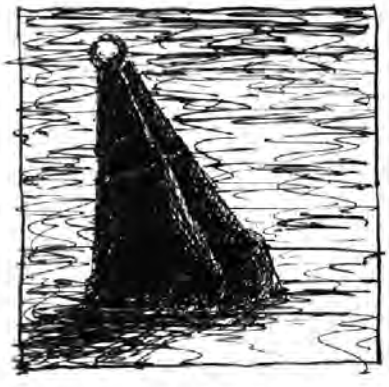
If any portion of this Plan or its application to any person or circumstance is held invalid, the remainder of the Plan or the application of that portion to other persons or circumstances is not affected.

For the purposes of this provision, and in observing the procedural requirements set forth in RCW 90.70.075(2), Plan "portion" shall refer to any of the several subelements found with the various program elements of this Plan.

ESTUARY MANAGEMENT AND PLAN IMPLEMENTATION PROGRAM

PROGRAM ELEMENT DIRECTORY

PROBLEM DEFINITION



Managing and protecting Puget Sound is a complex undertaking. Federal, state, local and tribal governments, businesses, individuals, and organizations all have individual roles, responsibilities, interests and mandates. This quantity of regulators, stakeholders and interested parties, combined with a historic lack of coordination among them, makes a comprehensive approach to long-term protection of Puget Sound difficult. Improved coordination is paramount to successfully and cost-effectively managing Puget Sound.

In 1985, the Puget Sound Water Quality Authority (Authority) was directed to develop and adopt a comprehensive management plan for Puget Sound to be implemented by federal and state agencies and local and tribal governments. The Authority, U.S. Environmental Protection Agency's (EPA) Region 10 office and state Department of Ecology (Ecology) formed the Puget Sound Estuary Program (PSEP) to oversee coordination and implementation.

In March 1988, Puget Sound was designated an estuary of national significance under the National Estuary Program (Section 320 of the federal Clean Water Act). A designation agreement signed between the state and the EPA defined a process for the PSEP to develop a comprehensive conservation and management plan (CCMP) for Puget Sound. PSEP co-managers all have roles in the process: the EPA provides federal funding, carries out technical studies, and oversees Plan implementation by federal agencies; Ecology is the lead state agency for most Plan elements; and the Authority prepared and adopted the actual CCMP. The 1991 Puget Sound Water Quality Management Plan (Plan) was approved by the EPA as the CCMP for Puget Sound.

Under treaties signed with the United States, federally recognized Indian tribes in western Washington possess important fishing rights in the Sound and rivers emptying into it. The state of Washington signed a government-to-government agreement with Puget Sound tribal governments recognizing their authority as

co-managers of the natural resources. A tribal representative serves on the Authority board as a voting member.

Adopting a comprehensive water quality management plan is only the first step toward protecting Puget Sound. There are many competing priorities and divergent interests which make implementation of the Plan difficult. PSEP co-managers must continue to work to implement the Plan's many elements. Coordination is essential to ensure that limited resources are used most effectively. Implementation will not be easy, but it is necessary to protect Puget Sound for future generations.

Plan Funding

Since its initial adoption in December 1986, the Plan has been inadequately funded, which has hindered efforts to restore, protect and preserve Puget Sound. Although a number of potential funding sources exist—the state General Fund, Aquatic Lands Enhancement Account, Centennial Clean Water Fund, Toxics Account, permit fees, Oil-spills Administration Account and various capital budget accounts—the Puget Sound Plan must compete for these monies with a plethora of natural resource-related programs operated by other agencies. Acquiring federal funds poses similar problems.

Local governments face increasing mandates and limited funding. This creates an additional challenge because much of the effective action to protect and enhance the Sound needs to happen locally. Few local revenue options exist, and most of these are tied to specific programs or activities. For example, utilities can be used to support protection programs for both storm water and on-site sewage systems, but there is no direct authorization to establish and fund a comprehensive, local, water quality program. Although the state provides grants and loans for projects that protect water quality, these funds are not adequate to pay for needed projects.

Tribal governments also face obstacles because of their limited revenue sources. As a result of recent legal rulings, tribal governments have significant rights in all resource management decisions that may potentially affect their treaty-protected salmon fishing. Tribes have initiated and participated in watershed planning and estuary protection and restoration efforts. Due to their relatively small revenue base, tribal governments need additional funding for Plan activities.

Adequate funding is essential to protect Puget Sound. Yet, it is difficult to raise sufficient funds for government action. Washington must learn from the experiences of other estuaries around the country: Failing to spend money now on prevention will mean far greater costs later for restoration.

Enforcement

Many laws and programs designed to protect the Sound's water quality and resources are not fully enforced. This is true not only of state and federal laws, but also of city and county land-use ordinances, such as shoreline master programs, zoning and other land-use ordinances and local health codes governing on-site sewage systems. Jurisdictions face competing priorities, inadequate

funding and lack of expertise. Local prosecuting attorneys have trouble enforcing laws due to inadequate penalties and insufficient staff.

Federal Facilities

There is a significant federal presence in the Puget Sound basin, including several major Department of Defense installations and numerous smaller facilities owned or operated by the National Park Service, the National Oceanic and Atmospheric Administration, the EPA and other federal agencies. The water quality effects of operating these facilities often resemble those resulting from industries, business, farm and household activities around Puget Sound.

The regulatory framework for federal facilities can be complex, making it difficult to ensure compliance with environmental laws. Although major federal laws require that federal entities are subject to the same federal, state and local environmental requirements as any nongovernmental entity, the President may exempt federal entities from environmental requirements. Further, the U.S. Justice Department has stated that the EPA is not authorized to bring suit against other federal agencies or issue unilateral orders to enforce environmental laws. The EPA has since adopted a federal-facilities compliance strategy that relies on administrative mediation of disputes.

Federal Superfund sites have been designated at several military installations around Puget Sound: Fort Lewis Army Base, McChord Air Force Base, Trident Submarine Base at Bangor, Whidbey Island Naval Air Station (NAS), and the Naval Undersea Warfare Engineering Station at Keyport. Eight of the installations have NPDES (National Pollutant Discharge Elimination System) permits from the EPA for industrial and/or domestic wastewater and stormwater discharges. Military bases regularly handle hazardous materials, and spills are a potential problem.

Other Federal Activities

Federal development projects, financial assistance and regulatory and permitting programs can have major effects on water quality, habitat and wetlands in the Sound. Examples include the U.S. Army Corps of Engineers' navigation improvement projects, the permit programs contained in Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, Housing and Urban Development block grants for shoreline development, U.S. Forest Service timber management activities and EPA Region 10 NPDES permits for federal facilities.

Because the federal government retains authority over so many activities that affect Puget Sound, it is essential that federal agencies cooperate with state and local agencies in implementing the Puget Sound Plan.

PROGRAM GOAL

To provide adequate management, funding, enforcement and federal consistency during the implementation of the Puget Sound Water Quality Management Plan, the Comprehensive Conservation and Management Plan for Puget Sound.

STRATEGY

The strategy for achieving this goal is to: (1) formalize and continue the existing Puget Sound Estuary Program management structure; (2) obtain adequate funding for the program, including new sources of state and federal revenue; (3) require accountability by implementing agencies; (4) provide strong enforcement at all levels of government; and (5) ensure that federal activities, including the operation of large federal facilities, are consistent with the Plan.

PROGRAM ELEMENTS

Management Structure

EM-1. Management Structure of the Puget Sound Estuary Program

The U.S. Environmental Protection Agency, the Puget Sound Water Quality Authority in cooperation with federally recognized Indian tribes of western Washington, and the Washington Department of Ecology shall continue to co-manage the Puget Sound Estuary Program (PSEP), as established under the provisions of Section 320 of the federal Clean Water Act as amended by the Water Quality Act of 1987.

The Puget Sound Water Quality Authority is responsible for preparing and adopting the Puget Sound Comprehensive Conservation and Management Plan (CCMP) for the program, which is also the Puget Sound Water Quality Management Plan provided for by Chapter 90.70 RCW. The Authority shall amend target dates and program tasks as necessary to ensure plan implementation.

The Environmental Protection Agency provides federal funding, carries out technical studies, and leads implementation by federal agencies. The EPA provides liaison with federal agencies and is responsible for oversight of programs that have been delegated to the state, such as discharger permits under the National Pollution Discharge Elimination System program.

Ecology, with state and delegated federal regulatory authority for water quality, air quality, and solid and hazardous waste, is the lead state agency for implementation of most Plan programs.

The three co-managers of the PSEP shall help review the activities of federal agencies as part of the federal consistency process developed by the PSEP Management Committee. This process is spelled out in EM-14.

EM-2. Management Committee

The three co-managers shall continue to jointly chair the Puget Sound Estuary Program Management Committee. This committee shall be composed of representatives of key federal and state implementing agencies and local and tribal governments. The management committee will advise the co-managers, provide a formal system of communication between the co-managers and those implementing the Plan, and review proposed revisions to the Plan. Other duties will include approving the work plans for EPA-funded implementation activities and reviewing urban bay action plans.

EM-3. Technical Advisory Committee

The co-managers may from time to time establish a Puget Sound Estuary Program Technical Advisory Committee. This committee shall be composed of scientists and technical experts, and shall choose its own chair. The Technical Advisory Committee will advise the co-managers on scientific issues and review technical studies and reports and will meet on an as-needed basis.

Funding

EM-4. Increased Funding

The estuary program co-managers shall pursue funding for implementation of the Plan and related activities from all available federal, state and local government sources as well as private sources.

The EPA shall strive to ensure that federal programs that provide funding for water quality are used to fund Plan activities, including related tribal programs, to the maximum extent possible.

Federal and state agencies that provide water quality funding to local and tribal governments are encouraged to participate in a forum that allows them to coordinate their efforts and target assistance to ensure maximum benefit from their efforts.

EM-5. Implementation of Long-Term Funding Proposals

The Authority shall pursue establishment of new funding sources based on some of the recommendations of the Puget Sound Finance Committee. Revenues generated by these sources should be used for Puget Sound Plan implementation and other water quality activities.

The Authority 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: The development of additional funding proposals and work with the B.C.-States Task Force shall be ongoing.

EM-6. Puget Sound Grants Program

The Authority shall establish, administer, and monitor 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 plan.

Target Date: Authority efforts to develop legislation to establish a funding source for these grants will be ongoing.

EM-7. Shellfish Funding Strategy

[Element Completed]

Accountability

EM-8. Plan Implementation

8.1. Coordination of Plan Implementation

The Authority, in cooperation with EPA, Ecology, and the PSEP Management Committee, shall continue to coordinate implementation of the Puget Sound Plan. The Authority shall (1) inform federal and state agencies and local and tribal governments of their responsibilities under the Plan; (2) participate in committees and work groups; (3) provide formal and informal guidance; and (4) assist in obtaining funding.

To facilitate this process, Authority staff shall work closely with each federal agency, state agency, tribal government, and local government which is given responsibilities by the Plan. The Authority staff shall assure that the agency or government understands its responsibilities under the Plan, assist the agency or government in implementation, monitor progress, and assist in resolving problems that arise during program implementation.

As part of its coordination responsibilities, the Authority shall continuously review the Plan and amend program tasks as necessary to ensure Plan implementation.

The Authority shall monitor the implementation of Plan tasks by federal and state agencies and tribal and local governments. This monitoring will consider consistency with program goals and policies, with the intent of specific Plan elements, and with adopted target dates. Federal consistency review procedures are discussed in element EM-14.

8.2. Measuring Results

The Authority shall also undertake surveys and analyze available data to measure the results of the Puget Sound Estuary Program and the Puget Sound Plan. Results may include the establishment or improvement of programs, ordinances, regulations, education activities, and other institutional steps to protect Puget Sound, as well as measurable reductions in loadings to the Sound and reported improvements in environmental conditions in Puget Sound. The Authority's findings shall be made available to the public.

8.3. Agency Biennial Implementation Plans

Because of the key role played by state agencies, each state agency with major Plan responsibilities shall prepare a biennial implementation plan for major program responsibilities. This implementation plan shall be completed by October 1 of odd-numbered years and shall include: (1) a definition of the activities and products for the agency called for in the Puget Sound Plan; (2) target dates and work schedule for Plan activities given available resources; and (3) an explanation why any portions of an agency's responsibilities under the Plan will not be completed. Implementation plans shall be submitted to the Authority and the Office of Financial Management (OFM) for review for consistency with the Puget Sound Water Quality Management Plan and

consistency with the purposes for which the Legislature had appropriated state funds. The plans will be submitted to the Authority by agency directors at one of the regularly scheduled monthly board meetings. In addition to the implementation plans, each state agency with major Plan responsibilities shall:

a. Notify the Authority and the OFM in writing whenever modifications are proposed to be made to Plan budget allocations or implementation plans to comply with agency budget cuts, funding transfers or shifts between funding sources. This notice shall be sent to the Authority prior to any irretrievable commitment of resources to allow the Authority an opportunity to comment. The notice shall include the dollar amount and a brief explanation of why the change is being made;

b. Submit a brief report to the Authority and the OFM by August 1 of every year evaluating progress toward completing the tasks and meeting the target dates specified in the implementation plan. The reports will be submitted to the Authority by agency directors at one of the regularly scheduled monthly board meetings; and

c. Provide the Authority copies of reports, interagency agreements, work plans and other significant work products developed pursuant to its implementation of each Plan element.

The Authority shall provide guidance to implementing agencies regarding the requirements under this element through interagency liaisons.

State agencies with major Plan responsibilities include:

Department of Ecology
Department of Natural Resources
Department of Health
Department of Agriculture
Department of Community, Trade and Economic Development
Department of Transportation
Department of Fish and Wildlife
Conservation Commission
State Parks and Recreation Commission
Washington Sea Grant (University of Washington)
Washington State University Cooperative Extension
Superintendent of Public Instruction

In addition to the review described above, the Authority may review Puget Sound related budgets and regulatory and enforcement activities of state and local implementing agencies as prescribed by RCW 90.70.055(5). The purpose of this review is to assist agencies in meeting timelines and other Plan requirements, to ensure that they have adequate resources to fulfill their responsibilities under the Plan, and to review the consistency of these activities with the Plan.

8.4. Biennial Budget and Work Proposal

By March 1 of even-numbered years, the Authority shall provide appropriate agencies with Plan priorities and a cost estimate for fully implementing the Plan during the next biennium. In preparing its biennial budget request, each implementing agency shall consider the Authority's priorities and projected costs and the agency's implementation plans for the current biennium. By May 1, each implementing agency shall provide the Authority with preliminary descriptions and cost estimates for Puget Sound Plan projects proposed to be included in the agency's budget request. This step will facilitate interagency discussion during the development of Plan budget requests. The OFM shall use the product of these discussions, along with the Authority's implementation priorities called for in RCW 90.70.060(a), in developing the Governor's Puget Sound Plan budget proposal.

8.5. Biennial Reports

State agencies and local governments identified in the Plan shall submit written biennial reports to the Authority documenting and assessing their consistency with the Plan as required by RCW 90.70.070(3). The Authority shall provide instructions and work with implementing agencies for that purpose. The biennial reports shall be submitted to the Authority by September 15 of the second fiscal year of each biennium. Agency biennial reports shall include: (1) an assessment of the agency's progress toward achieving the goal of improving Puget Sound water quality; and (2) a discussion of the obstacles impeding this progress with recommendations of how these obstacles can best be overcome.

The Authority shall use the information gathered during the biennial review process to prepare revisions to the Plan as required by RCW 90.70.055(3) and to prepare the State of the Sound Report as required by RCW 90.70.055(4)(c). This report will be presented to the Legislature in January of odd-numbered years.

The state agencies that are required to submit biennial reports include, but are not limited to:

Department of Ecology
Department of Natural Resources
Department of Health
Department of Agriculture
Department of Community, Trade and Economic Development
Department of Transportation
Department of Fish and Wildlife
Department of Labor and Industries
Attorney General
Conservation Commission
State Parks and Recreation Commission
Washington Sea Grant (University of Washington)
Washington State University Cooperative Extension
Superintendent of Public Instruction

The Authority shall review the success of Plan implementation (including public and private actions) and submit the State of the Sound Report to the

Legislature and the governor by January 1 of odd-numbered years. This report will provide a synthesis of the biennial reports submitted to the Authority by agencies and an analysis of the status and conditions of Puget Sound including a determination of the Sound's economic value. The report also addresses current and foreseeable trends in water quality and management of Puget Sound resources.

8.6. Review of Major Public Actions

As provided in RCW 90.70.070, the Authority shall continue to review major public actions being considered by federal and state agencies and local governments in order to determine whether the proposed action is consistent with the Puget Sound Water Quality Management Plan, with Authority goals and objectives, and with review criteria developed by the Authority.

In order to define the Authority's role in reviewing major public actions and to provide guidelines for determining an appropriate level of Authority response, the Authority establishes the following criteria governing its involvement:

- Whether the action is critical to implementation of the Puget Sound Water Quality Management Plan.
- Whether the action may be in direct and substantial conflict with the Plan.
- Whether the action entails significant adverse water quality effects which cannot be mitigated.
- Whether the action will have multiple effects or implications for various water quality issues or programs.

The Authority will use these criteria to determine which proposed actions are major.

As a result of such review the Authority may respond to a proposal in a variety of ways. Authority staff may respond to projects or documents which are not major public actions but where clarification of Plan requirements or technical comments would be of assistance to the responsible agency. The executive director of the Authority may submit comments on actions which are critical to Plan implementation or affect more than one program. The Authority shall submit comments where unmitigated water quality effects or substantial conflicts with the Plan are involved. The Authority shall maintain a record of its review and comment activities.

Cooperation among government entities is critical to implementation of the Puget Sound Plan and long-term protection of Puget Sound. To that end, the Authority may become involved in major public actions in the interest of improving intergovernmental coordination. In some cases, the Authority may offer to assist the parties find mutually agreeable solutions.

The Authority is authorized to intervene in administrative or judicial proceedings (RCW 90.70.070 (4)). While the Authority intends that intervention in judicial proceedings would be the least common form of response, reserved for very rare circumstances, the Authority may intervene in administrative proceedings as warranted.

The Authority emphasizes that its review of major public actions does not replace the authority of the permit-issuing agency to make the substantive decision on a permit or other matter. Furthermore, Authority review of a proposed action does not in any sense constitute an appeal of an agency decision; the Authority does not intend to function as an appellate body.

The Authority will respond to a proposal within the established review period or within a timely period if no formal response period exists.

8.7. Notice of Actions Subject to Review

In order to ensure that the Authority is aware of activities which potentially merit its attention, the Authority will inform state and local agencies of the specific types of actions for which notice to the Authority should be given.

These actions may include program, policy and permit actions, including actions taken under the State Environmental Policy Act (SEPA). All state agencies and local governments shall provide SEPA documents to the Authority wherever water quality, wetlands or related issues within the Puget Sound Plan area are involved. The Authority will respond when the proposal being analyzed meets one of the criteria listed above.

Target Dates: Agency implementation plans shall be submitted to the Authority by November 1 of odd-numbered years. Agency budget estimates for implementing the Puget Sound Plan shall be submitted to the Authority by May 1 of even-numbered years. Agency biennial reports shall be delivered to the Authority by September 15 of the second fiscal year of each biennium. The Authority shall produce the State of the Sound Report by January 1 of odd-numbered years.

Enforcement and Legal Support

EM-9. Federal Enforcement

The EPA shall initiate federal enforcement actions when necessary to ensure implementation of the Puget Sound 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. The EPA will also initiate federal enforcement actions on an independent basis, apart from requests of the Puget Sound Water Quality Authority.

EM-10. Enhanced Local Enforcement

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

The enhanced enforcement of wetlands protection laws may encompass shoreline master programs, zoning ordinances or other land development or construction codes which protect water quality or habitat functions of wetlands. Efforts to enforce laws and ordinances aimed at reducing nonpoint source pollution that are eligible for state grants include on-site sewage systems, pumpout facilities at marinas, farm practices, or other sources which are identified as a result of the local nonpoint planning process. 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 sources of 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. Preference for grant awards shall be given to applicants whose enhanced enforcement program includes an educational component that publicizes enforcement actions. Efficient and innovative approaches to enforcement such as civil penalties, dedicated fines and community service shall be encouraged.

Funds made available through the Centennial Clean Water Fund (CCWF) for enforcement will be used for start-up costs or seed monies to develop enforcement programs and not for ongoing staff needs.

Target Date: Program established August 1988.

EM-11. Attorney General Support

The Attorney General shall make every effort to support the Puget Sound 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 support to the Authority after they have first reported this problem to their management and to the Attorney General's office.

Target Date: Ongoing.

Federal Activities

EM-12. Memoranda of Understanding with the Department of Defense

The Region 10 office of the EPA, as a co-manager of the Puget Sound Estuary Program, 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 Plan. Target facilities include the following:

Puget Sound Naval Shipyard
Naval Submarine Base, Bangor
Naval Air Station Whidbey Island

Fort Lewis Army Base
McChord Air Force Base
Keyport Naval Undersea Warfare Engineering Station
Indian Island Undersea Warfare Engineering Station
Manchester Naval Supply Center

The EPA shall also use other regulatory opportunities to achieve these same goals with these facilities. These opportunities include: ensuring that multi-media inspections cover consistency with the Puget Sound Plan, or CCMP, and evaluating projects that support the goals of the CCMP as potential candidates for designation as supplementary environmental projects during enforcement settlements.

Target Date: Completed agreements at appropriate facilities by January 1996; integrating regulatory opportunity efforts during fiscal year 1995.

EM-13. Review of Plan by Federal Agencies

Federal activities which directly or indirectly affect the quality of Puget Sound shall further the goals of the Plan. Federal agencies are requested to take action on any Plan element that specifically names the agency. All federal agencies are requested to review the Plan on a continuing basis to determine whether any of their projects or programs potentially assist or conflict with the goals of the Plan.

The following federal departments and agencies shall examine their programs for consistency with the Plan. Agencies not included in this list are still required to comply with this element.

Department of Agriculture:
- Agricultural Stabilization and Conservation Service
- Farmers Home Administration
- Forest Service
- Natural Resources Conservation Service

Department of Commerce:
- National Oceanic and Atmospheric Administration
- National Marine Fisheries Service

Department of Defense:
- Corps of Engineers
- Air Force
- Army
- Navy

Department of Energy
Environmental Protection Agency
Housing and Urban Development
Department of Interior:
- Bureau of Land Management
- Bureau of Reclamation
- Fish and Wildlife Service
- Minerals Management Service
- National Park Service
- Office of Surface Mining

U.S. Geological Survey
Department of Transportation:
Coast Guard
Federal Highway Administration

The co-managers of the Puget Sound Estuary Program shall contact federal agencies, such as those listed, in writing to notify them of the requirements of the Puget Sound Comprehensive Conservation and Management Plan and to identify a PSEP contact for that agency.

If an agency finds that its programs or projects may adversely affect the implementation of a Plan goal, the agency shall notify the designated PSEP contact for that agency. Where appropriate, the PSEP co-managers shall negotiate memoranda of understanding (MOUs) with agencies to clarify expectations under the management plan agency commitments in order to best ensure Plan implementation.

Target Date: Agencies to comply on an ongoing basis.

EM-14. Federal Consistency Review Process

The co-managers of the Puget Sound Estuary Program, with the assistance of the Management Committee, shall implement a process to review federal activities for consistency with the Puget Sound 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 Comprehensive Conservation and Management Plan. 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 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, such as the Section 319 Nonpoint Source consistency review process. The consistency review process shall be implemented with assistance from the Coastal Zone Management (CZM) Program review process.

This process shall work as follows:

1. All appropriate policies resulting from the Plan shall be incorporated into the CZM review process. The CZM review committee will notify the PSEP co-managers of the federal activities that are submitted to them for review.

2. For the portions of the Plan that are not appropriate for CZM review, the PSEP Management Committee shall determine how to receive notice and conduct the necessary consistency review.

3. If there appears to be no consistency problem, the agency or the CZM office shall be notified. If there does appear to be a problem, the federal agency in question shall be notified along with the PSEP Management Committee. The committee shall consider the issue at a meeting. An

initial attempt will be made by the management committee to work through the difficulties with the federal agency whose activities are assessed as being out of compliance with the Plan.

4. If the problem is resolved, the agency and the CZM office shall be notified. If the problem persists, the PSEP co-managers shall escalate their efforts to resolve the issues. These efforts shall include, but not be limited to, negotiations, interagency work groups, exercising of state powers, memoranda of understanding, letters of concurrence, and elevation of the issue to higher levels of government.

5. In cases where enforceable policies are not met and a resolution cannot be reached, the CZM office shall be expected to withhold its approval of the project.

6. The following conditions will hold true for all cases of dispute over Plan consistency:

   a. Each federal agency on the PSEP Management Committee shall abstain from any review of its own proposal.

   b. A single coordinator or convener shall be appointed to facilitate the attempts to resolve the disagreements.

   c. Appropriate opportunities for public participation shall be provided.

   d. A timeline for review will be followed, not to exceed 60 days for new projects and not to exceed 30 days for continuations and amendments.

The PSEP co-managers shall take any other actions necessary to ensure that federal agencies act consistently with the Plan. In accordance with the Puget Sound Designation Agreement, the EPA shall actively seek commitments from other federal agencies that may be needed to implement the Plan.

The EPA shall use any appropriate means to secure federal agency commitments, for example:

1. Developing formal agreements with other federal agencies to ensure compliance.

2. Developing or recommending federal policies, guidelines, rules or regulations to implement the Plan.

3. Convening interagency work groups to develop appropriate implementation schedules.

4. Providing financial assistance.

Target Date: The PSEP is to implement a consistency process on an ongoing basis. Other actions to ensure federal consistency shall be taken on a continuing basis.

MAJOR PUBLIC ACTIONS

None.

LEGISLATION REQUIRED

None.

ESTIMATED COST

The estimated costs for fully implementing the Estuary Management and Plan Implementation Program are $4,117,994 for the 1995-97 Biennium and $4,267,520 for the 1997-99 Biennium.

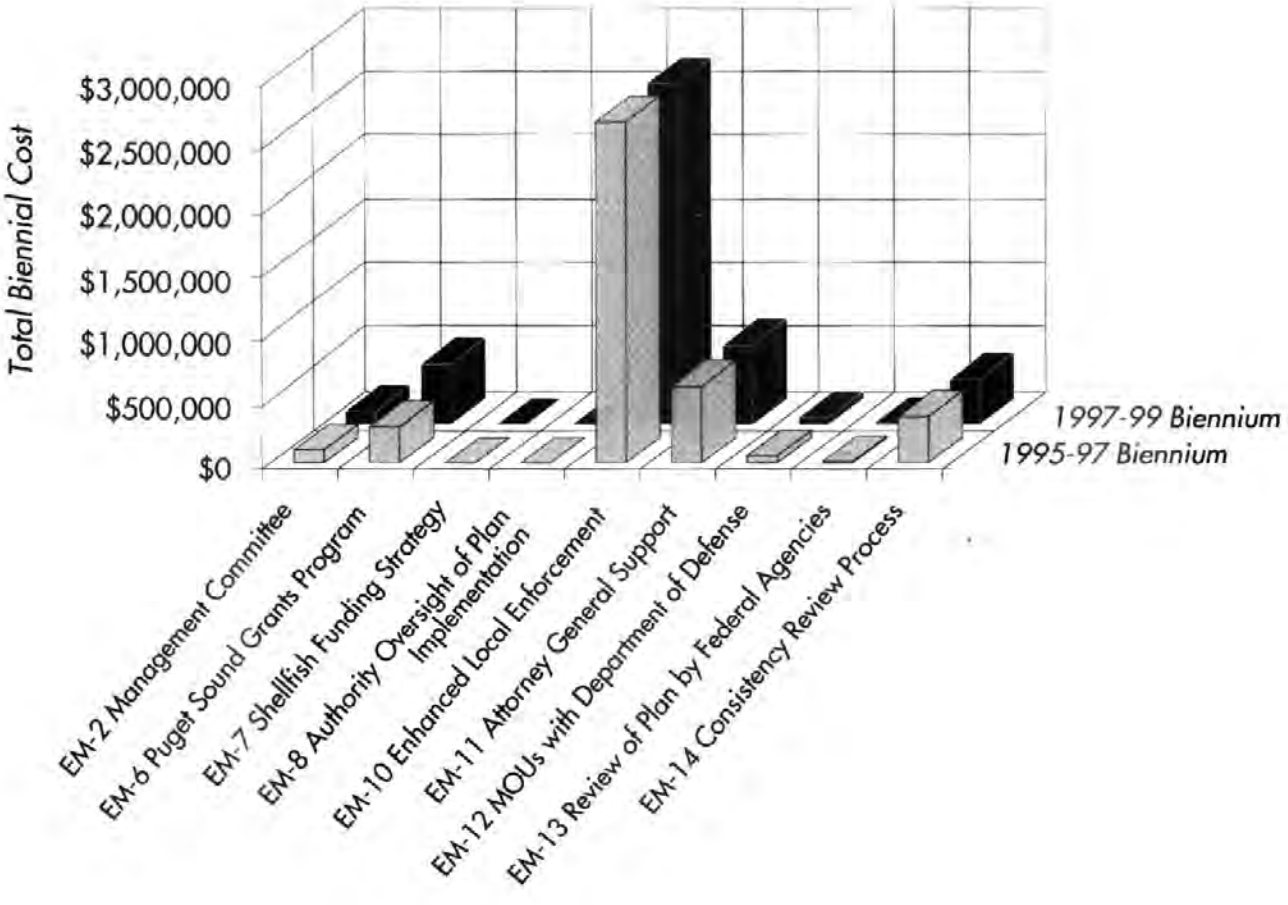
The element EM-6, Puget Sound Grants Program, would provide funding through grants to local governments and other agencies to implement Plan elements. The administrative costs for this program is assumed to be between three and four percent of the expected grant base of $6.75 million per year. This program would be managed by the Authority.

Funding for the enforcement elements of this program is estimated to cost approximately $1.6 million per year. Of this, $1.33 million per year is estimated for enhanced local enforcement (element EM-10) to be funded by state matching grants to local governments from the CCWF and the Puget Sound Grants Program. No local funding sources are estimated for element EM-10. Local implementation costs that are funded by local sources are included in estimates for other programs, particularly storm water and nonpoint source pollution.

The cost of the federal activities program (elements EM-12 through EM-14) is about $113,000 per year. This does not include costs to federal agencies for participation in the review process established under this program, nor does it include costs that may arise from any new agreements, policies or regulations that may be developed as a result of the initiatives described in this program.

No private sector costs have been identified for this program.

Estuary Management Program Implementation Estimates



FISH AND WILDLIFE HABITAT PROTECTION PROGRAM

PROGRAM ELEMENT DIRECTORY

PROBLEM DEFINITION

The Puget Sound basin comprises a unique diversity of habitat types, from deep-water marine areas to upland forests, that support a wide variety of plant, fish and wildlife species. These habitats provide plants, fish and wildlife with basic requirements for survival, such as food, water and shelter, as well as special seasonal requirements related to growth and reproduction. Open waters provide important habitat for thousands of organisms, including phytoplankton and zooplankton, subtidal macroalgae (kelp), benthic invertebrates, fish, and marine birds and mammals. Many species require a variety of habitats at different times in their life cycles. The Department of Fish and Wildlife estimates that up to 70 terrestrial species, plus all the anadromous fish species (salmon, steelhead trout, smelt, shad and sturgeon), rely on both marine waters of the Sound and upland habitats, usually riparian corridors.

Many types of habitat also protect water quality, control flood waters and preserve biological diversity. For example, riparian vegetation plays an important role in reducing turbidity, trapping sediment to prevent erosion, and providing thermal cover to prevent water temperature extremes. Marine shoreline vegetation absorbs wave energy and slows erosion. Floodplain habitat reduces the height and velocity of flood waters. Because the health of Puget Sound is dependent upon many interconnected relationships, it is critical to protect both aquatic and terrestrial habitat.

Rapid population growth and associated development are the greatest threats to fish and wildlife habitat in the region. Where and how growth occurs has direct implications on protecting fish and wildlife habitat. Activities that cause habitat loss are: (a) converting land to commercial or residential use; (b) draining or filling of wetlands; (c) improperly developing land; (d) improperly managing timber practices; (e) improperly managing agricultural practices; (f) disrupting water courses or surface- and groundwater sources; (g) improperly managing urban pollutants; and (h) spilling oil and other hazardous substances.

Some of these issues are addressed elsewhere in the Wetlands, Shellfish Protection, Spills and Nonpoint Source Pollution programs of the Puget Sound Water Quality Management Plan (Plan). Unfortunately, the cumulative effect of all these activities is rarely considered by local governments or state or federal agencies because of the difficulties involved with determining cumulative effects. Additionally, agencies have tended to focus on individual resources rather than on ecosystems or habitats. The result is a tremendous fragmentation of important habitat types.

Lands with significant habitat often have multiple uses and frequently multiple owners, while important waterways that are held in public trust travel through a maze of adjacent land uses, usually beginning in forestlands and ending in an urban area.

At best, habitat protection is a complex undertaking, particularly in light of the rapid growth and development in the Puget Sound basin. As our knowledge of individual species and their specific habitat requirements has increased, we are just beginning to understand the requirements of an ecosystem and methods to protect habitat throughout a watershed.

INSTITUTIONAL FRAMEWORK

At least 22 federal and 20 state laws are aimed at some aspect of fish and wildlife habitat protection. Tribal treaty rights, local laws and private programs also deal with habitat protection through a variety of mechanisms (both regulatory and non-regulatory). While some federal laws are administered to protect specific species (e.g. Endangered Species Act), others have broader mandates (protection of navigable waters under the federal Clean Water Act (CWA) Section 404) that include some aspect of habitat protection. The state has many of its own laws and programs to identify and protect fish and wildlife habitat through regulation (e.g. the Natural Heritage Program). The Growth Management Act added a new requirement for local governments to get involved as well.

This complexity of programs does not necessarily indicate a successful framework for habitat protection. While some overlaps occur between federal and state efforts, gaps also exist. As some agencies have begun to manage at the watershed level, for example, new federal efforts through the Forest Service are managing "provinces."

Treaties in the Puget Sound area have been interpreted to establish a role for the tribes in fisheries management and may imply that the tribes have a right to ensure that fish habitat is protected to sustain tribal fisheries. Tribal governments have established programs to protect fish and wildlife habitat on tribal lands and, in conjunction with the Northwest Indian Fisheries Commission, work with federal, state and local agencies to protect fish and wildlife habitat.

Many valuable habitat sites have been protected through voluntary private sector programs. These include land trusts, conservation easements and the actions of individuals and citizen groups.

The Authority's role in habitat protection focuses on aquatic systems. However, the Authority recognizes that fish and wildlife protection extends beyond aquatic boundaries[1]. This program establishes a mechanism whereby the various federal, tribal, state and local entities that manage fish and wildlife can

1 For the purpose of this program, aquatic systems include the waters of the state as defined by the Forest Practices Board, including associated riparian zones and shorelands. Wetlands are aquatic systems and are addressed by the Wetlands Protection Program. This program addresses those systems that are not commonly considered wetlands, such as the deep or open waters of Puget Sound and stream corridors.

coordinate their efforts so that habitat protection is accomplished from an ecosystem perspective.

AUTHORITY'S APPROACH

Protecting habitat in Puget Sound requires a regional, ecosystem perspective to ensure that diversity of habitat types is preserved. In addition, physical and hydrological connections among different habitat types need to be maintained to prevent habitats (and the species that depend on them) from becoming isolated. Generally, fragmenting and isolating habitats promotes the local extinction of species. In some cases, however, patches of habitat can be beneficial, if used appropriately, as in the case of artificial reefs. A regional habitat approach also allows entities and individuals with expertise and information to join together and focus management efforts to make the most of available resources and avoid overlaps and duplication.

As noted in the unfinished agenda chapter of the 1987 and 1989 plans, time and resource constraints have prevented progress toward protecting fish and wildlife habitat. The Authority found that the state lacked clear goals and policies for protecting habitat; issues needed to be addressed by all affected parties; resource agencies responsible for protecting habitat often lacked sufficient authority; public awareness and understanding of habitat issues and public involvement needed to improve; and existing resources were inadequate for inventorying, monitoring, enforcement and education efforts.

The Fish and Wildlife Habitat Program was established in the 1991 Plan. Program elements called for a broad-based habitat task force, interagency sharing of habitat data, a broad-based education strategy, increased field investigations and greater public involvement. The 1994 Plan calls for coordination of activities among federal and state agencies.

PROGRAM GOAL

To ensure that federal, state, local and tribal agencies coordinate fish and wildlife habitat protection programs so there is no net loss in the short term and, in the long term, there is a net gain of aquatic and riparian habitat and other habitat important to water quality protection in the Puget Sound basin.

STRATEGY

The strategy for achieving the goal is to: (1) encourage and support efforts by state and federal resource agencies, local governments, tribes, and private organizations to act aggressively and actively use existing mandates and authorities, including the Growth Management Act, to protect rapidly disappearing aquatic systems and related habitat in the near term; and (2) coordinate among existing agencies and governments in order to effectively protect and manage Puget Sound fish and wildlife habitat over the long term by providing integrated solutions for habitat protection at the watershed or sub-watershed level.

PROGRAM ELEMENTS

H-1. Coordination with the DCTED

The Puget Sound Water Quality Authority shall coordinate with the Department of Community, Trade and Economic Development (DCTED) and the Department of Fish and Wildlife (WDFW) on issues related to habitat protection, as they work with local governments to implement the Growth Management Act.

Target Date: Ongoing.

H-2. Agency Coordination for Habitat Protection

All agencies involved in aquatic habitat restoration projects shall coordinate efforts in order to reduce duplication and maximize benefits to the resources. The U.S. Fish and Wildlife Service (USFWS) shall act as lead agency, in coordination with the departments of Natural Resources, Fish and Wildlife, and Ecology, the Environmental Protection Agency (EPA), the U.S. Forest Service (USFS), the Army Corps of Engineers, local and tribal governments, private organizations, landowners and the scientific community. The USFWS shall coordinate funding, planning and implementation of freshwater habitat protection and restoration activities within watersheds or sub-watersheds. Other agencies may take the lead to coordinate efforts in specific geographic areas as appropriate. The Department of Natural Resources (DNR) shall act as lead agency in coordinating restoration activities in estuarine and marine habitats. Coordination of restoration efforts among agencies and other groups should include: 1) establishing consistent or complementary habitat priorities; 2) establishing consistent data collection and inventory methods; 3) coordinating activities and goals with local habitat protection programs established under the Growth Management Act; and 4) establishing partnerships with local community groups. Habitat restoration projects should complement and expand efforts occurring through the wetlands restoration element (W-8) and other watershed restoration projects.

Target Date: The USFWS and participating agencies shall report to the PSEP management committee annually regarding freshwater activities. The DNR and participating agencies shall report to the PSEP Management Committee annually regarding marine and deep water activities.

H-3. Habitat Database and Inventory

3.1 State Agencies

The departments of Fish and Wildlife, Natural Resources, and Ecology, and other state agencies that collect data on Puget Sound habitats shall enter or continue entering existing data on non-wetland aquatic systems (deep- and open-water, riparian and shoreland habitats) onto existing geographic information systems (GIS) to be shared between systems. The data shall be provided to the Puget Sound GIS (element M-4) which will be used to update the Puget Sound Environmental Atlas, and they shall be made available to other agen-

cies, governments and the public. These efforts shall be coordinated with the work of the Washington Geographic Information Council and with the DCTED as it guides data management related to regional growth management.

The Department of Fish and Wildlife and the Department of Natural Resources, shall increase their efforts to inventory Puget Sound fish and wildlife habitat relevant to this program, and coordinate the inventory with wetland inventories being done at the local level and with the compilation of inventories being prepared by Ecology under element W-4.

Finally, the departments of Fish and Wildlife, Natural Resources, and Ecology, and other state agencies that have habitat data on aquatic systems shall work cooperatively to develop a list describing the kind of data each agency has relating to these habitats.

3.2. Local and Tribal Governments

The Authority shall request state funding to establish a demonstration program of matching grants (in coordination with the DCTED and the Washington Department of Information Services) for local governments and tribes. The grants would be used to enhance existing computerized databases and to improve access to those databases for local governments or tribes without such databases. Funds could also be used to conduct inventories of local non-wetland aquatic habitats (including deep and open water, riparian zones and shorelands). Such inventories should be conducted according to current Puget Sound Estuary Program Guidelines and Protocols. Data should be provided to state agencies in a format specified by the granting committee.

Grant awards would be made through a committee comprised of representatives from the Department of Fish and Wildlife, DCTED, and the Authority. The grant program will promote efficient use of funds for regionwide data collection and will benefit the state by increasing available data.

3.3. Federal Agencies

In coordination with element W-5 (Wetlands Interagency Coordination) and the Puget Sound Estuary Program Management Committee, the USFWS shall work with other appropriate federal agencies, including the USFS, the National Park Service (NPS), EPA, NOAA, U.S. Geological Survey (USGS), Department of Defense (DOD), Army Corps of Engineers, and the Bonneville Power Administration, to share their data and information on Puget Sound fish and wildlife habitats with other Puget Sound agencies. A memoranda of understanding (MOU) could be developed among federal agencies to facilitate transfer of information.

Target Dates: The departments of Fish and Wildlife, Natural Resources, and Ecology, and federal agencies shall initiate work on subelements H-3.1 and H-3.3 by September 1, 1995. The government grant program for local governments and tribes shall be developed by January 1, 1996, with the first round of grants awarded in the summer of 1996.

H-4. Habitat Education Strategy

4.1. State and Federal Agencies

In coordination with element W-7 (Wetlands Education Strategy), the departments of Fish and Wildlife, Natural Resources, and Ecology, and the USFWS shall develop and implement a long-range education strategy for protecting aquatic habitat (including deep- and open-water, riparian and shoreland habitat) that augments their existing education programs. This strategy shall build on and integrate elements in the Education and Public Involvement Program of this Plan, specifically subelement PI-1.2 (Technical Assistance), element EPI-2 (Coordination Mechanisms), subelement EPI-3.4 (Interpretive Centers), subelement EPI-3.3 (Wildlife Habitat Education), element EPI-4 (Volunteer Audiences), and subelement EPI-5.2 (Habitat Protection).

The strategy shall address the critical role of aquatic systems and associated habitat in maintaining fish and wildlife populations and other important ecosystem functions, such as water quality protection. The strategy shall address the need to manage and evaluate various habitats from a regionwide, ecosystem perspective. Other habitat issues, such as the effect of the projected growth in the region, shall also be addressed.

The strategy shall involve entities and individuals possessing expertise in the field of habitat protection education. These include staff from the WDFW, Ecology, State Parks, tribes, local governments, universities, and private nonprofit conservation groups. The departments of Fish and Wildlife, Natural Resources, and Ecology shall work with those state agencies and groups to implement the strategy and to coordinate with other ongoing water quality and habitat protection education efforts, such as those related to watershed planning and the Timber/Fish/Wildlife Agreement (TFW). Strategy components may include: (a) guidebooks on habitat protection techniques or on habitat descriptions and locations; (b) public workshops and field trips; (c) interdisciplinary workshops and conferences for government and agency staff, as well as elected officials; and (d) backyard wildlife enhancement projects. To the extent possible, public libraries shall be provided with educational material on Puget Sound aquatic systems and associated habitats and populations, and the need and methods to protect them.

Through the Puget Sound Estuary Program, federal agencies, including the Army Corps of Engineers, USFWS, USFS, NOAA, SCS and EPA, shall coordinate with and help support this education effort. The EPA shall be encouraged to use its Center of Excellence to coordinate federal agency information on aquatic habitat (including deep-water, riparian and shoreland habitats) protection for use by local governments.

4.2. Local and Tribal Government Habitat Enhancement and Public Education

With the Department of Fish and Wildlife as lead, the Authority, the state departments of Fish and Wildlife and Natural Resources and the USFWS shall work with tribal and local governments to establish a habitat enhancement and public education program. The Department of Fish and Wildlife shall invite tribal and local governments to apply for habitat enhancement projects for

marine, stream, riparian, wetland or other habitats important to water quality protection, on the condition that they implement a public education program related to the project. Joint tribal and local government projects are encouraged. For tribes, the education will include habitat issues presented in the context of cultural heritage, cultural values and tribal rights. The Department of Fish and Wildlife will work with other state agencies and local and tribal governments to develop the application and selection process.

4.3. Wildlife Enhancement and Education, Private Sector

With the Department of Fish and Wildlife as lead, the DNR and USFWS shall work with developers, business and industry, local conservation groups, and local land trusts to implement joint habitat enhancement and education programs. Developers, business and industry, private conservation groups, or land trusts could apply for the funding or incentives on the condition that the project will provide public education on habitat, such as that envisioned at the Koll Center along North Creek in Bothell. The departments of Fish and Wildlife and Ecology and an interpretive specialist at State Parks shall be available to provide technical assistance on habitat enhancement or on educational activities if requested. The Department of Fish and Wildlife will form a steering committee to formulate funding and/or incentives for this program.

Target Dates: The WDFW, DNR, Ecology, State Parks, and federal agencies shall begin implementing work on subelement H-4.1 by September 1, 1995. The WDFW and the Authority will report on the funding mechanisms to establish subelement H-4.2 by January 30, 1996. The WDFW shall establish a steering committee for subelement H-4.3 by September 1995.

H-5. Public Involvement

The Authority's public involvement policy (PI-1.1) shall be followed by all state and local government agencies in implementing fish and wildlife habitat protection in Puget Sound. Specific actions to be implemented are:

5.1. Information on Hydraulic Project Approvals (HPAs)

The Department of Fish and Wildlife shall provide notice to agencies, local and tribal governments, and the public of current and pending Hydraulic Project Approval (HPA) permits for work in Puget Sound. Examples of ways to do this include a regular mailing of HPA lists to other agencies and governments and to public libraries. The notification is for informational purposes and is not a solicitation for public comment. The WDFW shall at a minimum make their computer listing of pending and recently issued HPAs available to the public. The WDFW and appropriate federal agencies are encouraged to promote interjurisdictional consistency by exploring ways to coordinate their permitting activities (such as the U.S. Army Corps of Engineer's issuance of 404 permits) with that of local governments.

Target Date: The WDFW shall, at a minimum, make their computer listing of HPAs available to the public by October 1, 1995. If funding becomes available, the WDFW shall develop a system to further distribute HPA listings so they are accessible to other agencies, governments and the public by June 30, 1996.

H-6. Field Investigations

State resource agencies shall increase their efforts related to field work needed for management of habitats associated with aquatic systems. This effort is not designed to establish any new programs, but rather to support existing programs and help them more effectively protect Puget Sound fish and wildlife habitat. Federal agencies concerned with habitat management are encouraged to increase their work in the field and to coordinate with ongoing state and local efforts.

The Department of Natural Resources shall increase field investigations and environmental review related to the leasing of aquatic lands. Specific tasks include:

a. Review applications for NPDES (National Pollutant Discharge Elimination System) permits.

b. Perform SEPA (State Environmental Policy Act) review of lease applications.

c. Inspect and evaluate mitigation projects.

d. Ensure compliance with the environmental conditions stipulated in lease agreements.

The Department of Fish and Wildlife shall:

a. Research and evaluate the effects of permitted (HPA) activities on aquatic communities and fish habitat.

b. Devise standard requirements for HPA-permitted activities based on research results and monitor consistency of HPA requirements.

c. Inspect and evaluate mitigation projects.

d. Research and identify important marine habitats based on trophic studies.

e. Incorporate the research results in its HPA review process.

f. Conduct field inspections related to applications for HPA permits.

g. Ensure compliance to the environmental requirements of the HPA permit and monitor consistency of HPA requirements.

The Department of Ecology shall:

a. Coordinate efforts to protect aquatic habitat within its wetlands, shellfish and nonpoint pollution programs.

Target Date: Agencies shall begin work on this element on July 1, 1995.

MAJOR PUBLIC ACTIONS FOR AUTHORITY REVIEW

1. Coordination with the DCTED and WDFW on critical areas guidelines (element H-1).

LEGISLATION REQUIRED

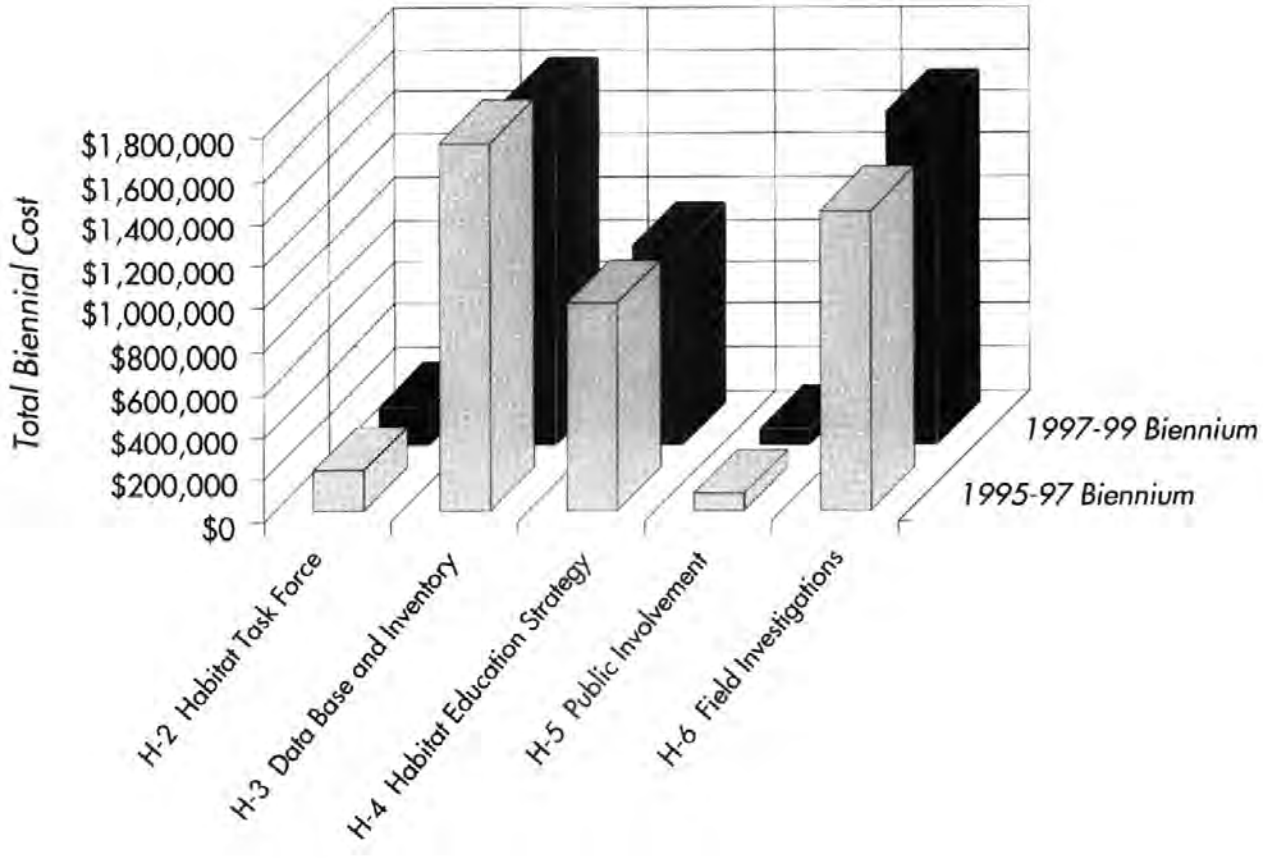
None.

ESTIMATED COST

Full implementation of the Fish and Wildlife Habitat Protection Program would cost an estimated $4.4 million during the 1995-97 Biennium and $4.4 million for the 1997-99 Biennium. Most of this cost is for the field investigations (element H-6) and to perform habitat inventories and enter what is learned into a geographic information system (GIS) (element H-3).

In order to perform the field investigations work in element H-6, the participating agencies would have to hire an estimated 13 full time employees. Once these employees were on board, the annual cost would be $781,000. Element H-4, Habitat Education Strategy, would cost an estimated $940,000 per biennium once the initial start-up costs for hiring new people had been met.

Fish and Wildlife Habitat Protection Program Implementation Estimates



SPILL PREVENTION AND RESPONSE PROGRAM

PROGRAM ELEMENT DIRECTORY

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 when spilled or released on land or in water. Response capabilities would be overwhelmed by any large spill and would fail to significantly reduce environmental damage.

Puget Sound is no stranger to spills of oil and other hazardous substances. In November 1985, jet fuel spilled into Des Moines Creek, killing fish and other organisms in four miles of 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 more than 200,000 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 travelled as far north as Vancouver Island. Oil was found on Dungeness Spit and the San Juan Islands. More than 10,000 birds died as a result of the spill. Numerous minor spills occur every year in Puget Sound.

Small and large spills have potential for significantly harming 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; it 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 or, in the case of oil, smother organisms; and it may remain suspended in the water column where it can harm fish and other aquatic life. 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 have not yet been determined.

INSTITUTIONAL FRAMEWORK

In 1986, state and federal laws were in place to require irresponsible parties to clean up spills and pay the costs of doing so. Contingency plans were also in place to guide coordination of a spill cleanup. These laws proved inadequate in practice, and many deficiencies were apparent in terms of prevention and response planning. Under the federal Clean Water Act, 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. Cleanup efforts are conducted pursuant to national, regional and state contingency plans, which identify what is to be done by whom in the event of a spill. The U.S. Coast Guard is the lead agency responsible for spill response in the marine waters of Puget Sound, with state and other federal agencies and local and tribal governments performing secondary roles. The U.S. Environmental Protection Agency (EPA) takes the lead for inland spills.

Some issues related to spill prevention and response have been addressed by recent state legislation. In 1989, the Washington State Legislature amended the state Water Pollution Control Act (90.48 RCW), to speed up damage assessment from an oil spill when damages cannot be quantified at a reasonable cost. In such an event, compensation will be assessed at between $1 and $50 per gallon of oil spilled. The 1989 Ocean Resources Management Act (RCW 88.40.020) requires that vessels over 300 gross tons which transport petroleum products as cargo have evidence of financial responsibility amounting to $1 million or $150 per gross ton, whichever is greater, to pay for spill cleanup and resource damage in the event of a spill.

AUTHORITY'S APPROACH

The 1987 Puget Sound Water Quality Management Plan (Plan) directed the Department of Ecology (Ecology) to revise its contingency plan for spills of oil and hazardous substances. The plan was to be based on a spill-response policy plan that specifies agency roles, responsibilities, communication and funding. Both the policy and contingency plans were to be completed in cooperation with other state and federal agencies and local and tribal governments.

Revisions to the Plan in 1989 directed the Authority to assess the adequacy of federal, state and local spill prevention measures. It also established a Spill Prevention and Response Advisory Committee, under the Puget Sound Estuary Program, to review contingency plan updates, review Ecology's progress reports and help review spill prevention issues. The committee completed its assignments and has been disbanded.

A number of new program elements were added to the 1991 Plan. Recommendations of the States/B.C. (British Columbia) Oil Spill Task Force were adopted. Ecology was encouraged to require spill control plans in wastewater discharge permits. The former Department of Community Development (now the Department of Community, Trade and Economic Development) was directed to design a training program for local fire departments to include in Article 80 of the Uniform Fire Code. The Authority was directed to establish a work group to identify gaps in current regulations, and fund a study of vessel safety issues in the Sound.

The 1994 Plan recognizes the significant progress made in oil spill prevention and deletes completed tasks and assignments.

PROGRAM GOAL

To emphasize spill prevention strategies and enhance response capability 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.

STRATEGY

The strategy for achieving this goal is to: (1) identify the tools and resources needed to protect Puget Sound from spills, and (2) implement a comprehensive spill prevention and response program using current regulations and enacting new legislation if necessary.

PROGRAM ELEMENTS

SP-1. Oil Spill Policy Implementation

Ecology and the Office of Marine Safety (OMS) shall address the issues described below and implement key recommendations contained in the 1986 Oil Spill Advisory Committee Report to the Legislature, the 1987 Ecology Spill Management Policy Recommendations report, the States/B.C. Task Force, and any further recommendations generated by continuing policy analyses.

Department of Ecology

Ecology shall continue to update and revise the state Contingency Plan for Spills of Oil and Hazardous Substances as necessary. Ecology shall continue to review, modify if necessary, and adopt appropriate recommendations from future efforts of the States/B.C. Task Force. Ecology shall continue ongoing efforts to require and enforce spill prevention and contingency plans from on-shore facilities handling oil. Ecology shall coordinate with Department of Fish and Wildlife (WDFW) on the review of contingency plans for adequacy in protecting sensitive habitats.

In updating the state Contingency Plan, Ecology shall develop policies for *in situ* burning and the use of dispersants for spill response in Puget Sound. Ecology shall brief the Authority on these policies prior to formal adoption.

Ecology, in coordination with the WDFW, shall continue to evaluate whether information on priorities for protecting critical resource areas in Puget Sound is available and accessible. The need for additional information and/or synthesis of existing information will be evaluated.

Office of Marine Safety

The OMS shall carry out programs for tank vessel spill-prevention plans, cargo and passenger-vessel screening, regional marine safety plans for Puget Sound, and field operations.

SP-2. Fire Fighting and Spill Prevention

The Department of Community, Trade and Economic Development's (DCTED) Fire Protection Services Division 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. 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 which will prevent release of those substances into the environment in case of an accident.

The OMS shall design and implement a marine fire-fighting program for Puget Sound. The program shall be designed to: (1) inventory existing equipment, vessels and trained personnel in the Puget Sound region; (2) summarize existing marine fire-fighting plans for all parties likely to respond to a marine fire; (3) develop a comprehensive plan to establish a marine fire-fighting network; (4) clarify roles of potential participants; and (5) describe how existing marine fire fighting may be coordinated.

Target Dates: The DCTED shall submit an outline of the training program and a training program schedule to the Authority by December 1995. The DCTED shall implement the training programs according to the schedule and submit annual progress reports to the Authority. The OMS shall submit an outline of a marine fire-fighting program and a program implementation schedule to the Authority by December 1995. The OMS shall implement the marine fire fighting program according to the schedule and submit annual progress reports to the Authority.

SP-3. Vessel Safety

The Office of Marine Safety shall implement the recommendations concerning vessel safety of the Regional Marine Safety Plans for Puget Sound. As part of this effort, the OMS shall appoint a Tug Escort Standards Committee to establish standards and recommended operational speeds for tug escorts in Puget Sound. The OMS shall also appoint a Towboat Standards Committee to establish operational standards for towing tank barges. The OMS shall also investigate and prepare a report on the effect of speed on vessel maneuverability and safety. The recommendations and study shall be conveyed by the OMS to the State Pilotage Commission and the U.S. Coast Guard to be used as the basis for potential regulatory changes necessary to ensure vessel safety. The OMS shall report to the Authority annually on its progress under this element.

Target Dates: The Office of Marine Safety shall appoint the Tug Escort Standards Committee and the Towboat Standards Committee by December 1995. The committees shall complete their development of recommended standards by December 1996. The OMS shall complete a report on the effect of speed on vessel maneuverability and safety by December 1996.

SP-4. Spill Prevention Education

Washington Sea Grant shall develop and 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 which 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 (element 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 Dates: The educational program shall be implemented according to the workplan schedule developed for this program. Washington Sea Grant shall submit semi-annual progress reports to the Authority.

MAJOR PUBLIC ACTIONS FOR AUTHORITY REVIEW

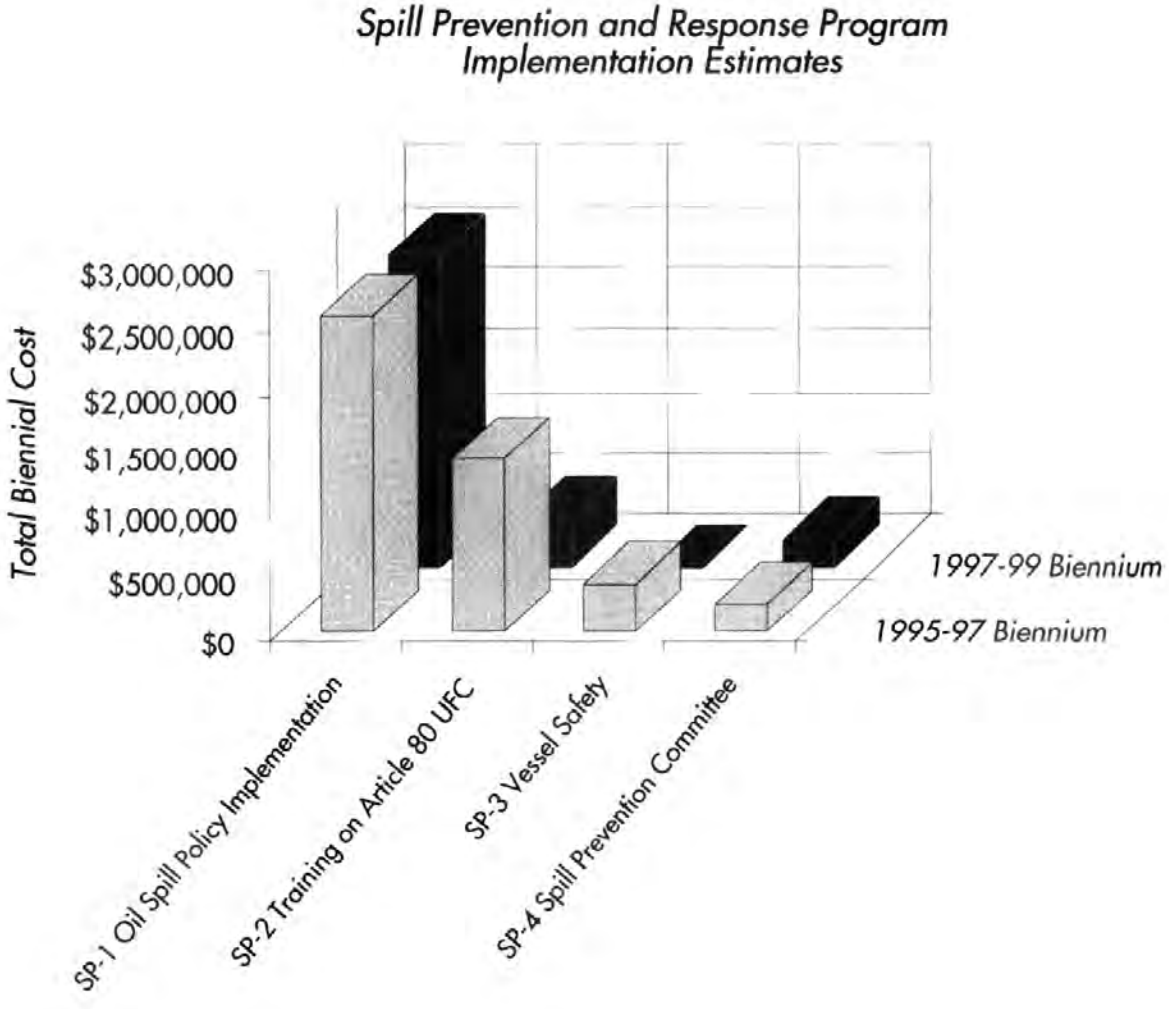
1. Training program outline and implementation schedule by the Department of Community, Trade and Economic Development (element SP-2). Marine fire-fighting program and implementation schedule by the Office of Marine Safety (element SP-2).

2. Vessel safety standards recommendations (element SP- 3).

ESTIMATED COST

Fully implementing the Spill Prevention and Response Program is estimated to cost $4.6 million during the 1995-97 Biennium and $3.2 million during the 1997-99 Biennium. The revised 1994 Spill Program will be almost entirely paid for by the Oil Spills Administration Account (a tax on crude oil brought into the state for refining), with minor contributions from federal, local and tribal funding sources and the state General Fund. Many of the costs will accrue due to actions to implement the policies agreed upon by the States/B.C. Task Force. These measures involve a large and complex array of costs which would be shared by numerous government agencies and private industries. Recommendations which involve general measures, such as increasing enforcement efforts, do not facilitate a simple calculation of costs. Therefore, the sum cost of implementing all of the recommendations remains unknown.

Private sector costs that may result from spill prevention and response activities are not included in the estimate of implementation costs. Improvements in spill prevention and response may also help counter private costs by reducing potential cleanup costs from spills.


Spill Prevention and Response Program
Implementation Estimates
Total Biennial Cost
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$0
1997-99 Biennium
1995-97 Biennium
SP-1 Oil Spill Policy Implementation
SP-2 Training on Article 80 UFC
SP-3 Vessel Safety
SP-4 Spill Prevention Committee

MONITORING PROGRAM

PROGRAM ELEMENT DIRECTORY

PROBLEM DEFINITION

To assess the effects of human activities on Puget Sound and its resources, it is necessary to collect baseline and long-term data on the Sound's water, sediments, biological populations and habitat. Population growth and associated urbanization, industrialization and waste disposal have increasingly strained area resources. Resource managers need accurate, up-to-date information on present conditions and changes over time to protect the resources from harm. The public needs accurate information to remain aware and involved in the decision-making process. Managers can assess risks to human health from eating contaminated seafood only if they have sufficient information about contaminant levels in fish, shellfish and other seafood, and the rates at which those levels change.

In 1986, the Authority identified the need for a long-term, comprehensive program to monitor Puget Sound and its resources. Monitoring efforts by federal, state and local agencies generally were not Sound-wide and not well coordinated. A substantial amount of data was being compiled on fresh and marine waters, sediments, and biota as part of specific, project-related intensive surveys, short-term or localized monitoring, and compliance monitoring. Program activity, however, was narrowly focused and largely designed and implemented by numerous agencies. Improved coordination and integration of Sound-wide monitoring programs was badly needed.

A comprehensive monitoring program can measure the effectiveness of regulatory programs and the Puget Sound Water Quality Management Plan (Plan), evaluate long-term trends in environmental quality, improve decision making and help prevent overlaps and duplications.

AUTHORITY'S APPROACH

The Authority addressed monitoring issues in the 1987 Plan by forming a Monitoring Management Committee (MMC), comprised of representatives from federal and state agencies, local and tribal governments, Canadian agencies, industry, the scientific community, and the public. The MMC was charged with developing recommendations for the Authority regarding: (1) goals and objectives for an ambient Sound-wide monitoring program, (2) a technical design for ambient monitoring, (3) a data management system to handle all ambient monitoring data, (4) a cost estimate and identification of potential funding sources for the program, (5) opportunities for citizen monitoring, and (6) a strategy for updating and integrating the Puget Sound Envi-

ronmental Atlas with the monitoring program. This committee was established in October 1986.

Prior to forming the MMC, a monitoring design was developed through the U.S. Environmental Protection Agency's (EPA) Region 10 office and refined through workshops involving the public and local and tribal governments. The workshops ensured that interested parties had a role in designing the committee. Members of the Puget Sound Estuary Program (PSEP), Technical Advisory Committee (TAC), and other scientists in the Puget Sound Area provided scientific review of the draft design.

The MMC presented its final report and recommendations to the Authority in April 1988. The committee's report and ongoing refinements provide the basis for the Monitoring Program. At the heart of this program is the Puget Sound Ambient Monitoring Program (PSAMP), which the Authority adopted in April 1988.[1]

The PSAMP Steering Committee was formed in August 1988 to manage and coordinate the program. It includes implementing state agencies, federal agencies, local and tribal governments, and the Authority. The majority of activities began in 1989.

As of 1994, a coordinated monitoring effort, which includes regular sampling, is in place. The departments of Ecology, Fisheries (now Fish and Wildlife) and Health have conducted regular sampling of marine and fresh waters, fish, sediments and shellfish since 1989. The state Department of Natural Resources (DNR) conducted habitat surveys in 1991-92. The U.S. Fish and Wildlife Service (USFWS) is conducting studies supporting future contaminant sampling of birds. Citizen monitoring activities are carried out regularly through the Authority's Public Involvement and Education (PIE) Fund, EPA and agency funds. The departments of Ecology, Health, and Fish and Wildlife all have operational data-management systems, and the DNR has loaded the Puget Sound Environmental Atlas onto the Puget Sound Geographic Information System (GIS).

PROGRAM GOAL

To implement the Puget Sound Ambient Monitoring Program. This program was designed to: (1) assess the health of Puget Sound and its resources; (2) identify existing environmental problems; (3) provide data and other information to assist the Authority and others in measuring the success of environmental programs; (4) document natural and human-caused changes over time in the ecological components of Puget Sound; and (5) support research activities by making available scientifically valid data.

1 Some of the environmental variables examined by the MMC were not included in the PSAMP recommendation due to high costs, lack of adequate protocols or logistical constraints. For example, sampling and analysis of freshwater sediments for toxics could not technologically be accomplished for a reasonable price and were therefore not included in the program. Many of the variables rejected for this initial PSAMP design should be given serious consideration in future iterations of the program. Funding levels and/or technological advances may allow for their addition to the program.

PROGRAM ELEMENTS

M-1. PSAMP Management Structure

The management structure for the Puget Sound Ambient Monitoring Program shall consist of the PSAMP Steering Committee, the MMC and the Authority. Staff, housed at the Authority, shall provide technical and administrative support to the program.

The PSAMP Steering Committee shall be chaired by the Authority and shall be composed of one representative from each of the implementing agencies, the EPA, the USFWS, and tribal and local governments. Additional members shall be added in the future if deemed necessary by the Authority. The PSAMP Steering Committee shall be responsible for the overall coordination and management of the PSAMP; coordination of agency activities; the review of technical and interpretive reports of PSAMP information; approval of changes in program design or "task implementation plans"; and the sanction of protocols for use in the PSAMP. The PSAMP Steering Committee may, at its discretion, consult with appropriate experts from outside the program on technical issues. The PSAMP Steering Committee shall meet every month or as needed, and shall reach decisions by consensus. If the PSAMP Steering Committee cannot reach consensus on an issue, then it shall be decided by majority vote.

The MMC shall be chaired by the Authority and shall consist of representatives from: the state departments of Ecology, Fish and Wildlife, Natural Resources and Health, King County Department of Metropolitan Services (Metro), local water and sewer districts, local public health officials, tribal governments, federal agencies (including the National Oceanic and Atmospheric Administration, EPA, USFWS, U.S. Geological Survey, Natural Resources Conservation Service, and Army Corps of Engineers) Canadian agencies, industry, shellfish growers, the scientific community, and citizen organizations.

The MMC shall act as the advisory group to the PSAMP Steering Committee. Proposed major changes to the PSAMP shall be referred to the full MMC or to MMC subgroup appointed by the PSAMP Steering Committee. Major changes include, but are not limited to: (1) the addition or deletion of a PSAMP task or major sub-task; (2) change in assignment of an implementing agency; (3) setting funding priorities among PSAMP tasks; (4) changes in protocols, sampling design or criteria for locating sampling stations; (5) and any significant technical issue upon which the PSAMP Steering Committee cannot reach agreement. The MMC shall meet as needed. Representatives from the MMC may also be included in PSAMP Steering Committee meetings on an ad hoc basis to address specific technical issues not requiring review by the full MMC.

If the PSAMP Steering Committee cannot reach agreement on major changes to the PSAMP or other technical issues after consultation with the MMC, or on any other issue, the PSAMP Steering Committee as a whole, or any member individually, may refer the matter to the Authority for resolution.

The PSAMP Steering Committee and the MMC shall review and reassess the design of the PSAMP on an as-needed basis.

The Authority shall facilitate agency cooperation among the state agencies implementing the PSAMP; provide arbitration for interagency disagreements concerning the PSAMP; provide and house the monitoring program staff; provide the central data-management functions; and distribute integrated, interpretive reports of PSAMP results.

The Authority shall: (1) implement PSAMP Steering Committee and Authority decisions; (2) coordinate the monitoring program; (3) manage a central database system; (4) provide technical review of field collection and laboratory analysis design; (5) provide quality assurance review of PSAMP data; (6) prepare technical assessments of PSAMP progress for the PSAMP Steering Committee; (7) ensure that program revisions are coordinated among agencies; (8) provide technical assistance to program participants in areas of data analysis and interpretation and field and laboratory activities; (9) organize outside technical assistance, where needed, to help in review of monitoring data and program revisions; (10) prepare integrated reports from data reports; (11) and coordinate with other monitoring and research efforts.

Memoranda of agreement shall be negotiated between each implementing agency and the Authority to: (1) ensure the implementation of the PSAMP; (2) allow for future modifications of the program, as needed; (3) secure long-term stable funding for the PSAMP; and (4) develop a permanent record of data for Puget Sound. These agreements shall include commitments of work to be performed by one agency to support products of another agency, product reviews, consultation, and technical support.

If the Authority sunsets, those Authority functions associated with the management of the PSAMP will be assumed by another organization. The PSAMP Steering Committee shall consult with the MMC and shall develop a recommendation for the long-term coordination and management of the PSAMP prior to the sunset date of the Authority.

Target Dates: Ongoing.

M-2. Puget Sound Ambient Monitoring Program (PSAMP)

The design of the PSAMP, completed by the MMC in April 1988, and subject to future amendment, has been adopted for use in Puget Sound, and defines the overall program design (program structure and task components) of the PSAMP. The 1988 PSAMP report, prepared by the MMC, also contains initial guidance on the specific design of each task. Implementation plans—prepared by the implementing agencies and approved by the PSAMP Steering Committee—shall provide detailed documentation of all components of task implementation. The implementation plans may update or amend the initial task guidance provided in the MMC 1988 report.

The Puget Sound Ambient Monitoring Program shall collect and analyze samples and carry out surveys to determine the quality of the water, sediments, biological populations, and habitats of the Puget Sound basin, using protocols,

quality assurance checks, data storage and reporting procedures, as detailed in the MMC 1988 report and the task implementation plans. The implementing agencies shall carry out specific assignments for implementing the PSAMP, as defined in task implementation plans approved by the PSAMP Steering Committee.

Initially, the state departments of Ecology, Fish and Wildlife, Natural Resources and Health, and the U.S. Fish and Wildlife Service (USFWS) have been chosen as the implementing agencies. Other federal and state agencies, local and tribal governments, and other organizations may become implementing agencies in the future. Program tasks outlined in the 1988 MMC report have been assigned to the implementing agencies as follows:

Department of Ecology	Sediment, Marine Water Column, Fresh Water
Department of Fish and Wildlife	Fish, Birds, Marine Mammals
Department of Natural Resources	Nearshore Habitat
Department of Health	Shellfish
USFWS	Contaminants in Birds

Changes to the overall program design shall require approval of the PSAMP Steering Committee in consultation with the full MMC or MMC subgroup appointed by the Steering Committee. The program shall include, at the least, sampling for sediments, water quality variables, biological populations, and habitat, within the limits of available funding.

Location, timing and frequency of sampling stations in each program task shall follow the approach outlined in the MMC 1988 report as updated and detailed in the task implementation plans. Task implementation plans shall include detailed field sampling techniques, station locations, laboratory procedures, a quality assurance/quality control (QA/QC) program, and a data management plan, and shall indicate any arrangements made with agencies or organizations for carrying out portions of the work. Task implementation plans shall be approved by the PSAMP Steering Committee, in consultation with appropriate experts outside of the program and implementing agency. Any changes to the approved task implementation plans shall require approval by the PSAMP Steering Committee. If the PSAMP Steering Committee decides that these changes require additional technical review, the committee may consult with experts outside of the program and implementing agency.

Target Dates: Implementation of the PSAMP is ongoing for those tasks for which funding is currently available.

M-3. Citizens' Monitoring

The Authority shall develop a citizens' monitoring program to collect data which will supplement the PSAMP and act as an educational and public involvement tool (see element EPI-6 for further details on citizens' monitoring). At a minimum, at least one citizens' monitoring project shall be carried out each year.

Citizen monitors shall be asked to carry out portions of PSAMP tasks deemed appropriate by the monitoring program staff in consultation with the PSAMP Steering Committee. Staff from the implementing agencies shall provide technical support and oversight for citizens' monitoring projects funded under this element. Authority staff shall provide volunteer-management support for citizens' monitoring projects funded under this agreement.

Data collected under citizens' monitoring programs shall be subject to the same protocols and quality assurance checks as all other portions of the PSAMP.

Target Date: Citizens' monitoring projects associated with the PSAMP will be carried out on a continuing basis.

M-4. Data Management and Quality Assurance

Data management and quality assurance for the PSAMP shall be carried out through a centrally coordinated data management system. Responsibility for data storage and analysis shall be distributed among the implementing agencies and the monitoring program staff.

Each implementing agency shall develop and use data management systems, as specified in the PSAMP report, to manage all data generated under those tasks of the PSAMP for which they are responsible. The monitoring program staff shall develop and maintain a central database of PSAMP data, as specified in the PSAMP report, including a computerized data inventory.

All data generated under PSAMP shall meet the quality assurance requirements specified in the PSAMP report and those subsequently ratified by the PSAMP Steering Committee.

The implementing agencies shall transfer data to the central database annually, following quality assurance checks. Standardized computer codes and formats specified by the PSAMP Steering Committee shall be used uniformly for all data transfers between and among the implementing agencies and the Authority.

The monitoring program staff, with the Department of Natural Resources' Division of Aquatic Lands, shall create a Puget Sound Geographic Information System (GIS) as recommended by the PSAMP Steering Committee and adopted by the Authority in June 1989. The Puget Sound GIS shall include information on Puget Sound resources and environmental conditions at a scale appropriate for regional planning and analysis. The Puget Sound GIS shall be used to update the Puget Sound Environmental Atlas and to prepare PSAMP reports and analyses, as appropriate. The implementation of the Puget Sound GIS shall be coordinated to the maximum extent possible with the data management activities of the 1990 Growth Management Act, SHB 2929.

Target Dates: The state departments of Fish and Wildlife and Natural Resources shall have operational data-management systems by September 1, 1996. The monitoring program staff shall have an operational central database with enhanced reporting capabilities by July 1, 1996.

M-5. Monitoring Reports

The implementing agencies shall analyze and report data for those tasks of the program for which they are responsible, as specified in the PSAMP report, in consultation with the monitoring program staff.

The implementing agencies shall each prepare an annual technical report which shall include a compilation of data, statistical analyses, interpretation, and recommendations for changes in the monitoring program design.

The monitoring program staff shall prepare an annual *Puget Sound Update*, which will be an integrated report, written for a non-technical audience. The *Puget Sound Update* will include information supplied in reports from the implementing agencies and the monitoring databases. The PSAMP Steering Committee and the MMC shall review the Puget Sound Update prior to its release.

Agency-intensive survey groups shall use the findings of the PSAMP as a resource in setting priorities for problem areas in need of study.

Target Dates: Each agency implementing the PSAMP shall prepare an annual technical report for the Authority.

M-6. Additional Monitoring and Data Management Needs

The goals of the PSAMP will be enhanced by the addition of appropriate intensive survey, receiving water monitoring data collected by dischargers, and other environmental data that are compatible with the data collected under the PSAMP. The PSAMP Steering Committee shall consult with state and local agencies concerning the applicability of their intensive survey and other environmental data to the PSAMP. The state departments of Ecology and Health, and other state agencies; the EPA, the U.S. Navy, and other federal agencies; Metro and other local and tribal governments shall collect and store information from intensive surveys, to the maximum degree feasible, according to sampling and analysis protocols specified by the PSAMP Steering Committee. Ecology, DOH, and other agencies as appropriate, shall, to the maximum extent practical, transfer appropriate intensive survey results, ambient monitoring data, and other environmental information to the central database at the request of the monitoring program staff. Transfer of the information shall be accomplished using data transfer formats developed under element M-4.

Collection and storage of information in a manner compatible with the PSAMP is addressed for compliance monitoring surveys in elements P-8 and P-17; for contaminated sediment inventories in S-8.1; for nonpoint pollution monitoring in elements NP-7.2 and MB-7; for shellfish monitoring in elements SF-3 and SF-5; and for wetlands evaluation in elements W-1.2, W-4 and W-6.

Target Date: The departments of Ecology and Health, and other agencies shall use PSAMP protocols on an ongoing basis. Intensive-survey data shall be stored in compatible format by Ecology and the DOH by January 1, 1996, and by all other agencies by July 1, 1996.

M-7. Evaluation of the PSAMP

In order to ensure that the PSAMP remains a necessary and cost-effective program that generates data useful to scientists and water quality managers, periodic evaluations of the program shall be conducted. Five years after the start of the program and every three years thereafter, the PSAMP Steering Committee shall identify an independent organization with appropriate technical expertise to evaluate the PSAMP. The independent organization shall prepare a report for the PSAMP Steering Committee which evaluates: (1) the effectiveness of PSAMP sampling, analyses and data management in meeting program goals; (2) the degree to which quality-assurance requirements are met and are effective in generating high-quality data; (3) the degree to which PSAMP reports are effective and appropriate in meeting the program goals; (4) the continuing need for the PSAMP sampling and analysis tasks, parameters, sampling frequencies, and station locations; (5) the degree to which PSAMP is being implemented according to the overall design strategy; and (6) the degree to which PSAMP results are used in making decisions about water quality management. The report shall also make recommendations for improvements to the program, including the addition or deletion of monitoring tasks.

Target Dates: First evaluation starts by July 1994 with the report due to the PSAMP Steering Committee by December 1994.

M-8. Pesticides Monitoring

A technical subcommittee to the MMC, 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 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 as appropriate, shall be convened. The technical subcommittee shall: (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 Authority for the inclusion of pesticides monitoring in selected tasks of the PSAMP. Some pesticides monitoring needs that the technical subcommittee should consider include:

- The monitoring of potential point and nonpoint sources of pesticides including sewer and storm drain outfalls and highway, forestry and agricultural runoff.

- The monitoring of ambient levels of pesticides in Puget Sound sediments and organisms to determine long-term changes in environmental concentrations.

Target Dates: The technical subcommittee shall be convened by July 1, 1996, and shall make recommendations on pesticides monitoring to the Authority by November 1996.

MAJOR PUBLIC ACTIONS

None.

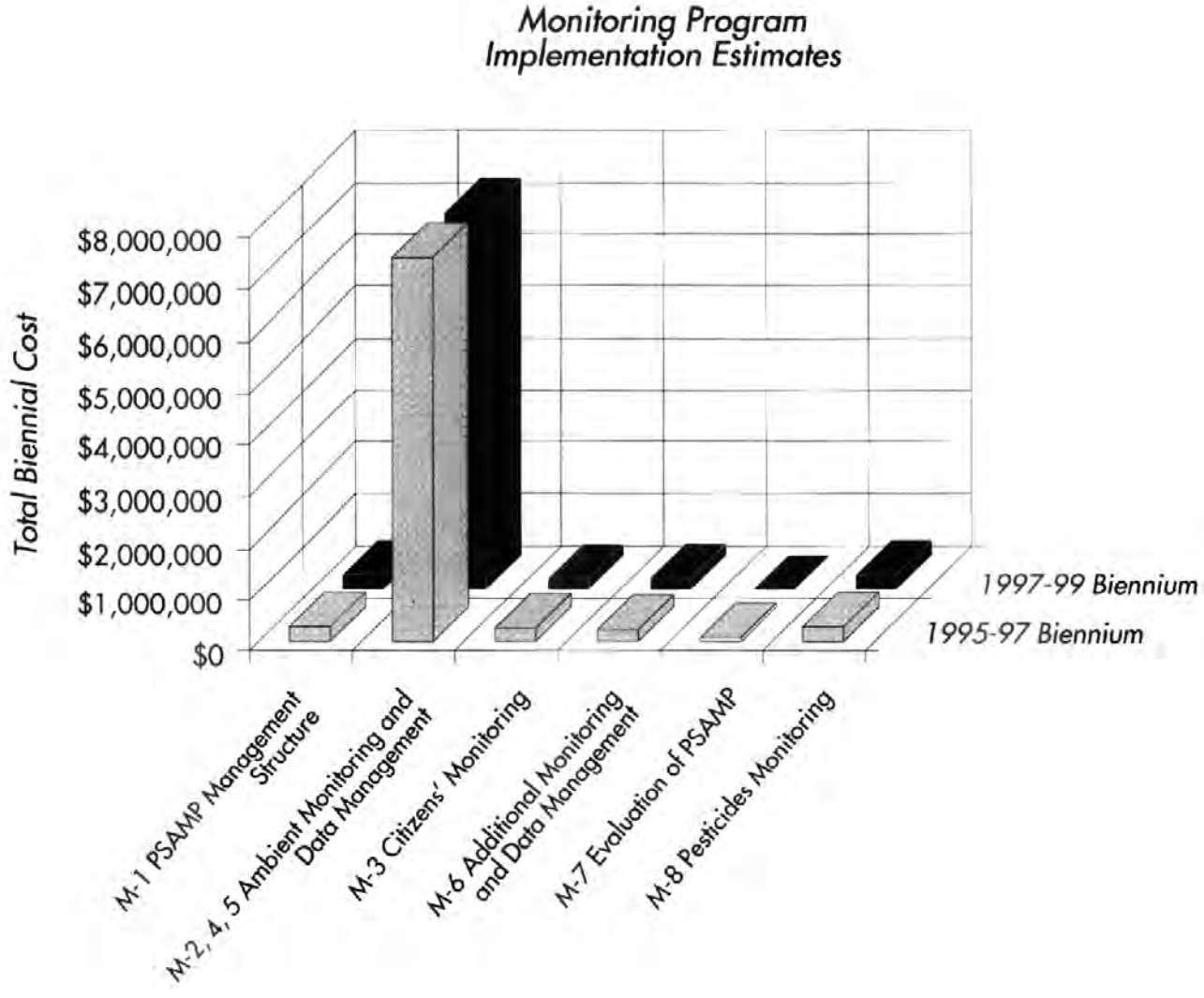
LEGISLATION REQUIRED

None.

ESTIMATED COST

Fully implementing the Monitoring Program is estimated to cost $8.6 million during the 1995-97 Biennium and $8.3 million during the 1997-99 Biennium. Field sampling and laboratory analysis of sediment, water quality and biological population samples constitute the most costly element of the program, with an annual cost approaching $4 million. Cost estimates include costs for field sampling, laboratory analysis of samples, coordinating and managing the program, providing a central data-management system, developing a Puget Sound Geographical Information System (GIS), coordinating a citizens' monitoring program, developing and maintaining individual agency data management systems, implementing quality-assurance procedures, and producing reports for technical audiences and the public.

No significant private sector costs have been identified for this program, with the exception of staff time provided by representatives of the private sector on the Monitoring Management Committee. Other monitoring costs also appear in the Municipal and Industrial Discharges Program, where there are requirements for increased monitoring by dischargers.


Monitoring Program
Implementation Estimates
Total Biennial Cost
$8,000,000
$7,000,000
$6,000,000
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$0
1997-99 Biennium
1995-97 Biennium
M-1 PSAMP Management Structure
M-2, 4, 5 Ambient Monitoring and Data Management
M-3 Citizens' Monitoring
M-6 Additional Monitoring and Data Management
M-7 Evaluation of PSAMP
M-8 Pesticides Monitoring

RESEARCH PROGRAM

PROGRAM ELEMENT DIRECTORY

PROBLEM DEFINITION

Research[1] and monitoring form the technical foundation for the Puget Sound Water Quality Management Plan (Plan). Research is essential for understanding Puget Sound and its associated watersheds, and for developing management options to protect the Sound in the future. It provides a basic understanding of conditions and processes, while monitoring establishes baseline data and tracks trends in conditions. Research explores and confirms findings made through monitoring. Finally, research helps develop accurate, practical and cost-effective methods for monitoring and for analyzing samples.

The need to include a comprehensive, coordinated program of research for Puget Sound was recognized in the earliest stages of Plan development. Comprehensive research was not being undertaken primarily because the system of funding promoted narrowly focused efforts. Funding for most research is administered either directly by federal agencies or through state programs that are set up as regional managers for federal funding. These agencies neither claim responsibility for Puget Sound as an ecosystem, nor see research as their primary objective. Research by agency staff or independent contractors is typically designed to provide specific information which supports an agency's ability to carry out its particular mission.

This approach to defining and funding research arose in part from a reactive, narrowly focused (e.g., "single-species") management perspective. Now, as awareness of the need to make well-informed management decisions from a wider, "systems" perspective (watershed, basin, ecosystem) grows, there is an increasing need to formulate research questions from a similar, broader perspective. Research must be focused on Puget Sound itself, on its unique physical and biological systems, and on the cumulative effects of management decisions on the Sound.

At the same time, the demand for highly focused, "applied" research has grown as state and local governments come under increased pressure to solve the complex problems of environmental protection. Issues affecting wetlands and other habitats (e.g., protection, restoration, mitigation for loss), storm water (best management practices for control and use of runoff), and on-site sewage systems (alternative systems) are driving research in innovative technical solutions.

1 Scientific investigation in which a hypothesis, idea or assumption is developed and tested through systematic collection and objective analysis of data.

INSTITUTIONAL FRAMEWORK

Despite the need for a comprehensive approach to research in Puget Sound, with few exceptions research in the Puget Sound region has consisted of a patchwork of agency-sponsored, short-term studies. When coordinated research projects do occur, they lack a basinwide focus. Localized restoration projects, such as Superfund and urban bay action teams, have brought together federal, state and local agencies in site-specific associations that promote longer-term, integrated studies. On occasion, agencies involved in formal and informal arrangements, such as the Puget Sound Estuary Program (PSEP), have combined efforts on research projects. Interagency coordination by the PSEP's technical advisory committee, for example, has resulted in applied research that is widely recognized as essential to our understanding of water quality problems.

Established in 1993 to protect water quality and ecosystem health in marine, coastal and estuarine waters, and administered by the National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA), the Pacific Northwest Regional Marine Research Program (RMRP) identifies research needs and sets priorities for research in the region encompassing Washington, Oregon and part of northern California. When funded, the RMRP should produce a program of research that is ecosystem-oriented, coordinates existing efforts and funds new research. Since it is the largest basin in the Pacific Northwest region, Puget Sound will receive a significant portion of the program's attention. On the other hand, given the regional scale of the RMRP, Puget Sound will receive only a small portion of the attention that its health and protection require.

In the Puget Sound region, providers, funders and users of research have been slow to address the need for a program of research that embodies shared goals and priorities with a basinwide perspective. A coordinated Puget Sound research program could:

(1) Provide a clear connection between the scientific community's research agenda and the information needs of resource managers, regulators and other policy-makers.
(2) Sponsor and highlight technical solutions required by other programs of the Puget Sound Plan.
(3) Promote investigations that increase our general knowledge of the Puget Sound system and are beyond the purview of any single agency.

Finally, discoveries relating to the delicate balance of biological systems in the Sound, and the development of creative and cost-effective solutions to Sound-wide water quality problems have little effect if the information never reaches people who can use it. Often, results are disseminated only to a select group within the scientific community, or in a form or time frame that prevents their usefulness to resource managers, policy-makers and the general public. Lack of public forums for exchanging information has caused difficulties and misunderstandings in both communities.

A coordinated, effective program of research for the Puget Sound region must address two needs: (1) to ensure that the effort and resources devoted to research are appropriate to and commensurate with problems that are confront-

ed in managing the Sound's water quality, and (2) to ensure that the results of research are understood and incorporated into the decision-making process at all levels.

AUTHORITY'S APPROACH

In an effort to promote a coordinated program of research for Puget Sound, the Authority pursued two separate but closely related processes: (1) focusing institutional and financial resources on Puget Sound research, and (2) actively disseminating research information through a series of conferences, workshops and publications.

In the 1987 Plan, the Authority presented a strategy that called for developing a research committee, holding an annual Puget Sound research conference, and also adopting research needs and priorities. Established in 1987, the Committee on Research in Puget Sound, was comprised of representatives from academic institutions, state and federal agencies, business, agriculture, environmental groups and private research organizations. The committee was charged with making recommendations to the Authority on eight issues important to Puget Sound research, including: research priorities, institutional needs, data management, research reserves, and the publication and dissemination of research results.

In July 1987, the Subcommittee on Establishing Research Priorities generated a ranked list of research priorities. In an effort to devise an institutional structure which might address problems related to coordinating and paying for research, disseminating research results, and using research results in making decisions, the Subcommittee on Institutional Issues reviewed the structure, responsibilities and operation of existing institutions in the Puget Sound region and around the nation. Based on this analysis, the Committee on Research recommended that a Puget Sound Research Foundation should be established.

In the 1989 revision of the Plan, the Authority adopted long-term research goals and a list of six research priorities developed by the Committee on Research. This list was intended to guide support for research through a grants program for Fiscal Year 1989-91. A seventh area of research having to do with pesticides was identified by an issue paper released in 1990 and added to the list.

The 1994 Puget Sound Plan's Research Program calls for the Authority to establish a grants program to fund research on Puget Sound. The Foundation Program was eliminated after efforts to establish the Puget Sound Research Foundation were unsuccessful. The Authority has been actively disseminating research information through a series of conferences and publications—most notably the Puget Sound Research conferences and *Puget Sound Notes.*

PROGRAM GOAL

To establish and maintain a system of priorities and funding for, and dissemination of, research that: (1) adds to our knowledge of the physical and biological systems of Puget Sound; (2) identifies causes and solutions of pollution problems; and (3) assists decision-making activities of regulatory and management agencies while stimulating creativity and excellence in research.

STRATEGY

The strategy for achieving this goal is to: (1) maintain the Puget Sound Research Program[2] in order to promote the coordination and funding of Puget Sound research; (2) maintain a renewable list of priorities for the program; and (3) assist in making the results of research available for use in making decisions.

PROGRAM ELEMENTS

R-1. Puget Sound Research Program

The Authority 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 Authority shall ensure that Research and Monitoring Program 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 Puget Sound Estuary Program and other estuary programs, the NOAA'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-2. Research Priorities

The Research Advisory Committee shall review, revise and recommend to the Authority a list of research priorities to serve as a guide to the Authority 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, as well as by other Plan programs (e.g., elements H-6, PS-2, SP-3, SW-7 and W-9).

The Authority 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.

2 Portions of the Research Program are identified in elements of other programs of the Plan, including the Fish and Wildlife Habitat Protection Program, the Nonpoint Source Pollution Program, the Shellfish Protection Program, the Spill Prevention and Response Program, the Stormwater and Combined Sewer Overflows Program, and the Wetlands Protection Program.

R-3. Research Grants Program

With the assistance of the Research Advisory Committee, the Authority shall establish and manage a competitive research grants program to support high-priority research that is not adequately funded by government agencies or other sources. The Research Advisory Committee shall review proposals with the assistance of appropriate experts, and select proposals on the basis of established criteria, including: current priorities, quality, significance of expected scientific contribution, and importance to an affected Puget Sound resource. The advisory committee shall annually recommend a slate of priority research projects to the Authority.

The Authority shall seek funding for research and award grants annually based on the recommendations of the advisory committee, current priorities for Plan implementation, and available funds. The Authority shall work cooperatively with agencies and tribal governments to allocate funds. At a minimum, the Authority 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.

The Authority 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.

R-4. Translation and Dissemination of Research Results

The Authority shall support timely dissemination and translation of Puget Sound research results useful to the public and resource managers. Specifically, the Authority shall:

a. Establish a policy that research supported by the program should undergo peer review and, where appropriate, be published in technical and scientific journals.

b. Support preparation of synthesis or review papers on key Puget Sound issues.

c. Urge the preparation of short summaries for non-technical audiences of all reports arising from Puget Sound-related research.

d. Support the centralization and computerization of research findings by the submission of all research reports to recognized repositories and by updating and managing *Sound Access*, a computerized bibliography of Puget Sound literature.

e. Publish an annual report summarizing progress on program-supported research and other activities.

f. 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.

g. 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.

h. Communicate and provide educational opportunities to increase public understanding of how research contributes to the resolution of current and future issues related to water quality in Puget Sound.

R-5. Information Management

The Authority shall facilitate access to information dealing with Puget Sound that is not readily available through the open literature, particularly unpublished research and data. The Authority 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. This function shall be coordinated with the data management functions of the Puget Sound Ambient Monitoring Program (PSAMP), which include the use of a central database of PSAMP data and the development of a computerized data inventory. The PSAMP data inventory will serve as a source of information on what computerized data are available and how they may be obtained.

The Authority shall maintain and periodically update the computerized bibliography, *Sound Access*.

R-6. 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 under-represented. Such reserves may be intended for research or as reference areas for monitoring. The Authority 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 Plan.

Target Date: This is an ongoing program.

MAJOR PUBLIC ACTIONS

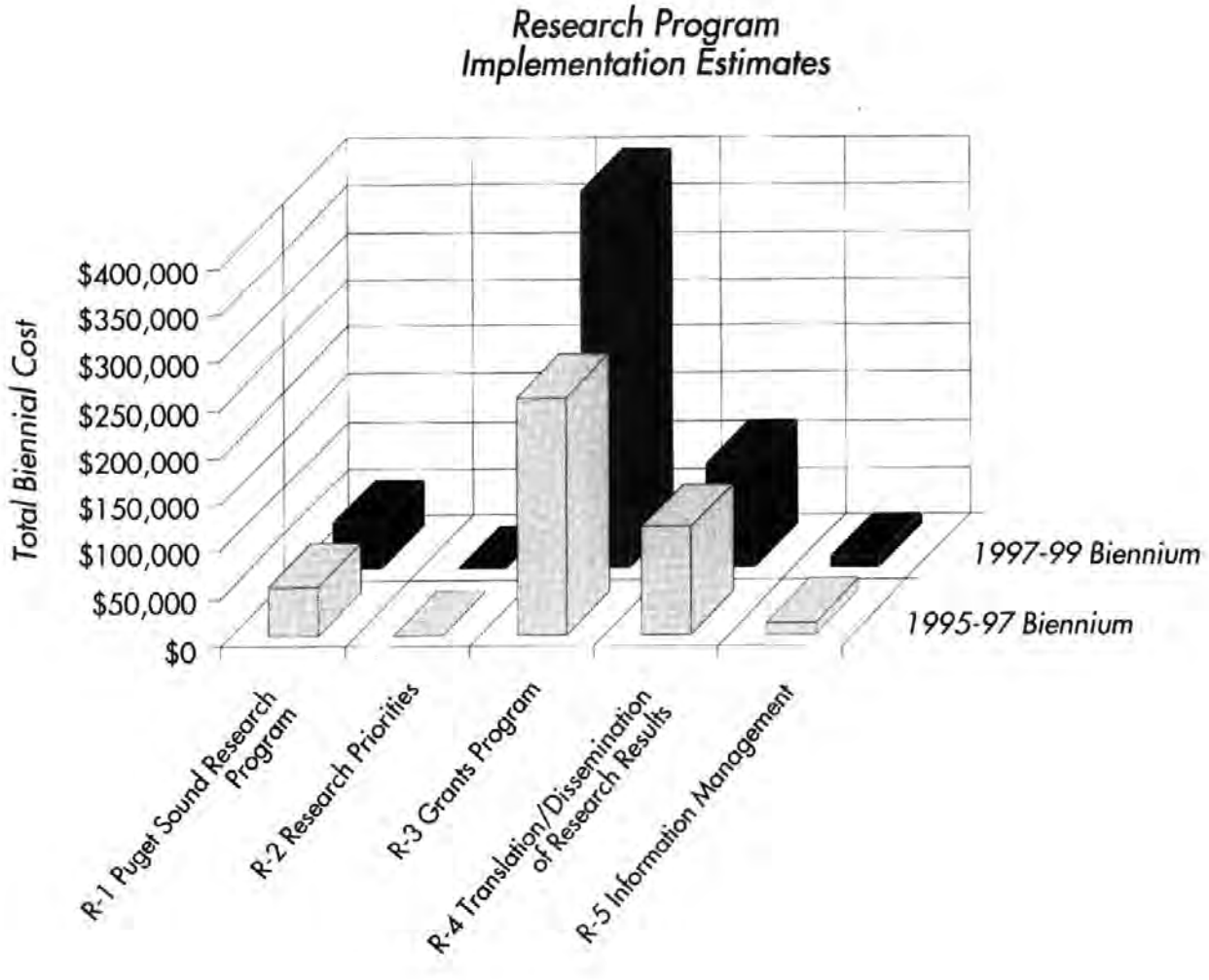
None.

LEGISLATION REQUIRED

None.

ESTIMATED COST

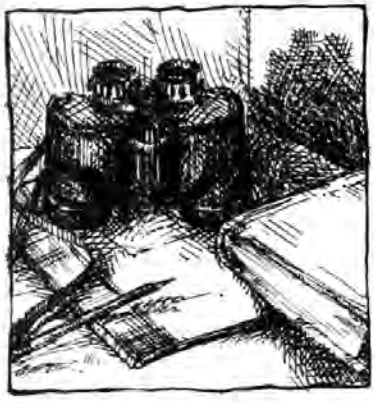
Fully implementing the Research Program is estimated to cost $426,000 for the 1995-97 Biennium and $576,000 for the 1997-99 Biennium. These costs would be for the Authority to administer a Puget Sound research program by holding a regular conference, disseminating research results, and awarding research grants. The 1995-97 costs would be mostly federal funds, with a small amount from the state. During 1997-99, federal funding would decrease, state funding would increase, and a major amount of private funding would be raised for funding research. This 1994 estimate reflects a significant down-scaling of this program. Previous versions of the Plan had projected research costs in the neighborhood of approximately $3.5 million per year.



EDUCATION AND PUBLIC INVOLVEMENT PROGRAM

PROGRAM ELEMENT DIRECTORY

PROBLEM DEFINITION



Protecting water quality requires an ongoing commitment from everyone—as individuals at home, work and play, and as members of our communities, where we influence others on matters of common interest. Each of us has many roles in which we affect water quality and many opportunities each day to make choices involving the water quality of Puget Sound.

Education and public involvement are necessary components of a long-term management strategy for the Sound because they inform and enable us to make choices. Education and public involvement enrich our knowledge and experience of the Sound, encourage behavioral changes that protect the Sound, and give us a voice to act on the Sound's behalf.

In learning about the resources of the Sound, we may better understand what is needed to protect it, whether it's regulations, voluntary programs or other options. Education also provides motivation and skills, and helps individuals and organizations adopt new strategies for taking responsibility for Puget Sound.

Involving the public in protection and restoration activities is important because members of local communities, including tribes, schools, businesses and industry, can bring information, expertise, values, priorities and funding to the decision-making process. Public involvement is equally important to educate government officials about local issues and needs. Resource management programs that do not adequately educate or involve the public are often met with resistance or animosity, and sometimes fail as a result.

A survey conducted in 1986 by the Authority revealed some significant deficiencies in education related to Puget Sound. Most education programs on water quality of the Sound were found to be sporadic and without sustained funding. Very few agencies allocated employees or budget to education, and there was little coordination among institutions, agencies and programs in the region. This often resulted in conflicting or poorly targeted messages being sent and limited resources being used inefficiently. For example, although there were numerous educational curricula related to Puget Sound, there were limited funds to train teachers in how to use them.

INSTITUTIONAL FRAMEWORK

In 1986, the Authority found that most citizens did not understand the nature of the pollution problems in the Sound. Although numerous education programs did exist, they were targeted at very specific audiences and selected issues. In addition, the Authority found that many requirements for public involvement in water quality issues were not being met and there was a lack of dedicated staff time and training devoted to public involvement.

Since 1986, agencies have allocated more resources toward education. They have also reorganized their education programs to better serve agency missions and resource management goals, and developed new opportunities for interagency cooperation. Authority programs, including the PIE Fund, staff outreach and nonpoint-source watershed planning under WAC 400-12, have created models for other agencies and local governments.

Citizen stewardship programs have been adopted by many local governments and state and tribal resource management agencies. Viewed with skepticism in the past, volunteers have been incorporated into many kinds of programs, including the Puget Sound Ambient Monitoring Program. Vigorous private sector efforts by Adopt a Beach, the Adopt-A-Stream Foundation and school-based programs through Project Green (Global Rivers Environmental Education Network) have complemented Authority programs.

Cooperative bridges have been formed using professional organizations like the Environmental Education Association of Washington and the Governor's Council on Environmental Education. In addition, various local and regional forums for environmental educators have been created to coordinate services and develop educational priorities.

Donations from private sources such as the Bullitt Foundation, Key Bank of Washington, and local funding sources such as stormwater utilities provide valuable funding for education projects and activities.

The 1994 Plan addresses the need for racial and cultural representation in public involvement policies.

AUTHORITY'S APPROACH

In 1987-89, the Authority focused more formally on public involvement than on education. The 1987 Plan included a public involvement policy to be followed by all state and local agencies for all Plan-related activities.

In the 1989 Plan, the Authority developed a long-range education strategy. To help develop the strategy, the Authority established the Education and Public Involvement Program advisory group. The committee is composed of educators, media experts and representatives of environmental and public interest groups, industry, business, agriculture, and local and tribal governments.

PROGRAM GOAL

To support, improve and sustain education and public involvement programs in the region over the long term in order to: (1) inform, educate and involve individuals, groups, businesses, industry and government in the cleanup and protection of Puget Sound; (2) increase understanding of the Sound's ecosys-

tem; and (3) create the kind of commitment that will be necessary to sustain efforts to improve and protect water quality over the long term.

STRATEGY

The strategies for achieving this goal include: (1) a public involvement policy to be followed by agencies and local governments; (2) increased resources to state agencies and tribal governments for coordinated interagency/intergovernmental education programs on marine and freshwater habitats, on water quality policy issues, and on volunteer action; (3) field agents to coordinate among local and regional education and public involvement programs; and (4) a Public Involvement and Education Fund (PIE Fund) to support short-term public involvement and education efforts of both the private and public sectors.

PROGRAM ELEMENTS

PI-1. Public Involvement

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 Plan. The Authority shall monitor public involvement activities of agencies implementing the Plan.

The policies are:

a. A broad representation of the public, including those being directly affected, members of economic, cultural or ethnic minorities typically not represented, business, and members of the general 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 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 Plan, existing standing committees or commissions and established processes such as the SEPA (State Environmental Policy Act), the Shoreline Management Act 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 needed 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 informa-

tion on decisions to be made or actions to be taken for the Puget Sound Plan is complete and understandable; (2) the effects, especially effects on special groups or geographic areas, of the proposed decision or action 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 Plan programs, the Authority and other agencies will communicate clearly and simply using lay language whenever possible.

g. Intergovernmental relations with tribal governments: To involve tribal governments in the decision-making process, agencies shall follow the Centennial Accord. Local governments shall communicate with tribal governments to determine the most effective mechanism for inter-government communication with tribes on any programs or projects related to the Puget Sound Water Quality Management Plan. Tribal governments shall follow the Centennial Accord.

Target Dates: Ongoing.

1.2. Technical Assistance on Public Involvement

The Authority, the Department of Ecology, Washington State University Cooperative Extension and the Department of Community, Trade and Economic Development shall provide technical assistance on public involvement for local governments to help them implement the Puget Sound Plan. Technical assistance shall include developing materials, providing training and making recommendations. Training shall include the topics of consensus-building, conflict management and how to use volunteers.

These agencies shall support citizen groups by opening their public involvement training sessions to citizens whenever possible; by notifying citizens of the opportunities to receive training in public involvement related to federal, state and local permit processes, and by conducting training on how to organize and maintain effective volunteer groups.

Target Date: The Authority's technical assistance and monitoring is ongoing. The Authority, WSU Cooperative Extension, the DCTED and Ecology shall be organized to provide coordinated technical assistance beginning as funding is available.

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 Puget Sound 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.

1.4. Short Course on Local Planning

The Department of Community, Trade and Economic Development and the Authority shall develop materials for use in the Short Course on Local Planning and other 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: Materials shall be available by September 1994 and updated as necessary thereafter.

EDUCATION

EPI-1. 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 which 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. Focus on local issues and resources and how they relate to the larger picture, promoting a sense of place.

e. Emphasize interesting, innovative activities which involve people, put them in charge of decisions, and lead to local action.

f. Provide people with solutions and things they can do.

g. Include concrete goals toward which everyone can work and which will visibly demonstrate progress and success.

h. Include connection with an ongoing information base which provides accurate information on Puget Sound issues. Build on existing programs.

i. Improve coordination of and cooperation among the education and public involvement resources and activities of state and local governments.

j. Design and organize activities, training and information which are tailored to the target audience.

k. Include youth.

l. Concentrate resources at the local level but include a Sound-wide entity or process which will provide common direction, standards and coordination for local actions.

m. Include an ongoing public awareness campaign which will 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.

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: Ongoing.

EPI-2. Coordination Mechanisms

2.1. Local Coordination: Field Agents

Together, the Washington Sea Grant Program, Washington State University Cooperative Extension and the Authority shall provide regional field agents to help coordinate and implement local and regional education and public involvement efforts to implement the Puget Sound Water Quality Management Plan with an emphasis on working with local governments and communities.

To accomplish this, the regional field agents shall:

a. Assist local governments and communities in developing, implementing and evaluating education and public involvement activities or programs which are related to Puget Sound water quality.

b. Provide assistance to Authority outreach efforts and 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.

Field agents will develop biennial work plans that reflect assignments in this subelement in consultation with local government agencies.

Field agents shall coordinate their work with tribal field agents described below in (element EPI-2.2).

Target Date: The Washington Sea Grant Program and Washington State University Cooperative Extension shall hire field agents when funding becomes available. By 1996 there shall be 18 field agents in the region.

2.2. Tribal Government Coordination: Field Agents

The Authority shall provide funds for tribal governments to establish field agents who will assist tribes in conducting education and public involvement programs related to implementation of the Puget Sound 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 (element EPI-2.1) above: 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 under this program shall meet regularly with Puget Sound field agents.

The Authority, Washington Sea Grant, WSU Cooperative Extension and tribal governments shall meet to determine the guidelines for: (1) tribal applications to receive funds under this program, including provisions to ensure participation in the program by small tribes; and (2) coordination among tribal governments, Sea Grant and Cooperative Extension to implement and operate this program. The program shall be operated in conjunction with 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: The equivalent of six full-time tribal field agents shall be hired by December 30, 1991.

2.3. State Coordination: Governor's Council on Environmental Education

The Governor's Council on Environmental Education, comprised of agency directors 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 Authority, Washington State University Cooperative Extension, the Washing-

ton State Energy Office, the Commissioner of Public Lands, and the Superintendent of Public Instruction, should:

- Establish a clearinghouse for education and public involvement information produced by state agencies that relates to Puget Sound and water quality.

- Serve as a forum for coordination of state agency programs that fund water quality and environmental education.

- 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: Program assistant position to serve as clearinghouse coordinator funded beginning July 1, 1995.

2.4. Agency Coordination and Education Coordinators

The departments of Ecology, Fish and Wildlife, and Natural Resources, State Parks, WSU Cooperative Extension, and Washington Sea Grant will hire education coordinators 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 Governor's Council on Environmental Education (element EPI-2.3), and agency participation in the Puget Sound Plan Coordination and Evaluation Meetings (element EPI-2.6).

Target Date: Ecology and WSU Cooperative Extension have hired education coordinators. Other agencies shall hire coordinators as funding becomes available.

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: (1) 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 as a way of complying with WAC 180-50-115 ("the Environmental Education Mandate"); (2) 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; and (3) use the Superintendent of Public Instruction's Advisory Council on Environmental Education as a forum for developing strategies for meeting the water quality and environmental education needs of Washington students.

Target Date: Ongoing.

2.6. Puget Sound Plan Coordination and Evaluation: Meetings

The Authority shall call two meetings a year in which educators and program staff will advise the agency on effective strategies for education and public involvement programs related to the Puget Sound Plan. The meetings will provide an opportunity for education and public involvement program staff to discuss: (1) program needs that might be met with resources or ideas from other programs; (2) timing and coordination issues; and (3) techniques for evaluating programs. The meetings will be widely advertised to local governments, tribal governments, nonprofit groups, and business and industry.

The meetings shall include the local field agents (element EPI-2.1) and appropriate staff from the Authority, Ecology and other agencies implementing the Plan's education and public involvement programs. Ecology representatives shall include: the public involvement coordinator (element PI-1.3), the education coordinator (element EPI-2.4), hazardous waste information office staff (element HHW-2), a member of the nonpoint technical-assistance team (element WP-6), wetlands education staff (element W-7), point-source outreach staff (element P-26), stormwater education staff (element SW-3), waste reduction staff (subelement EPI-5.1), shellfish education staff (element SF-8), contaminated sediments education staff (element S-9) and, where appropriate, other members of Ecology's education team. The meetings shall also include staff to the Governor's Council on Environmental Education (element EPI-2.3), staff for the State Agency Marina/Boaters Task Force (element MB-1), the coordinator for the DNR's Marine Plastic Debris Program, and staff from other appropriate educational programs of the departments of Fish and Wildlife, Health, and Natural Resources, and State Parks. In addition, representatives of staff from local watershed programs (elements WP-1 to WP-7) which include education, conservation district staff, and education staff for tribes shall be invited. The Authority shall encourage the participation of education and public involvement staff from private sector programs. Summaries of these meetings shall be provided to the PIE Fund, the agency education coordinators (subelement EPI-2.4), and the management group of the field agent program (subelement EPI-2.1).

Target Date: The Authority shall convene the first meeting when funding becomes available.

2.7. Coordination Among Federal Agencies

Implementors 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. The Consortium is a regional forum created to improve education and public involvement coordination among federal agencies. Members include the National Park Service, Bonneville Power Administration, the Bureau of Land Management, the Environmental Protection Agency, USDA Forest Service, the U.S. Fish and Wildlife Service, NOAA, the Northwest Power Planning Council and the U.S. Army Corps of Engineers.

Target Date: Ongoing

PROGRAMS TAILORED TO DIFFERENT AUDIENCES

EPI-3. General Audiences

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 Governor's Council on Environmental Education (subelement EPI- 2.3) 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, utilizing 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:

1. *Watersheds and Fish Habitat.* The Department of Fish and Wildlife shall convene a committee to develop a model watershed interpretive program at hatcheries that are easily accessible to visitors.

2. *Shellfish.* The Department of Fish and Wildlife shall convene a committee to develop an interpretive program at an appropriate location in Puget Sound (see element SF-6).

3. *Wetlands.* The Department of Ecology shall convene a committee to develop a wetlands interpretive program. This program shall be integrated with Ecology's wetlands education program under element W-7.

4. *Contaminated Sediments.* Ecology shall convene a committee to develop an interpretive program for contaminated sediments. This effort shall be integrated with the public information and public involvement activities under elements S-4 and S-7, and with the education activities under element S-9. The resulting materials shall be maintained and made available, independent of those elements, to educators, the media and the public.

Target Dates: As funding becomes available.

3.2. Washington State Ferries

The Department of Transportation shall initiate a program on the Washington State Ferries system which will train volunteers to make presentations on topics directly related to Puget Sound such as the history of the ferry system, the history of ports, marine resources of the Sound and protection of Puget Sound.

The display system implemented by the Washington State Ferries for the Centennial Celebration shall be continued and expanded.

Target Date: No target date established.

3.3. Wildlife Habitat Education

The Department of Fish and Wildlife (WDFW) 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 such as Project Wild of the Department of Fish and Wildlife, FOR-SEA of the Poulsbo Marine Science Center, and programs from the Office of Environmental Education. The WDFW shall work with Washington State Parks and Recreation Commission to provide training to park rangers. The WDFW 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 programs on weekends and in the summer. State Parks shall coordinate the educational activities of the rangers and the facilitators operating at state parks.

Target Dates: Ongoing as funding is available.

3.4. Interpretive Centers

The Authority shall provide funding to existing interpretive centers[1] around the Sound to support staff development and training, workshops, displays and interpretive activities on Puget Sound. The Authority shall provide interpretive centers with information such as the *State of the Sound Report* and *Puget Sound: Our Heritage At Risk*, from which interpretive centers can design displays or programs. The Authority and the Office of Environmental Education will publicize the schedules and activities of interpretive centers on a regionwide basis.

Using a geographic information system (GIS), the Authority 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 for its use, in order to educate citizens about the PSAMP and the Research Program.

Target Dates: Ongoing as funding becomes available.

1 Snake Lake Nature Center (City of Tacoma), Bellingham Maritime Heritage Center (non-profit), Padilla Bay (Department of Ecology), Nisqually Delta (U.S. Fish and Wildlife Service), Nisqually Reach Nature Center (non-profit), Poulsbo Marine Science Center (non-profit), Fort Worden Marine Science Center (non-profit), Feiro Marine Lab (Port Angeles), Seattle Aquarium (City of Seattle), Point Defiance Aquarium (City of Tacoma), Friday Harbor Whale Museum (non-profit), Jetty Island (City of Everett), Blaine Marine Resource Center (being developed; Blaine).

3.5. New Interpretive Centers

The Authority may initiate a process to establish new interpretive centers which would fill both geographical and topical gaps in interpretive activities related to the Sound.

Target Date: None established.

EPI-4. 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 subelement EPI-2.1 and shall notify volunteers of funding opportunities through programs such as the PIE Fund.

The Washington Sea Grant Program and WSU Cooperative Extension 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 and local and tribal governments to design the criteria for certification.

Target Date: Washington Sea Grant and WSU Cooperative Extension shall offer a program for Master Stewards as funding becomes available.

EPI-5. Business and Industry Audience

5.1. Pollution Prevention

Ecology shall expand its waste reduction program where possible to coordinate with the waste reduction or pollution issues of the departments of Health, Agriculture, Fish and Wildlife, 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 programs such as those of Metro (King County Department of Metropolitan Services).

WSU Cooperative Extension shall coordinate the educational resources of conservation districts and the departments of 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 the departments 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 Department of Community, Trade and Economic 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 (e.g., trade fairs, bulletins, trade association seminars or conferences, in-house training, community college classes, videos, agency programs, etc.). The lead agency, in consultation with members of the target audience, shall determine who should deliver the program (the state, the private sector, local field agents, local governments such as Metro, or educators).

Target Dates: As funding becomes available.

5.2. Habitat Protection

The Department of Fish and Wildlife shall coordinate with the educational resources of the departments of Ecology and Natural Resources 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 programs as described in the Habitat Program (subelements H-4.2 and H-4.3).

Target Date: The Department of Fish and Wildlife shall initiate a program by as funding becomes available.

5.3. Water Quality Protection Through Peer Education

The Authority shall continue to encourage business and industry to use the PIE Fund (subelement EPI-8.1) in order to implement water quality education projects by peer education through their networks and associations.

EPI-6. Youth Audiences

6.1. School and Citizens' Monitoring Programs

The Office of Environmental Education shall provide water quality kits to schools to undertake pilot freshwater monitoring projects related to agency and citizen programs or to participate in the Michigan-based international program for monitoring water quality. When these programs have been operating for a year, the Office of Environmental Education shall consult with the Authority, Ecology, the PSAMP Steering Committee, community college faculty, elementary and high school teachers, and citizens to provide recommendations to the Authority on: (1) the feasibility of expanded citizens' and school monitoring programs; (2) the parameters for which citizens and students can best provide information for the PSAMP and freshwater programs; (3) appropriate laboratory support and training for such a program; (4) data access and feedback mechanisms for effective citizen and school participation in monitoring programs; and (5) the practicality of integrating monitoring into existing school curricula. (See element M-3 for more information on citizens' monitoring.)

Target Date: Ongoing.

EPI-7. College and University Student Audiences

7.1. Puget Sound Internships and Credit

The Authority 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: Possible internships will be developed when funding becomes available.

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: Possible internships will be identified as funding becomes available.

EPI-8. Funding

8.1. PIE Fund

The Authority shall continue to support the funding of local programs through the Public Involvement and Education Fund (PIE Fund). The Authority shall publish requests for proposals for local programs which:

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 Plan and any area of Puget Sound. The Authority shall issue guidelines, call for proposals, select participants, and administer

contracts. The Authority 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 executive director of the Authority. The advisory group will be a 10- to 12-member group which includes 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 the educational needs of local governments which are directly related to the Puget Sound Plan, particularly those governments that are not receiving direct support from the field agent program (subelement EPI-2.1). Contracts may also be awarded through competitive processes for conferences, evaluations, publications and projects which relate directly to the purpose of the PIE Fund.

Target Date: Ongoing: Round 8 contracts were awarded May 1994.

EPI-9. Puget Sound Water Quality Authority Activities

The Authority 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 Puget Sound region. Specifically, the Authority shall conduct the following activities:

1. *Public Outreach.* The Authority shall conduct a proactive public outreach program which includes:

   a. Seeking out parties interested in or affected by Plan implementation.

   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 Authority staff to provide general information on any program in the Puget Sound Plan.

   d. Developing concise, readable materials for the general public describing issues, programs and activities.

2. *Public Education.* The Authority shall continue to educate the public through seminars, field trips, conferences, public meetings, publications, media, videos, and distribution of Authority information to local libraries.

3. *Publicity.* The Authority 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 Authority shall also use its newsletter and slide shows to give recognition to new and existing efforts and programs which are supportive of the goals of the plan.

4. *Coordination.* The Authority shall coordinate the integration of education and public involvement elements of all programs in the Plan in order to avoid duplication of resources (see subelements EPI-2.3, EPI-2.6 and EPI-2.7).

5. *Schools.* The Authority shall work with the Superintendent of Public Instruction and with the Governor's Council on Environmental Education to coordinate educational programs on water quality for K-12.

6. *Campaigns for Puget Sound.* The Authority shall initiate public awareness campaigns or activities which:

   - Focus on tangible results toward which individuals in both the private and public sectors can easily direct initiative and resources.

   - Provide an opportunity to show measurable results which 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.

7. *Year of the Sound.* The Authority 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.

8. *Sound Waters Award Program.* The Authority 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 Dates: Activities related to public outreach, public education, coordination, publicity, and schools are ongoing. Other activities as funding becomes available.

MAJOR PUBLIC ACTIONS FOR AUTHORITY REVIEW

The Authority will consider the adequacy of public involvement when reviewing major public actions identified in other programs. As part of its review of biennial reports of state and local agencies (see subelements EM 8.4 and EM 8.5), the Authority will consider implementation of the public involvement policy.

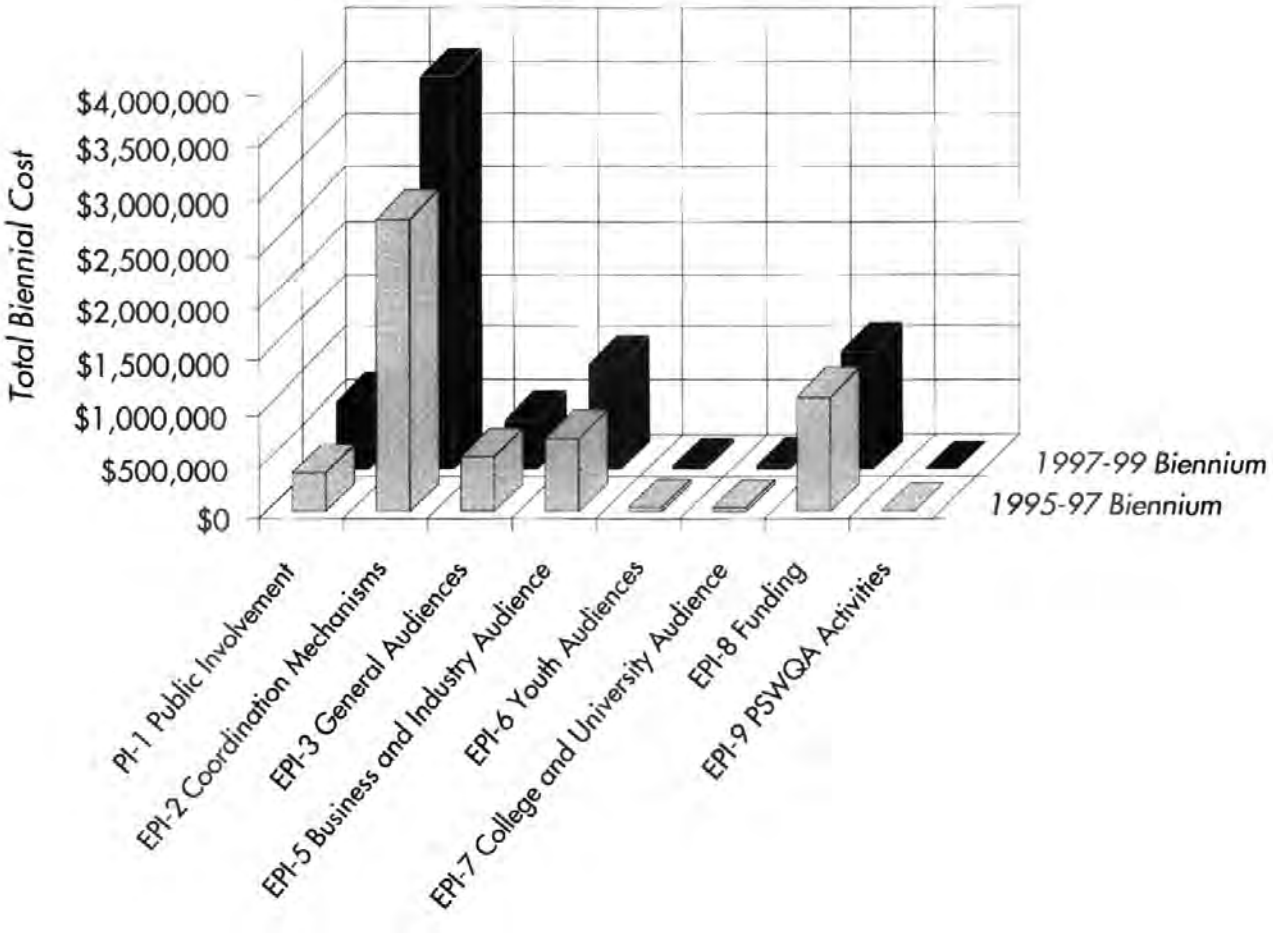
LEGISLATION REQUIRED

None.

ESTIMATED COST

A fully funded education program will cost approximately $5.6 million for the 1995-97 Biennium and $6.9 million during the 1997-99 Biennium. This includes $1.1 million each biennium for the PIE Fund. The major cost in the program is for the field agents. This element (element EPI-2) expands from $3.2 million in 1995-1997 to $3.3 million in 1997-99. The water quality field agent program, currently conducted jointly by Washington State University's Cooperative Extension and University of Washington's Washington Sea Grant Program, has been extremely beneficial for local governments. A fully funded program would expand upon the current successes and extend the program to include tribal water-quality field agents. The tribal agents would be funded out of the Puget Sound Grants Program, to be established under element EM-6.

Education and Public Involvement Program Implementation Estimates



NONPOINT SOURCE POLLUTION PROGRAM

PROGRAM ELEMENT DIRECTORY

PROBLEM DEFINITION

Nonpoint source pollution is a general term for pollution that is not collected in and discharged through pipes. Instead, it originates from a multitude and variety of diffuse sources, the cumulative effects of which can result in major pollutant loadings into Puget Sound.

Nonpoint source pollutants include pathogens, sediments, toxic contaminants and nutrients. Sources of pathogens include failing on-site sewage systems, animal keeping practices on commercial and noncommercial farms, sewage discharge from boats, and wastes from pets in urban areas. Sedimentation results from timber harvesting, construction-related land clearing and destruction of stream banks by livestock. Excessive nutrients can stem from fertilizers and failing on-site sewage systems, while toxic contaminants come from stormwater runoff and improper disposal of oil and other household hazardous wastes. The problems associated with nonpoint source pollution are many, and often complex. Solutions to the problems are sometimes difficult as they involve raising people's awareness to make changes in individual behaviors and lifestyles that are more friendly to the water environment.

Nonpoint pollution was not considered a very big problem until recent years. Most of the attention in the past focused on addressing pollution from industry discharges and sewage treatment plants. The activities that cause nonpoint pollution are certainly not new, but as growth and development has increased in the Puget Sound basin, the amount of nonpoint source pollution has greatly increased. One dramatic example of the effect on Puget Sound is the contamination of shellfish beds. Approximately 40,000 acres of commercial shellfish beds have been restricted since 1981, due largely to nonpoint pollution. While water quality in some areas of Puget Sound has improved, restrictions and closures of fisheries (due in part to loss of habitat), algal blooms, and many other signs of poor water quality are evident.

INSTITUTIONAL FRAMEWORK

Since the 1970s problems related to nonpoint sources of pollution have been addressed in varying degrees through separate control programs, each one usually administered by a different government agency. While these programs produced some important local successes, overall control of nonpoint pollution in the Sound was generally inadequate in 1987. Agencies did not coordinate efforts and no integrated process existed to control nonpoint sources within a given bay or watershed.

Under Section 319 of the 1987 amendments to the Clean Water Act, Congress required all states to develop programs to manage nonpoint pollution. The state of Washington assessed its waters and produced the Nonpoint Source Pollution Assessment and Management Program in October 1989. The Puget Sound Plan's Nonpoint Source Pollution Program was adopted as the 319 plan for Puget Sound, with the local watershed action program identified as one of the top priorities.

In 1990, the Coastal Zone Management (CZM) Act was amended to address land use and nonpoint pollution for the first time. Section 6217 of the Coastal Zone Act Reauthorization Amendments calls for states with federally approved coastal-zone management programs to develop and implement state coastal

programs to control nonpoint pollution. These institutional changes have greatly improved the way in which nonpoint source pollution is addressed.

In the past two years, many federal and state resource agencies have adopted various versions of a watershed management approach, partly driven by President Clinton's Forest Plan, dwindling salmon stocks, water quantity issues, and the expansion of the Department of Ecology's (Ecology) Total Maximum Daily Loads program to include nonpoint source loadings. The governor established the Watershed Coordinating Council in 1994 through which state resource agencies can coordinate their efforts on watershed management, particularly for salmon habitat restoration.

AUTHORITY APPROACH

The Nonpoint Program identified the need to address each type of nonpoint source basinwide, while it simultaneously recognized that solutions must occur at the local watershed level. The development and implementation of local watershed action plans is the heart of the Nonpoint Program because it uses community-based committees to cooperatively identify problems and solutions within watersheds. The Authority addressed nonpoint source pollution in the 1987 Plan through a local watershed planning process, countywide education and prevention elements, and statewide elements. The 1994 Plan strengthens the role for local government and others in addressing the different nonpoint problems on a more regional basis as well. The 1994 Plan also directs local governments to integrate growth management and watershed plans, and provides direction on integration of the EPA's 6217 program with the Plan programs.

Local Watershed Action Program

The 1987 Plan instigated a cooperative watershed action planning process that involves local governments and communities, tribes, state and federal agencies, and other interested and affected parties. Counties, or cities as appropriate, appoint watershed management committees. The committees are charged with writing an action plan that identifies problems stemming from nonpoint sources of pollution in the watershed and proposes solutions to reduce or prevent the pollution. The action plans address farm practices, storm water, on-site sewage systems, forest practices, marinas and recreational boats, and other issues of concern in the particular watershed. The control strategies are a mixture of educational, voluntary and regulatory approaches.

Twelve early action watersheds were selected for planning in 1987, and all twelve Puget Sound counties used ranking committees to rank 119 more watersheds in 1988. The Puget Sound Cooperative River Basin Team assisted with several of the ranking reports and prepared many of the characterizations for the watershed plans.

The Authority adopted a rule, WAC Chapter 400-12, in 1988 to guide local governments in the planning process. The rule, referred to as the Nonpoint Rule, was revised in 1991 to allow more flexibility in designing the plans and to shorten the review process.

Overall, the watershed action plans have been successful because of the involvement of the local community and the commitment from local agencies, businesses and citizens to act on the plans. Twenty watershed plans have been completed in nine counties and are in various stages of implementation. Seventeen more plans are being developed—nearly half of these should be adopted and approved in 1995. Eleven of twelve Puget Sound counties are participating overall.

The 1994 Plan encourages counties to cluster their remaining watersheds for planning and to initiate countywide monitoring programs. There are two new elements on integration of efforts to control nonpoint sources of pollution with growth management planning and the Section 6217 coastal nonpoint program, and new language that calls for watershed plans to also address protection and restoration of salmon habitat, riparian areas and wetlands

On-Site Sewage Systems

On-site sewage systems "fail" for a variety of reasons—poor construction and installation, improper use, inadequate maintenance, improper siting and design related to soils, and high water tables. Although on-site sewage systems have clearly failed when effluent collects on the surface or when the system no longer passes waste water, environmental harm can occur long before these symptoms appear. As funding has increased to survey individual systems, failure rates of 40 percent and higher have been identified in some areas around the Sound.

Minimum regulations for on-site sewage systems were first set by the State Board of Health in 1974. Less stringent guidelines were in place for systems installed prior to that time. Systems installed after 1974, though subject to the stricter regulations are not necessarily providing satisfactory treatment of waste water. Limited funding, staffing and training have hampered application and enforcement of on-site sewage regulations by state and local health agencies. Additionally, there has been no state requirement for maintenance of systems, regardless of their age.

The 1987 Puget Sound Plan called for the Department of Social and Health Services (now the Department of Health) to evaluate the effectiveness of state standards and regulations for on-site systems, for legislation requiring disclosure of information regarding on-site systems at the time of property transfers, and a for certification program for on-site professionals. Since then, new regulations have been adopted by the Department of Health (DOH) for on-site systems, local health departments have begun certification programs, and legislation was passed to expand disclosure requirements when property is transferred. Despite this progress, further efforts are needed.

The 1994 Nonpoint Source Pollution Program calls for local implementation of the revised state on-site sewage regulations, development of local on-site operation and maintenance programs, increased emphasis on alternative technologies, establishing operational permit programs for large systems, and development of rules for managing biosolids.

Agricultural Practices

Potential pollutants from commercial and non-commercial agricultural practices include sediments nutrients, toxic substances, and pathogens. Sediments enter water bodies as a result of livestock trampling in or near stream banks, soil erosion and poor cropping practices. Pathogens and toxic substances such as pesticides often bind to sediments and are carried into waterways. Increased sedimentation alone can damage fish habitat in streams by filling in gravel beds where fish spawn. Sediments carrying toxins from pesticides have an additional harmful effect.

Excessive nutrient loading from improper use of fertilizer can cause algal blooms, resulting in decreased oxygen levels which can be harmful to aquatic life. Pathogens from animal waste can run off into waterways if animals and manure are not managed properly. These pathogens pose risks to public health, including the contamination of shellfish beds around the Sound.

Efforts to curb pollution from agricultural runoff have been largely voluntary with an emphasis on education. Conservation districts have been successful at educating both commercial and noncommercial farmers about water quality issues and best management practices (BMPs).

While the focus of source control in the 1987 Nonpoint Source Pollution Program was on dairy waste management, subsequent revisions have broadened the emphasis to animal waste management and other farming practices on commercial and noncommercial farms. The program continues to promote technical assistance and education programs through conservation districts, the Washington State University (WSU) Cooperative Extension and the Natural Resource Conservation Service.

Pest Management

Pesticides from home, forest, agricultural or roadway use can contaminate streams, lakes, wetlands, ground water 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 ground water. Although pesticides are generally designed to be toxic to certain targeted organisms, they are sometimes toxic to organisms, such as fish and other aquatic life in streams and lakes which are receiving waters for polluted runoff.

The major regulatory and enforcement authority for pesticide use rests with the state Department of Agriculture. Ecology has authority for pesticide waste disposal. Ecology's hazardous waste and toxic reduction program targets commercial and public entities with an active education and compliance program on pesticide waste management. Washington State University 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 use. In addition, some

local governments and utilities have initiated integrated pest management (IPM) programs for roadside and utility rights-of-way.

Little was known about the extent of pesticide use (particularly in urban areas) or its effects on water quality in 1987. The Puget Sound Plan first addressed pesticides in 1991 with a call for pesticide-usage surveys and a pest-management information program, including research and education on IPM. The 1994 Plan acknowledges the Urban Pesticides Initiative, an association of state and federal agencies concerned with the issues of pesticide use in urban settings.

Forest Practices

Forestlands account for a large portion of land in Puget Sound, particularly in the upper watersheds. Timber harvesting and road construction can contribute large amounts of sediment to streams and rivers if precautions are not taken. Sedimentation has contributed significantly to the loss of fish habitat. Logging roads built prior to the Forest Practices Act and since abandoned (or orphaned) are of particular concern.

Forest practices are regulated by Washington's Forest Practices Act, RCW 76.09, administered by the Department of Natural Resources (DNR). Revised in 1992, the Forest Practices Rules contain additional requirements for wetlands and streams, clearcut size and timing, and introduced a new watershed analysis process. Other state agencies perform limited monitoring, review and advisory functions. Inadequate funding has slowed enforcement and monitoring.

Several new major state and federal forestry watershed initiatives have been created since 1991. The Department of Natural Resources, with the Department of Ecology, is administering the Jobs for the Environment Program, which has awarded millions of dollars to watershed restoration projects in forestlands. This funding has created many jobs for displaced timber workers. The DNR is collaborating with the Department of Fish and Wildlife (WDFW) on the Watershed Restoration Partnership, a multi-million dollar grants program focused on salmon restoration. In addition, the U.S. Forest Service, with the advice of local stakeholders, is conducting pilot watershed analyses and major restoration projects on federal forest lands in the Olympic and Mount Baker-Snoqualmie provinces.

The Timber/Fish/Wildlife Agreement has improved agency coordination and serves as a continuing forum for addressing remaining issues, such as coordination with Section 303(d) of the federal Clean Water Act, cumulative effects, further protection of wetlands, and conversion of forestland to other uses. The 1994 Plan calls for local governments to address forestland conversion as well as technical assistance to small forestland owners on best management practices.

Marinas and Recreational Boating

Contaminants from marinas and recreational boating include sewage (and associated pathogens) and the toxicants contained in petroleum products and other materials used to maintain and repair boats. Discharges of treated and untreated sewage from boats may especially be a problem in smaller bays with

poor water circulation, near shellfish beds and public swimming areas, and at marinas.

Since passage of the federal Clean Water Act in 1972, any boat with a toilet installed must have a marine sanitation device (MSD) to treat and/or hold sewage. Effective enforcement of this regulation by the U.S. Coast Guard, however, has proven to be a logistical impossibility. Educational programs have proved to be the most promising approach to reducing pollution from boating activities.

Contamination from recreational boats may be greatest at marinas and popular destination areas, where the concentration and disposal of wastes, including treated and untreated sewage, trash, petroleum products, and bilge water, may be significant problems. Marinas themselves, if improperly designed and sited, may cause water quality problems through habitat destruction and restricted flushing. However, marinas, destination sites and other boating facilities can provide the services which are essential for safe and effective disposal of boat wastes, particularly sewage and petroleum products. Unfortunately, many marinas do not provide sewage pumpouts or recycling facilities.

In 1987, the Authority recognized the need for boater education, increased availability of pumpouts, and an examination of the need for regulating the disposal of boat waste at state and local levels. Since then, better guidelines for the design and siting of marinas and sewage disposal facilities have been developed, publically funded pumpouts have been placed in over 20 public and private marinas and state parks, and state and federal pumpout grant programs have been initiated. With the assistance of the recreational boating community, an ongoing boater education program was created, and a state agency task force meets regularly to coordinate boating-related activities and to implement other aspects of the boating program. The federal Clean Vessel Act was passed in 1993, creating a new federal grants program for installing pumpouts and other disposal facilities for boat sewage. The 1994 Plan emphasizes wastes other than sewage and a strategy for operation and maintenance of pumpouts has been added.

Household Hazardous Waste

Toxicants from household hazardous waste include paints, paint thinners, lawn and garden pesticides and fertilizers, cleansers, degreasers, medicines, cosmetics, transformers, dyes, and automotive products such as antifreeze, batteries and oil. Many are emptied down drains or toilets and passed to municipal sewage treatment plants. Metro (King County Department of Metropolitan Services) estimates that residential areas contribute seven to 11 percent of the metals, 31 to 36 percent of the volatile organics, and 55 to 64 percent of the extractable organics to Metro sewage treatment plants. The percent contribution of household toxicants to smaller treatment plants may be much larger. While secondary treatment degrades or dilutes some toxicants, others persist in sludge, evaporate into the air, or continue in suspension or solution through the discharge pipe. Those in sludge or in the air can then enter Puget Sound through rain and runoff.

Many household wastes are disposed of at landfills, where they can reach the Sound through landfill leachate taken to municipal treatment plants, or when leachate in uncontained landfills contaminates surface runoff and groundwater. Incineration of household hazardous waste does not always destroy the toxics, and can subsequently cause contamination from rainfall, or improperly disposed ash.

In 1985, household hazardous wastes were included as moderate-risk waste under the state Hazardous Waste Management Act (RCW 70.105.220). Despite this, there were few legal, proper or practical disposal options available to homeowners and small businesses. The act addressed this issue by requiring local governments to identify local moderate-risk management options and implement a management program by December 31, 1991. Under the program, local governments are required to have a management plan for these wastes, although the specifics are left to the discretion of local governments.

PROGRAM GOAL

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

STRATEGY

The strategy for achieving this goal is to: (1) target state, federal and local resources on priority watersheds through a cooperative process of local watershed planning and implementation; (2) provide technical and financial assistance and incentives to local governments for controlling and preventing nonpoint pollution; and (3) develop or enhance state programs or regulations for those nonpoint sources that are most effectively controlled at the state level.

PROGRAM ELEMENTS

NP-1. Section 6217 Federal Coastal Nonpoint Pollution Control Program

The Puget Sound Plan's Nonpoint Source Pollution Program activities shall be consistent with relevant management measures of the Coastal Nonpoint Pollution Control Program developed under Section 6217 of the 1990 Coastal Zone Act Reauthorization Amendments (CZARA Section 6217). Ecology shall develop the Coastal Nonpoint Pollution Control Program under Section 6217 of the federal CZARA consistent with the goals, objectives and strategies of the Nonpoint, Shellfish, Stormwater and Combined Sewer Overflows, Wetlands Protection, and Education and Public Involvement programs of the Puget Sound Plan. The Section 6217 program developed by Ecology shall help support implementation of the Puget Sound local watershed action plans. Using federal Clean Water Act Section 319 and Coastal Zone Management Act funds, the EPA and NOAA (National Oceanic and Atmospheric Administration) shall consider funding demonstration projects, as determined by the Puget Sound Estuary Program (PSEP) Management Committee, in priority watersheds for each category of management measures.

NP-2. Integration with Growth Management Plans

Each local government shall fully use its growth management authority to protect the waters of the Puget Sound basin from the effects of nonpoint source pollution. Existing and potential nonpoint source pollution effects and mitigation strategies shall be analyzed and documented in Growth Management Act (GMA) environmental impact analyses. 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.

LOCAL WATERSHED ACTION PROGRAM

WATERSHED PROGRAM GOAL

All ranked watersheds within the Puget Sound basin counties shall implement local watershed action plans which result in reduction and prevention of non-point pollution to Puget Sound.

STRATEGY

The strategy for achieving this goal is to to provide technical and financial assistance and incentives for local communities and governments both to convene watershed management committees in the ranked watersheds which do not yet have watershed action plans, and to support the implementation of completed watershed action plans.

WP-1. Selection of Priority Watersheds

[Completed portions of this element have been deleted.]

Round 1. Early Action Watersheds: (Element completed)

Round 2. Long-Term Watershed Selection Process:

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. Counties (or other appropriate lead agencies) are encouraged to help meet local goals for nonpoint pollution control by developing and implementing watershed action plans in the three highest ranked watersheds by 1996.[1] 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

1 Counties pursuing other related programs such as ground water or storm water may need to delay this goal slightly.

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 (subelement PI-1.1) in the Puget Sound 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 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.[2] 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: Development and implementation of watershed action plans is ongoing. Counties shall prepare and implement at least three watershed action

2 This does not preclude a public body from applying to the CCWF to conduct a needed project addressing some component of a comprehensive watershed plan, such as storm water.

plans by 1996. Counties shall review the need to re-rank their watersheds by June 1995.

Hood Canal

The Hood Canal Coordinating Council (HCCC) is an example of governmental coordination in a watershed. The HCCC is an intergovernmental group comprised of three counties and two tribes, and includes ex-officio members from state and federal agencies and local watershed management committees. Created through interlocal agreement in 1985, it was originally charged with planning and implementing a long-range action plan addressing water quality, coordinating governmental activities relating to water quality, and conducting educational programs. This resulted in the preparation of the 1986 Hood Canal Regional Planning Policy, which was used for several years to guide efforts addressing nonpoint pollution problems in Hood Canal. The HCCC is currently re-evaluating that document to assess the activities it should undertake in the future.

WP-2. Guidelines for Watershed Action Plans

[Completed portions of this element have been deleted.]

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.

The Authority shall periodically review and revise the Nonpoint Rule. The Authority shall provide assistance to Ecology as necessary in interpreting the nonpoint rule.

Target Date: As needed.

2.2. Action Plan Contents[3]

The watershed action plan shall include a watershed characterization, problem definition, 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: (1) a description of the biological conditions, habitat, and physical characteristics of the environment; (2) information on land use and population trends; (3) a water quality assessment; maps showing the action plan boundaries; (4) wetlands, shellfish beds and other critical areas, waterways and water bodies; (6) jurisdictional boundaries; and (7) 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, prevent-

3 The Nonpoint Rule, Chapter 400-12 WAC, currently complies with this element, which will also be used to guide any subsequent rule revisions.

ing further closures of shellfish beds, protecting fish habitat, protecting wetlands and riparian zones, and achieving other objectives appropriate to each watershed. Watershed action plans shall address nonpoint pollution, as applicable, from agricultural practices, on-site sewage systems, storm water, 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 and streams. The pollution control strategies contained in action plans shall be consistent, as appropriate, with the management measures guidance under the CZARA Section 6217.

The Nonpoint Rule 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.

Agricultural Practices. The use of conservation district and Natural Resource Conservation Service (NRCS) farm management plans is the preferred approach to controlling pollution from both commercial and noncommercial farms (the conservation districts' farm conservation planning and practices documents are the recommended standard.) Watershed management committees may address animal keeping and pasture management through other regulatory or educational approaches, but the rule shall specify that any farm which has fully implemented an approved farm management plan through the conservation district and NRCS program shall be exempt from further agricultural practices regulations under the watershed action plan process unless water quality violations occur. (See also AG-2, Animal Waste Management.) The selection of an educational approach to controlling pollution sources shall not be construed to overrule or prevent the enforcement of existing regulations and laws by local, state or federal agencies nor shall it be construed to exempt local governments from other requirements of this Plan.

On-Site Sewage Systems. Action plans shall include approaches for controlling nonpoint source pollution from on-site sewage systems, including regulation, education, programs for maintaining on-site sewage systems, and the use of alternative or community systems in appropriate areas. Compliance with Chapter 246-272 WAC is required.

Storm Water. Action plans addressing storm water shall be consistent with requirements under elements SW-1 and SW-2 of the Stormwater and Combined Sewer Overflows Program and applicable federal requirements.

Forest Practices. Watershed action plans which include forest practices must coordinate with the provisions of the Timber/Fish/Wildlife Agreement in cases where state law preempts local control of forest practices, especially in the areas of pre-planning and basin planning, watershed analysis, enforcement, data management, orphaned roads, and extended review. Action plans shall

also address the role of local government in controlling the water quality effects of conversion of forested land to other uses.

Marinas and Boats. Action plans addressing marinas and boats shall be coordinated with activities taking place in the Marinas and Recreational Boating elements of the Puget Sound Plan (elements MB-1 through MB-9). Plans shall include education of individuals, marina operators and boaters, as well as the adoption of needed local policies and regulations.

Other Nonpoint Sources. Action plans shall include strategies for controlling and preventing other problems caused by nonpoint pollution sources or potential problems as identified, such as pesticides, household hazardous waste, landfills, mines, sand and gravel pits, septage disposal practices, contaminated sites, and others.

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 a description of the specific actions required of each implementing entity, a schedule with annual milestones, estimated costs and a budget, and a long-term local financing strategy. It shall also include the lead agency for coordinating implementation, a dispute resolution process, provisions for public involvement in the preparation and adoption of implementation plans, policies and ordinances, and 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, including: 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.

2.3. Nonpoint Handbook

The Authority, in coordination with the departments of Ecology and Health, shall revise and reprint the nonpoint handbook, as necessary.

2.4 Watershed Plan Compilation

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

WP-3. Watershed Management Committees

When funding becomes available for each priority watershed or grouped watersheds, 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 Authority 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, affected parties,[4] watershed residents, and appropriate state and federal agencies (if the watershed includes significant state or federal lands or regulatory role). 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[5] in preparation of the plan, compiling and publishing the plan, submitting the plan to 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.

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 EPI-2.

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 which 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 nonconcur-

4 Affected parties are defined as both 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.

5 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 it is adopted by a county and/or city council. An agency could be both a planning agency and an implementing agency. For example, a health department could both propose regulations for on-site systems and enforce them after they have been adopted by the county council or commission. In watersheds with two or more counties or cities, there could be several implementing agencies for the same source, for example, two different health departments carrying out on-site programs prepared by a single planning agency and adopted by the two different county councils or commissions.

rence, proposing necessary modifications to those sections requiring its involvement.

WP-4. Plan Adoption and Implementation

Each watershed action plan submitted to 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 Plan:

a. The plan must have been developed by a watershed management committee in accordance with the process described in the Nonpoint Rule.

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 CZARA Section 6217 management measures, to be carried out by implementing agencies to address the priority nonpoint source pollution problems 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 Authority 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 the plan. 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 Authority. Ecology may approve portions of a plan before approving the entire plan and require those portions to be implemented during the revision process for the remainder of the plan.

Each implementing agency identified in the plan approved by Ecology shall be responsible for carrying out its portion of the watershed action plan using the approaches described in the plan. The lead implementing agency shall be responsible for coordinating among implementing agencies and for preparing reports to Ecology. Each local, state and federal implementing entity identified

in an approved action plan shall be responsible for carrying out its portion of the action plan within the prescribed schedule.

Counties, or cities for those watersheds entirely within a city's boundaries, shall designate a watershed management council to advise and assist in overseeing implementation, and to help raise community awareness. Watershed action plans may be revised by watershed management councils following submission of revisions to and approval by Ecology. Ecology or the lead agency may initiate a revision process based on annual watershed reports and subject to available funding.

WP-5. Program Funding and Incentives

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

5.1. Nonpoint Watershed Grants

The Department of Ecology shall administer programs for disbursing grant funds from the Centennial Clean Water Fund, 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 Centennial Clean Water Fund (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 of tribal governments in watershed planning, tribes 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 other tribes in the grant application process.

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 Authority recognizes the need for ongoing funding to maintain districts' basic administrative functions and also to carry out water quality programs. The Authority expects that such funding will be made available, within the limitations of statewide responsibilities, from appropriations to the Commission for conservation district basic funding and Puget Sound Plan implementation, and from the 2.5 percent appropriation to the Commission from the Centennial Clean Water Fund.

5.3. Continued Funding for Washington Conservation Corps

The Department of 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 under the Puget Sound Plan.

5.4. Local Financing Mechanisms

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 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.

5.5. Federal Funding

The Authority, Ecology and 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 Plan (as stated in the 319 Management Plan) and shall be developed jointly by the Authority, EPA and Ecology, as co-chairs of the Puget Sound Estuary Program Management Committee. If Ecology wishes to modify the Puget Sound Estuary Program Management Committee priorities, given the need to coordinate an overall statewide request and address lakes and ground water, the department shall work with the committee to develop a revised request. Other funding sources should include the federal Coastal Zone Management Act Reauthorization Amendments of 1990, federal forest and job restoration initiatives, and other federal watershed programs.

WP-6. Technical Assistance for Watershed Plans

[Completed portions of this element have been deleted.]

Ecology shall continue to coordinate among Interagency Technical Assistance Team (ITAT) members to keep them active and informed, and shall continue providing watershed committees with clear direction as to which individuals or agencies to call directly for specific types of assistance. Ecology shall convene the ITAT members 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 the federal assistance provided by the Puget Sound Cooperative River Basin Team, other Ecology grant programs related to nonpoint source pollution (such as 604(b) grants), the Section 319 and 6217 programs, the boater education program (element MB-4), the Ecology and Health shellfish protection programs, the Department of Health's (DOH) on-site sewage program, and the Department of Natural Resources' (DNR) watershed analysis and forest practices prescriptions. Team members and watershed committees are encouraged to use resources provided through the Education and Public Involvement Program in the Puget Sound Plan in conducting education associated with watershed action plans.

ITAT members 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 which 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 U.S. Department of Agriculture Natural Resource Conservation Service shall continue to act as lead for the Puget Sound Cooperative River Basin Team and shall provide continued funding, in coordination with cooperating agencies, beyond 1995 when the team's current funding is scheduled to terminate. The River Basin Team shall continue to provide technical assistance to local governments and watershed committees in developing, implementing and monitoring the watershed action plans, including assistance with implementing and evaluating management measures under Section 6217. The Authority, Ecology and EPA, as the Puget Sound Estuary Program co-managers, shall seek ways to involve federal agencies in addition to those on the River Basin Team 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

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 Authority and Ecology.

7.2. Monitoring

Ecology (or Ecology and the Department of 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.

7.3. Default Watersheds

Ecology shall work directly with local governments which fail to prepare watershed action plans to identify reasons why and to develop an appropriate strategy for addressing nonpoint concerns. If local governments fail to prepare and implement nonpoint watershed action plans, the Authority shall follow procedures in Chapter 90.70 RCW and in element EM-8 of the Puget Sound Plan to seek action. 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.

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 OS-1 through OS-5 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 Authority as part of each revision of the Puget Sound Plan.

Target Date: Ecology shall report progress on this element in its reports to the Authority. Counties shall begin baseline monitoring in at least one new watershed by 1996.

ON-SITE SEWAGE SYSTEMS

PROGRAM GOAL

To reduce and ultimately eliminate harm from wastes generated by existing and future on-site sewage systems.

STRATEGY

The strategy for achieving this goal is: (1) to establish comprehensive programs at the local level for the appropriate application of on-site sewage treatment and disposal technology, and for effective operation, maintenance and inspection, education, and financial and technical assistance regarding on-site sewage systems; (2) to provide effective state oversight, regulation and financial and technical assistance; and (3) to investigate, review, approve,

promote and apply, as appropriate, alternative on-site sewage treatment technologies.

OS-1. On-Site Sewage Regulations and Programs

[Completed portions of this element have been deleted.]

The Department of Health (DOH) shall periodically review and, as appropriate, amend the state on-site sewage regulations, Chapter 246-272 WAC, including continued consideration of consistency with management measures of the Coastal Nonpoint Pollution Control Program and evaluation of issues related to the location and density of on-site sewage systems. The regulations shall maintain provisions requiring local on-site sewage operation and maintenance programs in the Puget Sound basin. The DOH 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 in: (1) protecting water quality through application of on-site sewage treatment and disposal technology; and (2) reducing pollution from failing or inadequately located, constructed, installed or maintained on-site sewage systems.

Target Date: Ongoing.

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

Local health jurisdictions shall create or assist with the creation of operation and maintenance programs for controlling pollution from on-site sewage systems. These programs shall provide for regular inspections, maintenance and pumping of systems, as well as education of system owners and users. Local governments, in conjunction with health jurisdictions, shall select and establish appropriate mechanisms for carrying out on-site sewage programs, such as on-site sewage maintenance utilities, clean water districts or shellfish protection districts, public/private partnerships, or other means.

Target Date: All counties shall have established local operation and maintenance programs by 1997.

OS-3. Certification of On-Site Professionals

The Department of Health shall develop a program, including any required legislation or amendments to WAC 246-272 and RCW 18.43.070, for state certification of designers, installers, pumpers, environmental health specialists, and others involved in the design, installation and maintenance of on-site sewage systems. The DOH shall require all on-site sewage systems to be installed, designed, given permit approval and inspected by certified professionals. As part of this program, the DOH, in cooperation with Washington State University (WSU) Cooperative Extension, shall conduct a continuing education program for certified professionals.

Target Date: Begin program implementation by December 1994.

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

The Department of Health, with assistance from Ecology, shall expand its program for large on-site sewage systems. The DOH shall: (a) conduct an inventory of systems; (b) assess the need for new performance, siting or other

requirements; (c) establish an operational permit program; and (d) maintain a database. The DOH 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 the DOH and other interests, shall continue to develop rules and guidelines for the management of biosolids, including holding-tank septage. The DOH, along with Ecology, shall conduct a literature review, develop a handbook, and provide training and technical assistance for local governments on the environmentally sound disposal of septage.

Target Date: Complete the inventory and establish an operational permit program for large on-site sewage systems by June 30, 1995. Complete rules and guidelines for biosolids management by March 31, 1995. Complete literature review and handbook development by December 31, 1995.

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

The Department of Health shall expand its program for alternative and experimental on-site sewage systems. The DOH shall: (a) investigate, evaluate, review, approve, guide and encourage the appropriate implementation of alternative and experimental on-site sewage system technologies; (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) maintain a database. The DOH 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: Ongoing

AGRICULTURAL PRACTICES

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.

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: 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.

Ecology shall institute a permit system for concentrated animal feeding operations, including commercial dairies, in accordance with requirements of the federal Clean Water Act and Chapter 90.64 RCW. In implementing the permit system and in responding to water quality violations caused by farm animal wastes, Ecology shall carry out timely inspections and enforcement actions to ensure compliance with the state Clean Water Act (Chapter 90.48 RCW). Any farm that has fully implemented a farm management plan through the conservation district and NRCS system shall be exempt from further regulations on animal keeping and pasture management under a watershed action plan unless water quality violations occur.

Target Date: Institute permit system by January 1995. Conduct inspections and enforcement actions as needed to ensure compliance with water quality standards.

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.

Target Date: Ongoing.

PEST MANAGEMENT

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 homeowners), and identify storage and disposal practices.

Target Dates: 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 by September 30, 1995. Surveys will be completed and results compiled for two watersheds by March 30, 1997.

PS-2. Puget Sound Pest Management Information Program

WSU Cooperative Extension shall act as the lead to work with the Puget Sound Estuary Program, National Oceanic and Atmospheric Administration, and the Department of Ecology's Groundwater Program and Solid and Hazardous Waste Program, to find funding for and to establish a Puget Sound Pest Management Information 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, including the King County Roads Division program on integrated pest management and the Thurston County Integrated Vegetation Management Program, to conduct research and education on integrated and targeted pest-management, promoting conservative use of pesticides and use of alternatives to pesticides. Targeted audiences for educational activities shall include home 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 which should receive priority for research.

Local governments and state agencies shall adopt practices which are demonstrated to be effective by the program. The Authority shall establish a process to designate effective practices.

Priority will be given to research and promotion of pest-management practices which 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 (Ecology, WSU, DOH, Agriculture, the Authority and EPA) in the Urban Pesticide Initiative.

WSU Cooperative Extension shall provide resources to the local watershed management committees (element WP-3), the Ecology 1-800-RECYCLE hotline, and local plans for managing hazardous waste (elements HHW-1 and HHW-2).

Target Dates: WSU Cooperative Extension shall hire a person to initiate the program by November 30, 1995. The advisory group shall be formed by January 1996. By June 1996, work on a database and educational activities the Puget Sound region shall have started. By September 1996 two demonstration research projects will have been identified and begun. By January 1997,

the program will be providing support to local governments as they implement plans for managing hazardous waste (element HHW-2). By September 1997, the Authority and WSU Cooperative Extension will have established a process for agencies and local governments to adopt practices which are demonstrated to be effective through this program.

FOREST PRACTICES

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.

STRATEGY

The strategy for achieving this goal is to: (1) continue using the Timber/Fish/Wildlife (TFW) Agreement approach for reaching consensus on forestry management issues; (2) to implement the new forest practices rules; and (3) to develop and implement local programs addressing the effects of private forestland conversions and small forestry operations.

FP-1. Timber/Fish/Wildlife Agreement

The Authority endorses the Timber/Fish/Wildlife (TFW) Agreement and the revisions in 1992 to the Forest Practices Act and Regulations. In particular, the Authority supports the TFW approach of significantly increasing enforcement and monitoring of forest practices, preplanning and basin planning, interdisciplinary identification teams, data management, a comprehensive program for identifying and correcting problems with orphaned roads, regulations for managing riparian zones extended review period for forest practice applications (extended from 15 to 30 days), staff increases at the DNR, and continuing program evaluation.

The Authority will support statutory and regulatory actions, including any federal and state funding proposals, necessary to implement the TFW Agreement. The Authority also supports the watershed analysis requirements under the revised Forest Practices Rules of 1992 and encourages the DNR to expedite the analysis schedule.

The Authority will 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 TFW evaluation process.

FP-2. Private Forestland Conversions

Local governments shall develop memorandums of agreement (MOAs) with the DNR to reduce and prevent effects to water quality from forest practice activities. These MOAs 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 MOAs, local governments 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 SEPA (State Environmental Policy Act) on Class IV general forest practices; and working with the DNR in designating areas likely to convert.

The Authority encourages local governments; the departments of Natural Resources, Ecology, Fish and Wildlife; and Community, Trade and Economic Development; 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.

Target Date: June 30, 1997

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

WSU Cooperative Extension, in cooperation with the DNR, local governments, the departments of Community, Trade and Economic Development, Ecology, and Fish and Wildlife, conservation districts and tribal governments shall develop a program to encourage and promote the use of best management practices, consistent with 6217 management measures, 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.

Target Date: June 30, 1996

MARINAS AND RECREATIONAL BOATING

PROGRAM GOAL

To reduce and ultimately eliminate harm from wastes generated by recreational boating activities, including sewage, petroleum products and other pollutants stemming from boat maintenance and repair.

STRATEGY

The strategy for achieving this goal is to: (1) coordinate implementation of the program by state agencies and local governments; (2) 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 which affect water quality; and (3) evaluate

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

[**NOTE**: The Marinas and Recreational Boating Program focuses on recreational boating because of its widespread occurrence throughout Puget Sound. However, small (less than 65 feet in length), uninspected commercial vessels using areas where nonpoint pollution from boats has been identified as a problem are the subject of education and enforcement programs. Education of the commercial fishing industry is also addressed in the Spill Prevention and Response Program (element SP- 4).]

MB-1. Coordination of Marinas and Boating Elements

1.1. State Agency Coordination

With the Authority as lead, the departments of Ecology, Health and Natural Resources, the State Parks and Recreation Commission, the Interagency Committee for Outdoor Recreation, and the Authority shall work as a task force on coordinated implementation of the following measures:

a. For new and expanded marinas and floating homes:[6] Shoreline Master Program amendments prepared by the Department of Ecology as described in element MB-2.

b. For existing marinas: (1) Educational activities addressing appropriate sewage disposal and other water quality effects at marinas in coordination with element MB-4 and (2) Information addressing sewage disposal options for public and private marinas as described in element MB-3.

c. Development of a means to evaluate the effectiveness of the actions to address water quality effects from boats and marinas as called for in elements MB-3, MB-5, MB-7 and MB-8. This shall include such measures as the number of pumpout stations sited around the Sound, data on pumpout use, etc.

1.2. Public Involvement

The development of Shoreline Master Program Guidelines (element MB-2), information on sewage disposal options for marinas, and operations and maintenance strategies (element MB-3), and other appropriate tasks shall be carried out with the assistance of an advisory committee or committees representative 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.

6 "Floating home" means a structure designed substantially as a permanently based structure and not as a vessel. It is typically characterized by permanent utilities and a semi-permanent anchorage/moorage design, and by the lack of adequate self-propulsion to operate as a vessel.

Interested members of the public shall be kept informed of the activities under element MB-1.1.

Target Date: State agency task force meets every two months.

MB-2. Shoreline Master Program Amendments for Marinas

Ecology, in coordination with the Department of Health shall issue guidelines to include specific standards for siting, design, renovation or expansion of new marinas, existing marinas, and associated fuel docks and boat repair facilities. The guidelines shall include standards for new and expanded marinas to prevent any restriction in the use of commercial and recreational shellfish beds and specific regulations requiring best management practices to control pollutants from boat use, maintenance and repair. The revised guidelines shall also specify 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. The guidelines shall also address means for controlling water quality effects from floating homes and barge homes not otherwise prohibited.

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

Target Date: Update guidelines as needed. Local shoreline master programs amended by January 1996.

MB-3. Waste Disposal at Marinas

State agencies and local governments shall: (1) promote and coordinate the installation of sewage disposal facilities at new and existing, public and private marinas, launch ramps and other boating facilities, and (2) 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 (Department of Natural Resources), funding opportunities (State Parks and Recreation Commission), and regulatory authorities (departments of Ecology and Health, and local governments).

The Department of Health shall assemble information on the range of sewage disposal options (technical, educational, regulatory and financial) available to those involved in marina sewage disposal programs. The DOH shall provide this information to operators of public and private marinas and other boating facilities, and shall update it every two years.

With the Department of Health as lead, the state agency task force shall develop a strategy for operating and maintaining marine sewage disposal facilities. This strategy shall include: 1) 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, 2) surveys of pumpout facilities for reliability and usage, 3) technical assistance and training on such systems, and 4) 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 operations and maintenance costs through user fees.

Target Date: Information regarding sewage disposal options prepared and distributed by July 1994. Operation and maintenance strategies designed by July 1995.

MB-4. Marina and Boater Education Program

[Completed portions of this element have been deleted.]

State Parks shall continue working with local governments and boating groups to encourage the use of state public-education materials and to develop local boater environmental education programs. State Parks shall also use funds under the state and federal boat-sewage pumpout grant programs to support this program. State Parks shall provide interpretive signs to marine state parks where pumpout and dumpout facilities are installed (element MB-5) and at marinas associated with areas where Ecology conducts its water quality studies under element MB-7. State Parks shall evaluate the effectiveness of the boater education program with the assistance of a qualified external, education program evaluator and other appropriate entities. The evaluation shall include an assessment of how frequently pumpout and dumpout facilities are being used and other measures of changes in boater behaviors. This evaluation shall be used by the departments of Ecology and Health in their consideration of no-discharge (element MB-8) and no-anchorage (element MB-9) areas, and by State Parks in its enforcement of marine sanitation device (MSD) regulations (element MB-6). State Parks representatives shall assist the Interagency Technical Assistance Team (element WP-6) in providing information on boats and water quality to watershed management committees.

Target Date: Complete first biennial program evaluation by December 1994.

MB-5. Construction of Pumpouts

The State Parks and Recreation Commission shall provide grants for the construction and renovation of facilities for boat sewage disposal 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.

In consultation with interested parties, State Parks shall review progress made in installing sewage pumpouts and dump stations and in boater education under the state grant program and report to the Legislature on program status and needs for continued funding.

As administrator of the federal Clean Vessel Act grant program, State Parks shall prepare a comprehensive plan for the funding and installation of sewage disposal facilities for boaters with the assistance of an advisory group of interested parties. State Parks shall also prepare a guide for installing boat-sewage disposal facilities for 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: State Parks shall report its findings on the state grant program by December 1994. State Parks shall install pumpouts in at least two parks per year until the need for pumpout services is met.

MB-6. Enforcement of MSD Regulations

The State Parks and Recreation Commission shall develop a comprehensive strategy to ensure compliance with federal marine sanitation device (MSD) installation and use. The strategy shall include methods to protect environmentally sensitive areas. In developing the strategy, State Parks shall consult with the U.S. Coast Guard, the Environmental Protection Agency, the departments of Health, Ecology, Natural Resources, and Fish and Wildlife, sheriff's departments, local governments, and the boating community to develop various options for such a strategy. The strategy could suggest one or a combination of options such as new legislation, a memorandum of understanding (MOU) with the Coast Guard, a model ordinance for local governments, or simply continuation of a boater environmental education program. Public meetings shall be held in several locations around Puget Sound to take comment on the options prior to the State Parks and Recreation Commission 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 an MOU with the U.S. Coast Guard 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.

In developing the strategy, 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.

Target Date: State Parks options for a strategy to ensure compliance with federal MSD installation and use by boaters to be researched by June 1996. State Parks chooses option by September 1996. Submit any appropriate new legislation, draft an MOU with the U.S. Coast Guard, or develop other programs as necessary by January 1997. Begin implementation by July 1997.

MB-7. Monitoring Program for Boating Areas

The Department of Ecology, with the assistance of the Department 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, placement of sewage disposal facilities, and establishment of no-discharge areas. The program shall include baseline data, water and shellfish samples (where applicable) and boat counts. The monitor-

ing program shall be consistent with the Puget Sound Ambient Monitoring Program.

Target Date: Ongoing.

MB-8. Study of No-Discharge Areas[7]

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 vessels have federally approved functioning sewage treatment systems (MSDs). Section 312 of the Clean Water Act authorizes states to apply to the EPA for the authority to prohibit all such discharges, whether treated or untreated, in those areas.

The departments of Ecology and Health, in consultation with State Parks, shall evaluate the need for no-discharge designations in areas of Puget Sound. Their evaluation shall consider the effects and current status of the boater education program (element MB-4) and MSD enforcement strategy (element MB-6). In setting priorities for the areas to be considered for designation, the agencies shall draw upon the survey and planning work done by State Parks for the Clean Vessel Act and state pumpout placement programs, information assembled by the Puget Sound Marina/Boater Advisory committee, applications by local governments, and other sources.

In determining whether an area needs a no-discharge designation, the departments of Ecology and Health shall consider water circulation and other natural characteristics of the area, the presence of commercial and recreational shellfish beds and swimming areas, the sufficiency and rate of use of existing sewage disposal facilities, the number and type of boats using an area, and, if available, information from the inspection program (element MB-6) and the monitoring program for boating areas (element MB–7).

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

The Authority shall inform local governments of the option to designate no-discharge areas for controlling of sewage disposal from boats. 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: Evaluations begun by July 1995. Applications to the EPA begun by December 1995.

7 "No-discharge" areas are areas where the use of Type I and Type II MSDs (treatment devices as opposed to Type III holding tanks) is prohibited. Vessels with Type I and Type II devices are permitted in no-discharge areas but may not discharge. The process of designation may be initiated by the state or a local government and requires application by the governor or the Department of Ecology to the U.S. Environmental Protection Agency and a showing that sufficient pumpout facilities for all vessels exist.

MB-9. No Anchorage Areas

The Department of Health shall provide ongoing evaluation of the results from the monitoring of boating areas and the success of the education program (element MB-4) in protecting commercial and recreational shellfish beds from closures due to pollution from anchored boats. The DOH 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 the education program is unsuccessful in achieving standards for water quality and shellfish classifications in boating areas.

If the DOH 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 MSD enforcement program (element MB-6), if applicable.

Target Date: If necessary, the Department of Health shall submit legislation with anchorage prohibitions to prevent any restriction in the use of commercial and recreational shellfish beds to the 1997 Legislature.

HOUSEHOLD HAZARDOUS WASTE

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.

STRATEGY

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

HHW-1. Phased Funding of Local Hazardous Waste Management Plans

[Element Completed]

HHW-2. Information and Education on Less-Toxic Alternatives for Household Products

Ecology and the Authority shall work with local governments, Washington State University 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 Authority shall distribute this information through their newsletters, the nonpoint planning and stormwater programs, other environmental education programs, and the PIE Fund. Ecology shall continue to distribute this information through its 1-800-RECYCLE information line and through 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 the 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 local household hazardous waste plan implementation. Ecology, the Authority, the Department of Agriculture, and WSU Cooperative Extension shall assist with funding for participating groups through contract processes such as the PIE Fund or through joint grant proposals to foundations.

Target Date: Ecology and the Authority shall continue distribution of information through mechanisms available. WSU Cooperative Extension hires staff and begins joint development of regional pesticide education program with other groups by September 1995. By December 1996, the pesticide education program will be contributing to all local government household hazardous waste programs that want support.

MAJOR PUBLIC ACTIONS FOR AUTHORITY REVIEW[8]

1. The passage by the State Board of Health of revisions to WAC 246-272 for on-site sewage systems and any subsequent proposed revisions (element OS-1).

2. Ecology guidelines on shoreline master program requirements for marina siting and design (element MB-2).

3. Establishment of a cost-share program (element AG-3).

LEGISLATION REQUIRED

1. Legislation would be required to expand boating safety enforcement powers to allow inspections of marine sanitation devices on vessels (element MB-6).

2. If no-discharge areas are designated, legislation would be required to prohibit use of Type I and Type II MSDs in those areas (element MB-8).

3. Legislation would be required to prohibit anchorage near commercial and recreational shellfish beds (element MB-9).

4. Legislation may be required to establish a cost-sharing program (element AG-3).

8 Although the Authority will not be reviewing the actual selection of priority watersheds or the individual action plans adopted for each priority watershed as major public actions, the selection process and the plans will be reviewed by the Authority through its general oversight role, as part of the evaluation of the program described in element WP-7, and through the reports required of state agencies and local jurisdictions described in element EM-8.

ESTIMATED COST

The Nonpoint Source Pollution Program elements are divided into seven distinct sections. These are the local watershed action program, on-site sewage systems, commercial and noncommercial agricultural practices, pest management, forest management practices, marinas and recreational boating, and household hazardous waste.

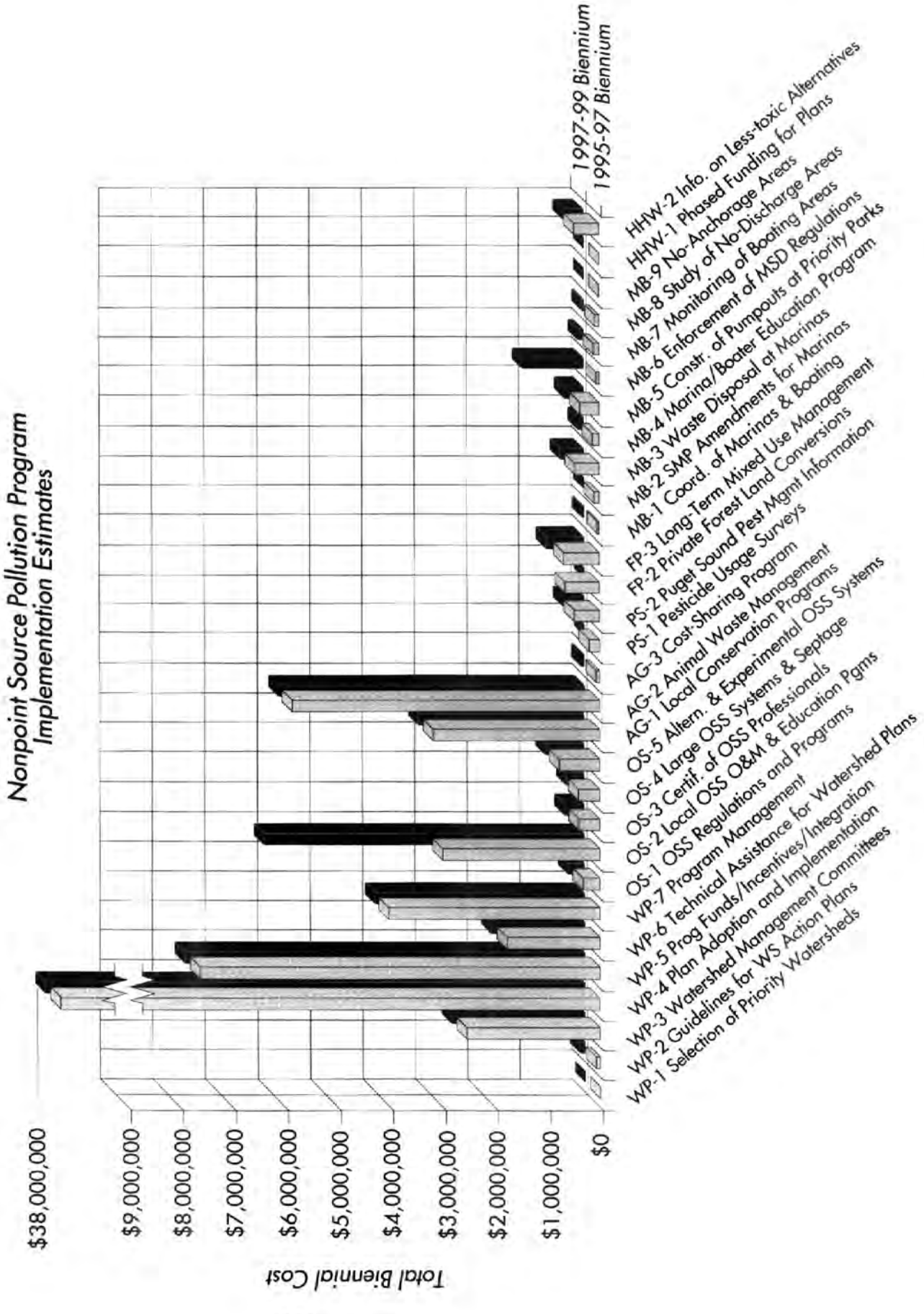
The estimated cost for the Nonpoint Program is approximately $73 million during the 1995-97 Biennium and about $76 million during the 1997-99 Biennium. About 80 percent of these expenditures are estimated to be made by local governments, with about half of this amount projected as coming from state and federal grants.

Most elements are projected to be financed from the Centennial Clean Water Fund, federal funds, the Puget Sound Grants Program (element EM-6), the State Toxics Control Account, state's General Fund and Capital Fund, and/or local and tribal government funds. Local and tribal funds might be generated through fees (e.g., for on-site system inspections and maintenance), rates (for watershed action plan components), and general fund taxes. Many costs for controlling nonpoint pollution will be borne by the private sector. For instance, watershed action plans (element WP-4) will result in costs for implementing agricultural and stormwater best management practices (BMPs) and for on-site sewage system pumpouts, repairs or possible replacements. These private costs are not directly included in the cost estimates, although we can assume that much of the local government funding will have to come from the private sector according to some rate, fee or tax structure.

Some of the costs projected for this program are based on certain assumptions that may turn out not to be applicable. For instance, during the 1997-99 Biennium, over $1 million is allotted for implementation of element MB-6, Enforcement of Marine Sanitation Device (MSD) Regulations. Ninety-five percent of this cost arises from the assumption that enforcement activities will be undertaken as part of the strategy for this element.

Some changes have been made in the Nonpoint Program for the 1994 Plan that affect the cost estimates. For example, the costs of preparing watershed action plans has been reduced by recommending that a county's watersheds with similar characteristics be grouped together for producing a single plan to control nonpoint pollution sources. The costs for the state Department of Health have been increased in element OS-5 by requiring them to actively research and test alternative on-site sewage systems to determine which ones will perform effectively. This is especially important given the more stringent on-site standards that have been adopted under element OS-1.

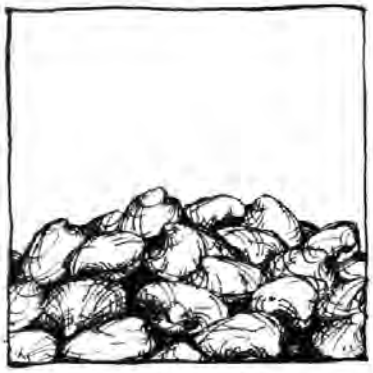
Total costs for implementing the household hazardous waste portion of the program one projected to come from the State Toxics Control Account. Local governments do incur costs developing moderate-risk assessment programs as required under the Hazardous Waste Management Act. In 1991, these programs were estimated to cost between $20,000 for less-populated counties, such as San Juan County, to $5,201,000 for larger and more populated counties, such as King County. Household hazardous waste collection and public education generally account for 50 to 90 percent of these costs.


Nonpoint Source Pollution Program
Implementation Estimates
Total Biennial Cost
$38,000,000
$9,000,000
$8,000,000
$7,000,000
$6,000,000
$5,000,000
$4,000,000
$3,000,000
$2,000,000
$1,000,000
$0
1997-99 Biennium
1995-97 Biennium
HHW-2 Info. on Less-toxic Alternatives
HHW-1 Phased Funding for Plans
MB-9 No-Anchorage Areas
MB-8 Study of No-Discharge Areas
MB-7 Monitoring of Boating Areas
MB-6 Enforcement of MSD Regulations
MB-5 Constr. of Pumpouts at Priority Parks
MB-4 Marina/Boater Education Program
MB-3 Waste Disposal at Marinas
MB-2 SMP Amendments for Marinas
MB-1 Coord. of Marinas & Boating
FP-3 Long-Term Mixed Use Management
FP-2 Private Forest Land Conversions
PS-2 Puget Sound Pest Mgmt Information
PS-1 Pesticide Usage Surveys
AG-3 Cost-Sharing Program
AG-2 Animal Waste Management
AG-1 Local Conservation Programs
OS-5 Altern. & Experimental OSS Systems
OS-4 Large OSS Systems & Septage
OS-3 Certif. of OSS Professionals
OS-2 Local OSS O&M & Education Pgms
OS-1 OSS Regulations and Programs
WP-7 Program Management
WP-6 Technical Assistance for Watershed Plans
WP-5 Prog Funds/Incentives/Integration
WP-4 Plan Adoption and Implementation
WP-3 Watershed Management Committees
WP-2 Guidelines for WS Action Plans
WP-1 Selection of Priority Watersheds

SHELLFISH PROTECTION PROGRAM

PROGRAM ELEMENT DIRECTORY

PROBLEM DEFINITION



Puget Sound is one of the most productive shellfish growing areas in the country. According to the Pacific Coast Oyster Growers Association, the combined value of all commercial shellfish production in Puget Sound was about $42 million for 1993. The association believes this figure could be doubled if the waters that were downgraded in the past two decades were reclaimed. The value of shellfish, however, extends far beyond economic numbers. Shellfish are a part of Puget Sound—a historical and cultural piece of the Sound integral to the region's quality of life. The Department of Fish and Wildlife estimates that during 1991-92, an average of 600,000 recreational shellfish trips were made each year to Puget Sound, yielding 1.7 million pounds of clams and 2.2 million pounds of oysters.

Some commercial shellfish beds in Puget Sound were closed to harvesting as early as the 1950s. These early closures occurred mainly in urban areas due to the beds' proximity to sewage treatment plants and other urban sources of pollution. A significant change in this pattern has occurred since 1981. Harvest restrictions are imposed when fecal coliform levels exceed certain standards. Fecal coliform are an indicator of potentially serious human-health disease organisms. Today, most restrictions placed on harvesting shellfish occur in rural, not urban, bays usually as a result of the cumulative effects of nonpoint source pollution (polluted runoff from many sources). Animal keeping practices, failing on-site septic systems, storm water, sewage treatment plants, marinas and boats are all sources of fecal coliform bacteria. In some cases, such as at Dosewallips State Park, marine mammal populations have contributed to the closure of shellfish harvesting.

Since 1981, the Department of Health (DOH) has restricted or prohibited shellfish harvesting from approximately 40,730 acres of commercial shellfish beds (38,770 acres were lost between 1986 and 1993 alone). This figure does not include the entire eastern shore of the central Puget Sound basin, from Everett to Tacoma, where commercial shellfish harvesting is prohibited due to point source discharges (discharges that originate from a distinct source, such as a pipe) and pollution associated with urbanization.

Most of the downgrades since 1981 are associated with nonpoint pollution sources, although many are also initiated for precautionary reasons due to close proximity to sewage treatment plants or other point sources. Two of the largest downgrades occurred in 1987 at Port Susan and in 1989 in North

Skagit Bay. The Port Susan downgrade (11,900 acres) was a result of agricultural runoff and the proximity of the Warm Beach sewage treatment plant. The North Skagit Bay downgrade (9,540 acres) was due to rural nonpoint source pollution.

Since 1989, the DOH upgraded 5,530 acres of shellfish beds. The two largest upgrades of commercial harvest areas occurred in Oakland Bay in 1989 and in South Skagit Bay in 1993. Both upgrades were primarily due to improvements at local sewage treatment plants.

In 1994, the DOH classified 145 high-use recreational beaches where shellfish are harvested. Classification was carried out under WAC 246-280, Recreational Shellfish Beaches. Of the 145 beaches, about half are unclassified due to insufficient water quality information. Recreational beaches are classified as open, closed, conditionally open or unclassified. Thirty-eight beaches are closed to recreation harvesting, 28 are open and four are conditionally open.

The effects of nonpoint source pollution on shellfish resources means that, unless action is taken, harvest restrictions are likely to continue (and perhaps accelerate) as the region's population grows.

INSTITUTIONAL FRAMEWORK

Concern about contamination of shellfish beds gave rise to better monitoring and increased efforts to control pollution. In 1986, the monitoring of shellfish was incomplete. Monitoring focused solely on fecal contamination in commercial areas with no attention given to contamination at recreational areas or other types of contamination such as domoic acid or paralytic shellfish poisoning (PSP). The Department of Health was responsible for limited shellfish monitoring. No agency addressed the problem of shellfish habitat loss.

Currently, many more agencies are involved in protecting shellfish areas from pollution. Tribal and local governments play a significant role in pollution reduction.

The Department of Ecology (Ecology) enforces water quality standards in Puget Sound and provides financial assistance to local governments. Funds are used to identify and correct existing or potential pollution sources.

The Department of Health protects human health from consumption of contaminated shellfish through the National Shellfish Sanitation Program. As part of the program, the DOH classifies commercial and recreational shellfish growing and harvest areas. The DOH is also responsible for monitoring and reporting occurrences of paralytic shellfish poisoning (PSP) and other naturally occurring marine toxins that have human health implications. Both the departments of Ecology and Health supply technical assistance to local implementing agencies.

The Department of Natural Resources (DNR) is the subtidal and intertidal land steward, responsible for shellfish culture (aquaculture) and geoduck harvest. The DNR has an active management program for aquatic lands.

Other agencies with shellfish responsibilities include the Department of Fish and Wildlife for overall resource management of the state's shellfish resources; the Department of Agriculture for promoting the state's aquaculture industry; and the State Parks and Recreation Commission for managing the more than 1,000 state parks adjacent to the Sound.

Because failing on-site sewage (septic) systems and poor agricultural practices cause shellfish bed downgrades in many areas, local governments play an important role in the management structure. Local health departments implement on-site ordinances, provide technical and financial assistance to homeowners, inspect systems and enforce for compliance. In addition, local health agencies cooperatively develop "joint plans of operation" with the DOH to assess the health and sanitary status of recreational shellfish harvest beaches. Harvest classification is then based on plan findings. Also, local conservation districts work with farmers to install management practices on their farm that protect water quality.

Local governments receive funding for water quality programs that address land-use issues related to shellfish downgrades. The programs, which may also be partially funded by local utility revenues, primarily develop and implement locally developed watershed action plans to prevent pollution from nonpoint sources (see the Nonpoint Source Pollution Program for greater detail). Threats to shellfish resources are also addressed in the Stormwater and Combined Sewer Overflows Program.

Most tribes in the Puget Sound basin have treaty rights outlining their usual and accustomed shellfish harvest areas and are becoming more involved in protection efforts beyond reservation boundaries.

AUTHORITY'S APPROACH

The Authority's 1987 Puget Sound Water Quality Management Plan (Plan) called for expanding Ecology's existing shellfish program and integrating it with the Plan's Nonpoint Source Pollution Program, improving the DOH's monitoring program to test for PSP (paralytic shellfish poisoning), fecal coliform and toxicants at selected sites, developing a recreational shellfish program, annually inventorying contaminated beds, developing a fund assessment, and improving public involvement and education.

Revisions to the Plan in 1989 and 1991 primarily called for ongoing implementation of the two main portions of the program: protecting commercial shellfish beds and implementing the recreational shellfish program, affording equal protection to both. In addition, these revisions called for Ecology and the DOH to develop a strategy to respond to shellfish bed downgrades.

PROGRAM GOAL

To protect water quality and prevent contamination of commercial and recreational shellfish beds so that shellfish are safe for human consumption; to reduce contamination of shellfish beds sufficiently to allow reopening of at least one contaminated shellfish bed each year; and to prevent human consumption of shellfish from contaminated beds until such time as the contamination is corrected.

STRATEGY

The strategy for achieving this goal is to: (1) adopt shellfish policies which will ensure that programs that control pollution sources protect shellfish; (2) respond to existing and potential shellfish contamination with aggressive restoration and protection programs; (3) monitor commercial and recreational shellfish areas for toxic contaminants and indicators of pathogenic organisms; and (4) increase public involvement and education in shellfish protection.

PROGRAM ELEMENTS

SF-1. Shellfish Protection and Restoration Policy

State and local agencies shall ensure that the programs for nonpoint source pollution (including locally developed watershed action plans), stormwater and combined sewer overflows, and municipal and industrial discharges, and related funding programs meet these objectives:

a. Protect recreational and commercial shellfish beds from contamination and from reclassification to a more restrictive status;

b. Reduce contamination of commercial beds sufficient to allow lifting of harvest restrictions; and

c. Reduce contamination of recreational shellfish beds.

Target Date: Ongoing.

SF-2. Protection and Restoration of Recreational and Commercial Shellfish Beds

[Completed portions of this element have been deleted.]

The departments of Ecology, Health, Department of Natural Resources (DNR), Fish and Wildlife, and Agriculture, the State Parks and Recreation Commission (State Parks), and local and tribal governments, in cooperation with the Authority, shall continue and expand their existing shellfish protection and restoration programs.

Ecology has lead responsibility on water quality issues, including enforcement of the state Clean Water Act, Chapter 90.48 RCW. Ecology shall continue to provide policy guidance, financial aid, grants administration, resource characterizations, and technical assistance, in coordination with the Nonpoint Source Pollution Program, to local and tribal governments, conservation districts, or other entities carrying out shellfish protection and restoration programs. Ecology's technical assistance shall address such issues as shellfish protection districts and other funding sources; local land-use measures for shellfish protection; water quality monitoring to locate and control pollution sources; best management practices (BMPs) that reduce water pollution stemming from stormwater runoff, agricultural practices and other sources; appropriate management measures under the Coastal Nonpoint Pollution Control Program; and on-site sewage treatment systems with flows greater than 14,500 gallons per day.

The Department of Health has lead responsibility on shellfish sanitation issues, including implementation and enforcement of the National Shellfish Sanitation Program. The DOH shall continue to: (a) expand and coordinate its investigations and monitoring program with the departments of Ecology, Natural Resources, Fish and Wildlife, State Parks, and local and tribal governments; (b) retest sites where harvest restrictions apply and meaningful progress has been made in improving water quality; (c) monitor sites being addressed by local shellfish protection projects; and (d) develop assessments of pollution sources, recommend corrective actions to local governments and/or state agencies, and provide technical assistance. The DOH's technical assistance shall address such issues as water quality monitoring to determine growing area classifications, shoreline investigations, and on-site sewage treatment systems with flows less than 14,500 gallons per day. The DOH shall provide data from water quality monitoring, trends and summary information on shellfish growing areas as soon as available to parties involved in restoration activities within the Puget Sound basin. Also, in conjunction with the publication of the annual inventory, the DOH shall provide local governments with information on priority watersheds, including watersheds threatened by potential for contamination.

The departments of Ecology, Health, Natural Resources, Fish and Wildlife, and Agriculture, the State Parks and Recreation Commission, and local and tribal governments shall continue to work cooperatively and aggressively to protect and restore water quality in recreational and commercial shellfish areas. These efforts shall target priority watersheds in the Puget Sound basin with valuable recreational or commercial shellfish areas that currently meet, or could be expected to meet, state water quality standards but are threatened with 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 or downgrade in the classification of the Sound's threatened shellfish growing areas.

Local governments shall fully implement provisions of the Growth Management Act (Chapter 36.70A RCW) and accompanying regulations (Chapter 365-190 WAC) to protect water quality in shellfish tidelands. Through use of countywide policies, comprehensive plans, development regulations, ordinances to protect critical areas, and the State Environmental Policy Act (Chapter 43.21C RCW, Chapter 197-11 WAC), local governments shall establish land-use measures that ensure compliance with water quality standards in commercial and recreational shellfish areas. 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. For example, water quality impacts and corresponding mitigation strategies shall be analyzed and documented in Growth Management Act environmental impact analyses.

When local governments concur with adopted, locally developed watershed action plans developed under Chapter 400-12 WAC of the Nonpoint Source Pollution Program (element WP-2), the goals, policies and control measures of the watershed plans shall be incorporated into appropriate comprehensive

plans, capital facilities plans, critical areas ordinances and other local regulations and programs. Jurisdictions sharing watersheds shall cooperate in analyzing water quality threats and effects, and shall adopt coordinated programs for protecting and restoring shellfish areas. Local governments shall also pursue comprehensive funding for water quality and shellfish protection, considering such authorities as shellfish protection districts, stormwater utilities, on-site sewage system maintenance districts, and conservation district special assessments.

Target Date: Ongoing.

SF-3. Testing Selected Shellfish Beds for Toxicants

The Department of Health shall establish an ongoing program, consistent with the Puget Sound Ambient Monitoring Program and including use of the Puget Sound Protocols and Guidelines, to test for toxicants at commercial and recreational areas where recent studies have found toxicants to occur. The results of the tests shall be used to establish baseline and trend information on toxicants in shellfish around the Sound. Beds where toxicants exceed existing Federal Food and Drug Administration (FDA) action levels, or other accepted standards as they are developed (such as risk-assessment methodology based on the Water Quality Criteria document), shall be closed and routinely reevaluated. The Authority shall request the FDA to reconsider, in consultation with Environmental Protection Agency (EPA) and National Oceanic and Atmospheric Administration (NOAA), the need to establish standards and require testing for toxicants not covered by existing FDA action levels.

Target Date: Ongoing.

SF-4. Recreational Shellfish Program

[Completed portions of this element have been deleted.]

Representatives from the departments of Ecology, Health, Fish and Wildlife, and Natural Resources, State Parks, the Washington Sea Grant Program, tribal governments, a public interest group, and local health departments shall comprise the Recreational Shellfish Committee. With Ecology and the DOH serving as co-leads, the committee shall meet at least twice each year to coordinate implementation of the recreational shellfish action plan, and shall review the plan for possible revision at least every two years.

Based on recommendations of the recreational shellfish action plan and requirements of Chapter 246-280 WAC, Recreational Shellfish Beaches, the DOH shall continue to assist and distribute available funds to local health departments through joint plans of operation for developing and implementing local programs for public, recreational shellfish beaches. In cooperation with local health departments, the DOH shall evaluate the condition of, and establish and maintain classifications for public beaches. The initial focus should be on the approximately 145 targeted public beaches identified in the recreational shellfish action plan.

The departments of Health and Ecology, in cooperation with other state agencies and local and tribal governments, shall continue to implement protection

and restoration activities described in elements SF-2 and SF-7 where necessary for recreational shellfish beaches.

Target Dates: Convene the Recreational Shellfish Committee every six months and revise the recreational shellfish action plan at least every two years starting January 1994. Distribute funds annually to local health departments for recreational shellfish programs. At a minimum, classify 30 public recreational beaches per year starting January 1994, and review the classifications on a regular basis.

SF-5. Annual Inventory and Information Management

The Department of Health shall publish an annual inventory of all shellfish beds, including sites in the Puget Sound basin where recreational and commercial shellfish beds have been found to be contaminated, indicating the types of contamination tested for and the types found. The inventory shall be distributed to local health departments, Ecology and other state resource agencies, the Puget Sound Estuary Program Management Committee, tribal governments, and local watershed management committees (see element WP-2). Health, in coordination with the Puget Sound Ambient Monitoring Program, shall prepare a guide to all existing databases and information sources on the shellfish resource. The DOH shall consult with the departments of Ecology, Fish and Wildlife and Natural Resources, the State Parks and Recreation Commission, tribal governments, and local health agencies and shall update and distribute the guide annually to watershed management committees, recreational shellfish restoration projects, and the entities named above. Activities under this element shall be coordinated with the Recreational Shellfish Program (element SF-4).

Target Dates: Annually distribute inventory by January 1.

[Element completed.]

SF-6. Public Involvement and Education

Ecology, in consultation with the Recreational Shellfish Program Committee, the departments of Health, Fish and Wildlife, and Natural Resources, and University of Washington Sea Grant specialists shall implement its Shellfish Education Strategy, a program for public involvement in and education on the protection of the shellfish resources of Puget Sound.

The program shall implement improved mechanisms for disseminating information among agencies and to the public on shellfish issues, especially regarding beach closures and health risks to consumers. The program shall also include procedures for coordinating workshops and the updating and distribution of agency shellfish publications, citizen involvement in shellfish protection projects, and the prevention of shellfish contamination. Ecology and the DOH shall jointly organize an annual low-tide event in early summer that publicizes concerns about shellfish and water quality.

The DOH and local health departments shall implement a program of posting, press releases, and other techniques to prevent harvesting of contaminated shellfish and to inform the public, including shellfish growers, of commercial

and recreational shellfish contamination and closures and of programs addressing these issues.

The Department of Fish and Wildlife shall establish a work group that includes agencies, boaters, shellfish growers, and tribal governments to develop an interpretive program at an appropriate location in Puget Sound (subelement EPI-3.1).

Ecology, the DOH and other agencies shall include, as appropriate, information about shellfish and shellfish protection in other educational programs developed under the Puget Sound Plan. Education shall be a required element of all local programs under elements SF-2 and SF-4 and shall be included, as appropriate, in Nonpoint Source Pollution Program watershed action plans, the activities of teams providing technical assistance on nonpoint source pollution issues (element NP-6), and the boater education program (MB-4).

Target Date: Ongoing.

SF-7. Shellfish Closure Response Strategy

[Completed portions of this element have been deleted.]

Local governments are encouraged to create shellfish protection districts before downgrades to existing shellfish beach classifications occur. The departments of Ecology and Health shall continue to implement and update, as necessary, a memorandum of agreement which governs their responses to downgrades in classification of commercial and recreational shellfish beds caused by water quality degradation. This agreement specifies the general roles, responsibilities and a schedule for the two agencies to develop response strategies for correcting contamination of shellfish beds. Development of a closure response strategy shall be initiated within 30 days of a downgrade and an initial closure response plan shall be completed within 60 days. At a minimum, each strategy shall: (1) provide for the participation of all affected agencies, local and tribal governments, and growers, groups and individuals, and (2) include concise and aggressive assignments and compliance schedules for correcting the sources of contamination.

Chapter 90.72 RCW, Shellfish Protection Districts, requires counties to create shellfish protection districts and programs in response to downgrades of recreational or commercial shellfish beds caused by ongoing nonpoint source pollution. Creation of these districts shall be carried out in accordance with Chapter 90.72 RCW and shall be integrated with the closure response strategies. The response strategies shall also be coordinated with relevant land-use and water quality plans, such as Puget Sound local watershed action plans developed under Chapter 400-12 WAC of the Nonpoint Source Pollution Program, to ensure swift and effective restoration of water quality in shellfish areas and to avoid duplication of effort.

Ecology, the DOH and the Authority shall seek to fund implementation of each response strategy with monies from the Centennial Clean Water Fund, the Puget Sound Estuary Program, the federal Clean Water Act, Section 319, or other sources.

Target Date: Response strategies prepared and implemented as needed.

MAJOR PUBLIC ACTIONS FOR AUTHORITY REVIEW

1. Recreational Shellfish Action Plan (element SF-4).
2. Shellfish closure response strategies (element SF-7).

LEGISLATION REQUIRED

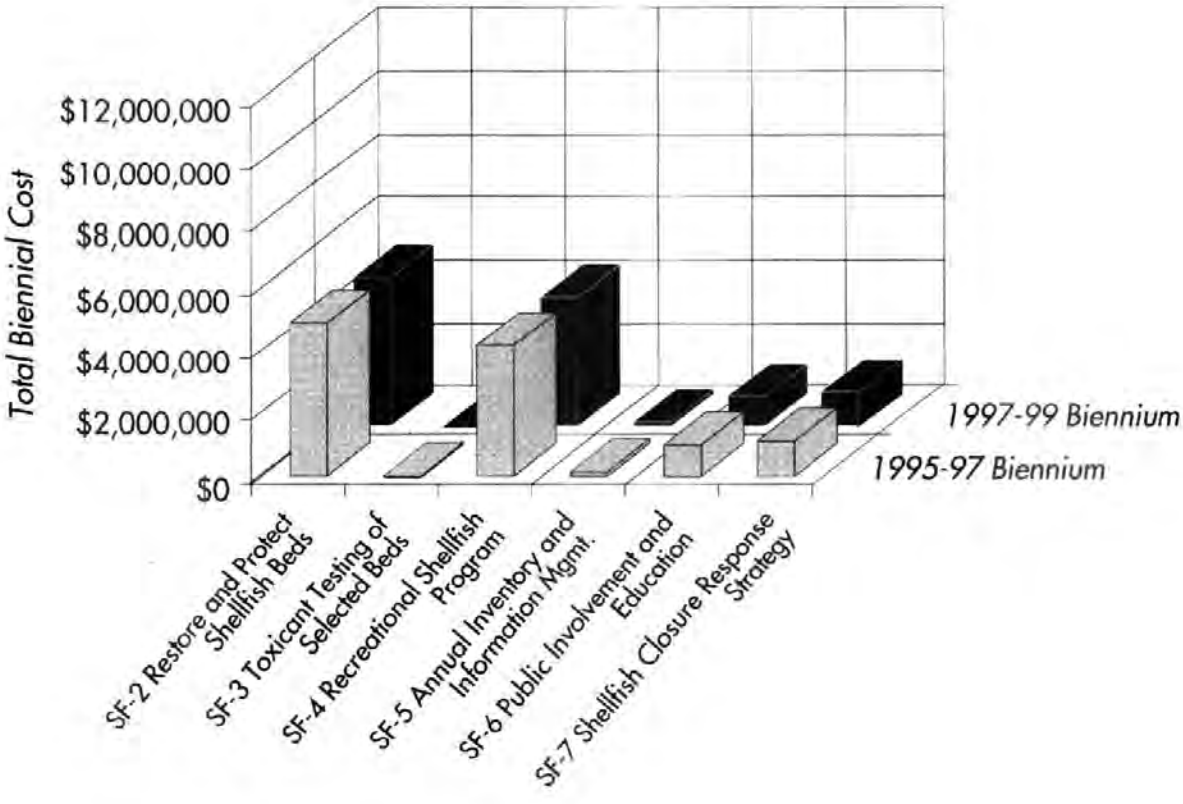
None.

ESTIMATED COST

The Shellfish Program is estimated to cost approximately $11.2 million during the 1995-97 Biennium and $11 million during the 1997-99 Biennium. Most of the state agency costs are attributed to the state Department of Health's work monitoring shellfish-growing areas, helping local governments respond to shellfish-harvest downgrades, and providing grants to local governments; the Department of Ecology's assistance to local governments in protecting shellfish growing areas; the Authority's shellfish protection grants to local governments; and resources for the state Department of Agriculture and the State Parks and Recreation Commission to participate in restoration and protection efforts. Local government costs are mostly associated with protecting and restoring shellfish harvesting. This work is closely related to the work that they do in implementing watershed plans in the Nonpoint Source Pollution Program since these sources of pollution are major contributors to shellfish area degradation.

Private sector costs resulting from shellfish restoration and protection projects would primarily involve repairs and/or replacements of failed on-site sewage systems, implementation of programs to control waste from farm animals, and fees charged by local government shellfish protection districts. These private costs are not separately identified in the cost estimate for the shellfish program, although they would certainly contribute to the local government funding that is raised for this program.

Shellfish Protection Program Implementation Estimates



WETLANDS PROTECTION PROGRAM

PROGRAM ELEMENT DIRECTORY

PROBLEM DEFINITION

Wetlands are important to the health of Puget Sound, helping to protect water quality by filtering pollutants and providing habitat for a diversity of species. Wetlands are the most biologically productive ecosystems in nature, anchoring the estuarine and freshwater food webs through photosynthesis and production of innumerable small organisms upon which larger creatures depend.

For a vast array of species from birds, fish, amphibians and reptiles to small and large mammals, wetlands provide essential habitat for feeding, nesting, cover and breeding. The Department of Fish and Wildlife lists over 175 wildlife species that use wetlands for primary feeding habitat and 140 species that use them for primary breeding habitat.[1] At least one-third of Washington's threatened and endangered species *require* wetlands for their survival.

Of the five Pacific salmon species, chum and chinook utilize estuaries, where salt water and fresh water meet, most extensively for nursery and rearing areas, and juveniles of all five species rely on estuaries to some degree. In the Puget Sound basin, nine salmon stocks are extinct and 55 are threatened. The loss of habitat, specifically estuarine wetlands, is thought to be a contributing factor to fisheries decline.

Wetlands provide other functions important to communities, including the slowing and storage of flood water, cleansing water of certain pollutants, recharging ground water and serving as an outlet for ground water to recharge streams (groundwater discharge) and providing recreational areas. In their natural state, wetlands help decrease the need for costly stormwater facilities and flood protection measures, such as levees and dikes. Recent studies show that where the ratio of wetland area to watershed area falls below five percent, the frequency of flooding increases and the length of the summer dry period increases.[2]

More than half the wetlands along the coasts and riverbanks of Puget Sound have been destroyed by human activity. In the Skagit Valley for example, 90

1 U.S. Department of Agriculture. Forest Service. Pacific Northwest Region. 1985. Management of Wildlife and Fish Habitats in Forests of Western Oregon and Washington. Part 2 - Appendices.

2 Puget Sound Wetlands and Stormwater Management Research Program. 1994. Research Summary No. H1. Topic: Wetland Hydrology.

to 95 percent of the wetlands have been lost, primarily to agriculture. Commercial and residential development in such areas as the Green/Duwamish and Puyallup River basins has eliminated over 95 percent of the original wetlands. The largest cities in the Puget Sound basin, including Seattle, Everett and Tacoma, are built largely on fill in areas that used to be river deltas. Exact figures on wetland losses are not available for many of the freshwater wetlands, although estimates are generally around 50 percent.

Although the current regulatory system is more protective than it has ever been, wetlands continue to suffer from harmful activities associated with growth and development. These actions include increased stormwater runoff from nearby development, sedimentation from clearing and grading activities, littering (of everything from cans to tires and washing machines), invasion by exotic plant species (e.g., purple loosestrife) and general lack of good stewardship.

Solutions to these problems include: better regulations for activities which occur near wetlands and affect wetlands (stormwater management programs, better forest management practices, noxious weed control programs,etc.); improved enforcement of regulatory programs that use fines and penalties as disincentives; improved mitigation through better planning and monitoring of mitigation projects; education; and restoration of damaged wetlands.

INSTITUTIONAL FRAMEWORK

In 1986, wetlands were regulated at the federal level primarily through Section 404 of the Clean Water Act, administered by the U.S. Army Corps of Engineers and the Environmental Protection Agency (EPA). At the state level, the Hydraulic Code and Shoreline Management Act were the primary regulations for activities involving wetlands. In some areas, local regulations also applied. The State Environmental Policy Act (SEPA), Coastal Zone Management Act and Clean Water Act Section 401 certifications also were used to some extent to review activities that may effect wetlands. In spite of these regulations, wetlands were poorly protected due to gaps in regulations and overlaps that caused poor administration of regulations.

Several efforts to enact a state wetlands law to require state wetland standards failed. Subsequently, the 1990 Growth Management Act (GMA) and its amendments, required that local governments identify and protect critical areas, including wetlands, within their jurisdiction. Several problems arose with the creation of local ordinances. Each local government adopts its own ordinances—often lacking coordination with adjacent jurisdictions—leaving Puget Sound wetlands subject to varying levels of protection. Local governments have little funding and sometimes little expertise in administering and enforcing wetlands regulations.

Although the GMA increased local government involvement in wetlands regulations, it did not decrease the involvement of state and federal agencies. The additional involvement of local government added confusion to an already complex permit system.

In 1992, the Corps of Engineers adopted regional conditions for nationwide permits, which established more restrictive regulations for the discharge of dredged or fill material which would affect more than one acre of headwaters or isolated wetlands.

Water quality protection for wetlands is authorized under the Water Pollution Control Act (RCW 90.48.020) and the antidegradation policy (WAC 173-201A-070). Although Washington state has not yet included wetlands in the water quality standards, a 1993 Superior Court decision clarified the Department of Ecology's authority over wetlands as waters of the state.[3]

In response to the confusion surrounding wetlands protection and the need to develop a better system of regulation, the EPA provided a grant to the departments of Ecology and Community, Trade and Economic Development (DCTED) for the State Wetland Integration Strategy (SWIS). The SWIS project gathered many stakeholders into six separate workgroups to address the most pressing issues surrounding wetlands protection—economics, education, regulatory reform, planning, technical issues and non-regulatory programs. Recommendations from the work groups will steer changes to improve the current system.

Wetlands protection continues to be complex, as new issues of water quality and quantity in wetlands arise, and fundamental tasks such as consistent definitions and delineation manuals remain. Growth and development continue to demand the conversion of natural landscapes for buildings, parking lots and other uses, making the preservation of wetlands a challenging task.

AUTHORITY'S APPROACH

The Authority determined that a comprehensive approach was necessary to protect Puget Sound wetlands. The 1987 Plan called for several actions to improve the regulatory system and to establish a non-regulatory program. It called for valuable wetlands to be identified and preserved in perpetuity through acquisition or other means, development of state standards for wetlands, local government wetland programs and protection of wetlands on state-owned lands.

Revisions in 1991 expanded the Wetlands Protection Program to call on local governments to adopt regulatory ordinances as required by the GMA, and to take additional measures such as using comprehensive planning to steer development away from wetlands, adopting preservation programs that include direct acquisition, financial incentives for landowners to preserve wetlands, restoration programs to restore lost functions of degraded wetlands, and education programs to gain community support for protection programs and to inspire stewardship.

Federal agencies are assigned a number of tasks associated with their respective programs and responsibilities towards Puget Sound wetlands in order to enhance their role in promoting wetlands protection.

3 Building Industry Association of Washington, et al. v. State of Washington, et al., Thurston Co. 91-2-02895-5, p. 13-14, 1993.

The 1994 Wetlands Protection Program includes increased flexibility for mitigation projects, a call for improved consistency in the design and monitoring of mitigation projects, a strengthening of the inventory and tracking element and an expanded restoration program.

PROGRAM GOAL

To ensure that: (1) federal and state agencies and local and tribal governments establish and coordinate programs to protect wetlands, and (2) in the short term there is no net loss of wetlands function and acreage, and in the long term there is a measurable net gain of wetlands function and acreage in the Puget Sound planning area.

STRATEGY

The strategy for achieving this goal is to: (1) preserve wetlands, either through purchase or some other mechanism; (2) develop and implement local government programs that meet the Authority's standards for protecting wetlands; (3) develop and implement a program for protecting wetlands on state-owned uplands and aquatic lands, including nearshore habitats; (4) develop and implement a long-range wetlands education strategy; (5) inventory wetlands to measure whether the goal of no net loss of wetlands (and, in the future, a net gain) is being met; (6) encourage interagency coordination and assign specific actions to federal agencies; and (7) restore wetlands.

PROGRAM ELEMENTS

W-1. Wetlands Preservation

1.1 Agency Coordination and Technical Support

State and federal agencies involved in wetlands regulations, preservation or restoration shall actively support the development of local non-regulatory programs, as defined in element W-2.1. Support shall be given through technical assistance and funding, when feasible, of local programs. Ongoing technical assistance should include specific guidance to: a) enable local governments to make non-regulatory programs that protect wetlands compatible with growth management planning; b) identify local funding mechanisms; and c) share information from existing programs in place around Puget Sound. Ecology shall have the lead role in providing assistance to local governments and coordinating agency efforts. As part of the guidance, Ecology shall develop a list of federal and state grant and loan money available for preservation efforts to distribute to local and tribal governments. Local workshops or other means should be used to distribute and share information. Agencies shall also work closely with and support the wetland preservation activities of Puget Sound land trusts.

Target Date: Ecology provides information and technical assistance on non-regulatory programs to all Puget Sound counties by July 1996 and to 15 selected cities by January 1997. Support from all agencies is ongoing.

1.2. Identification of Wetlands to be Preserved

Ecology shall form an ad hoc working group with the departments of Natural Resources (DNR) and Fish and Wildlife, the Interagency Committee for Outdoor Recreation, tribal governments, other agencies, land trusts, and interested groups to identify a list of known significant, high-quality wetlands to be preserved. This work group shall establish guidelines and criteria for sites to be listed and ranked. Primary criteria should include biological significance and long-term viability; secondary criteria should include ability to coordinate site-specific preservation with other watershed protection efforts (element W-8 and element NP-2). The working group shall coordinate with the Natural Heritage Program at the DNR and other programs that may have identified high-quality sites.

The list should be continuously revised as new sites are identified and others deleted. Ecology shall maintain the list and distribute it to other agencies and interested groups annually.

Documentation shall accompany the list describing the size, location and general functions and values of the selected wetlands. The Authority shall review the wetlands preservation list and documentation of wetlands selected for preservation annually.

The work group shall seek to have wetlands on the preservation list included in other agencies' and groups' acquisition priorities, such as those of the U.S. Fish and Wildlife Service (USFWS), the National Park Service, the Department of Fish and Wildlife, The Nature Conservancy, the Trust for Public Lands, local land trusts, and the Washington Wildlife and Recreation Coalition. The goal is to achieve protection for all of the sites on the list through acquisition, conservation easements or other preservation strategies.

Target Date: First revised preservation list submitted to the Authority by February 1996 and subsequent revisions annually thereafter.

1.3. Coordinated Preservation and Long-Term Management

All state, federal and local agencies shall take actions necessary, including a vigorous attempt to seek funding, to preserve and protect in perpetuity those wetlands identified under element W-1.2. This is an ongoing program in which specific sites are protected as funds and other means of preservation become available. Preservation includes acquisition, purchase of development rights, conservation easements, designations of open space and other available methods. Ecology shall take the lead to coordinate preservation efforts for the subelement W-1.2 site list and shall work to recommend a preservation strategy for each site.

The DNR, in coordination with Ecology, shall consider using available funds to secure some of the wetland areas identified under subelement W-1.2. The DNR and Ecology shall seek other funds for long-term maintenance of acquired areas. The DNR may make grants to local governments and other entities wishing to sponsor projects to preserve wetlands.

The DNR and Ecology shall recommend a preservation strategy for each site that includes: (a) a technical rating of the value of site preservation; (b) the

urgency of the securing action; and (c) preliminary site management and preservation methods.

The DNR shall submit annual reports to the Authority and Ecology on its preservation and acquisition activities and, if necessary, make interim reports on areas where high-quality wetlands are known to be imminently threatened by degradation.

Funds appropriated to the DNR to carry out this program shall be expended consistent with the agencies' recommended strategy for preserving the site. All government and private entities are encouraged to use other appropriate funds available to them to acquire wetlands in accordance with each specific site preservation strategy.

After sites are secured, a detailed site management plan shall be developed and carried out by the owner or manager.

The DNR and Ecology shall provide technical advice and limited staff support to any agency, local government, tribal government, organization, or private party wishing to take the lead in preserving any site, including those not on the final list. State preservation actions should coordinate with and complement preservation programs of other federal and state agencies and private organizations such as The Nature Conservancy and Trust for Public Lands. Data on functions, values and acreages of all wetlands preserved under this program shall be provided to the Department of Ecology as sites are acquired for inclusion in the wetlands tracking system (element W-4) for measuring progress in achieving the wetlands program goal of no net loss of wetlands in Puget Sound.

Target Date: Initiate acquisition for most important sites as funds become available. Identify recommended preservation strategies for sites on the list by February 1996. Develop plans for site preservation and management as funding and other mechanisms become available. Ecology and the DNR shall submit annual progress reports to the Authority.

W-2. Puget Sound Local Government Wetlands Protection Programs

Each local government in the Puget Sound region should develop and implement a comprehensive wetlands protection program that includes regulatory and non-regulatory components and is consistent with the recommendations provided in this element.

Ecology and the DCTED shall assist local governments in their efforts to develop the necessary technical detail in their programs to achieve consistency with the Authority's recommendations.

The Authority, with technical assistance from Ecology, shall review and comment on wetlands protection programs established by local governments in order to encourage them to develop and implement effective programs to protect wetlands.

Local governments should use Ecology's Model Wetland Protection Ordinance and any updated version thereof in developing their comprehensive, wetlands protection program.

The provisions in this element are designed to be consistent with the deadlines and criteria of the Growth Management Act.

2.1. Local Government Wetlands Protection Programs

The goal of comprehensive wetlands protection programs established by local governments should be to ensure that in the short term there is no net loss of wetlands function and acreage, and in the long term there is a measurable gain of wetlands function and acreage in the local government planning area.

"Functions" refers to the beneficial roles served by wetlands, which include control and storage of flood water and stormwater runoff; water quality enhancement by removal of pollutants; groundwater recharge; prevention of erosion; sediment trapping; critical fish and wildlife habitat; open space; areas for scientific study and education; and recreation. Wetland functions and values provide public benefits, and are the reason for protecting wetlands against damage and destruction. Loss of wetland acreage is often related to loss of function and is easier to quantify. Therefore, "acreage" should be included as a second dimension of wetland loss.

The no net loss goal has been embraced by national and state efforts to protect wetlands. The National Wetland Policy Forum (1988) established the following policy goal:

> *To achieve no overall net loss of the nation's remaining wetlands base and, in the long term, to increase the quantity of the nation's wetlands resource base.*

The goal was incorporated into Executive Order 89-10 and the 1991 Puget Sound Water Quality Management Plan. The no net loss goal reflects the widespread concern that too many wetlands have been, and continue to be, lost in the Puget Sound region.

The wetlands protection program established by local governments should include the following methods of protecting and preserving wetland resources:

1. Comprehensive land-use planning
2. Preservation
3. Restoration
4. Regulation
5. Education
6. Program evaluation

1. Comprehensive Land-Use Planning

Local governments should integrate protection of wetlands into the development of comprehensive plans required by the Growth Management Act (GMA). The following are examples of how this can be accomplished.

Provisions for open space. Under the GMA, open space corridors must be identified within and between urban growth areas (UGA's). Open space should be located to protect wetlands whenever possible. In maintaining open space within UGA's, wetlands should be viewed as an incentive for achieving urban densities, not sacrificed to achieve them. Comprehensive plans should take special measures to protect wetlands in UGA's, including identification of prime wetland sites, providing policy protection, allocating funding for special costs, and designing compatible infrastructure.

Land-use element. The land-use element of the Growth Management Act calls for local governments to protect groundwater quality and quantity, and to provide for the cleansing of drainage, flooding and stormwater runoff which drain into the Puget Sound. Wetlands provide some of these functions naturally, and therefore should be protected from development. Local governments can achieve protection by excluding wetlands from the developable land base, or by using innovative land-use techniques to avoid impacts to wetlands within development zones. In addition, the comprehensive plan should include provisions for a wetland inventory. Wetlands may be components of identified recreation and open space lands, provided that allowed activities do not adversely affect wetlands and their protective buffers.

Capital facilities plan element. Funding should be provided to acquire prime wetlands which can not be adequately protected through other means.

Conservation plan element. Wetlands protection should be included as part of a conservation element. This element should survey available wetlands data and evaluate the potential for wetlands loss and needs for protection. Policies should be established for appropriate fee and less-than-fee open space acquisition, use of innovative land-use management techniques, public education about wetlands protection, restoration of degraded wetlands, and mitigation of development effects through project review.

Coordination among local governments. Comprehensive plans must be coordinated with adjacent jurisdictions, including tribes, and regional planning bodies. The plans should consider regional needs for wetlands protection. For example, the susceptibility of wetlands to degradation from excess stormwater and flood flows often requires interjurisdictional coordination.

Coordination with state and federal agencies. Local governments should coordinate wetlands protection programs with appropriate state and federal agencies, including those agencies that own or manage land within the local government's jurisdiction.

Coordination between mandatory functional plans. Comprehensive plans should consider interrelationships between shoreline master programs, locally developed watershed action plans, stormwater plans, comprehensive flood plain management plans, and other resource or issue-specific plans. These plans have land-use components which may impact wetlands protection.

Assessment of cumulative benefits and effects. An analysis of the cumulative benefits and effects of the comprehensive plan on wetlands should be included as part of the State Environmental Policy Act (SEPA) evaluation.

2. Preservation

Each local government should develop a preservation program to address the protection of significant wetlands and their protective buffer areas. Securing the wetlands in perpetuity can be accomplished using methods that include public acquisition and land trusts. Providing economic incentives for private landowners to protect their wetlands is another effective preservation method.

It is important for the wetlands preservation program to be consistent with, and to the extent possible, incorporated into the local government's comprehensive land-use plan. Wetlands preservation may be considered an innovative management technique under Section 9 of the GMA. This section requires local governments to use innovative techniques to conserve and protect critical areas, such as wetlands. The GMA also requires local governments to ensure the existence of "open space corridors" in urban growth areas. The programs established by local governments to preserve wetlands should include a strategy for preserving wetlands of high quality by designating them as open space corridors and securing the titles or conservation easements to such lands.

The local government preservation program should address the following methods of protecting wetlands:

a. Public acquisition

Local government preservation programs should be consistent with and complement the state acquisition program under subelement W-1.3. Wetlands appropriate for public acquisition should be identified by each local government. These may include regionally significant wetlands which have not been included in the state acquisition program, wetlands not adequately protected through regulation, and wetlands that serve a special community function and/or are locally significant. Once identified, these wetlands can be acquired in whole or part, as the availability of funds allows. Public acquisition efforts should also include provisions for managing these acquired wetlands. Management objectives should include the protection of the values, functions and acreage of the wetlands and associated buffers as well as the control of exotic and invasive species (such as purple loosestrife) and protection of native wetland vegetation.

b. Land trusts

Local governments should encourage private land trusts to promote wetlands preservation. A land trust is a non-profit organization whose purpose is to preserve open space within a specific geographic area. A variety of options may be used to assure protective stewardship of valued lands, such as wetlands. There are many local land trusts engaged in acquiring wetlands in the Puget Sound region. Each local government should encourage its community to work with existing land trusts, or to establish a land trust for wetlands

preservation, if needed. The success of land trusts will complement the efforts and reduce the financial burden to local governments with respect to wetlands acquisition.

c. Private stewardship

Landowners should be encouraged to protect wetlands by guarding against activities which may degrade wetland functions and values, by removing exotic and noxious plants which may damage the wetland ecosystem, and by enhancing degraded wetlands. Local governments may provide economic incentives to encourage and assist private stewardship of wetlands. This will reduce the financial burden that may be associated with ownership of undevelopable land, and help to ensure the continuation of public benefits from wetlands. Economic incentives may include reduced property taxes for wetland areas, density credits and transfer of development rights.

There are a number of state and federal agencies which can provide assistance to local governments in developing wetlands preservation programs, including the following: Department of Ecology[4], Department of Community, Trade and Economic Development, Washington Interagency Committee for Outdoor Recreation, Department of Fish and Wildlife, Department of Natural Resources, and U.S. Fish and Wildlife Service. Tribal governments may also be interested in forming active partnerships with local governments and in assisting in wetlands preservation. In addition, several non-profit, national organizations are promoting wetlands preservation efforts. Ducks Unlimited, Trout Unlimited, the Nature Conservancy, Land Trust Exchange, National Audubon Society, and the Trust for Public Land are a few of the more well-known organizations.

3. Restoration

Each local government should integrate restoration actions into its comprehensive, wetlands protection efforts to facilitate achievement of an overall gain of wetlands in its planning area. Restoration, although often considered a part of regulatory mitigation efforts, fills an equally critical, non-regulatory role. Wetlands restoration involves reestablishing a wetland's functional characteristics and processes that have been lost. Native vegetation should be used in all restoration projects, and provisions made for control of invasive and exotic species.

Assistance with the development of restorations programs can be obtained from Ecology, the EPA and USFWS. Actions should be consistent with and complement subelement W-8.2.

4 See "Wetlands Preservation, An Information and Action Guide," Department of Ecology publication No. 90-05. This booklet provides information on options for wetlands preservation, existing land trusts, and public organizations that can assist local governments. Pursuant to element W-1, a complete how-to-guide for establishing a local government wetlands-preservation program was published by Ecology in 1990.

4. Regulation

Each local government in the Puget Sound region must develop a regulatory program for protecting wetlands to meet the mandates of the GMA. The program should regulate land development and mitigate effects on wetlands.

The regulatory program should be designed to fit the specific needs of the local community.[5] Existing local permit programs, where available, may be used to prevent redundancy and to make the best use of existing resources.

If no appropriate program is available, or if existing programs do not adequately protect wetland resources, a new permit system should be developed. Local governments should refer to Ecology's Model Wetland Protection Ordinance for guidance on developing a regulatory program.

The basic elements which 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"

Each local government should provide a clear definition of "regulated wetlands" in their wetlands protection ordinance. This definition is important in determining the scope of the regulatory program.

For purposes of consistency within the Puget Sound basin, local governments should adopt the following definition of "regulated wetlands," which is similar to that used in Ecology's Model Wetland Protection Ordinance.

- Regulated wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.
- Swamps, marshes, bogs and similar areas are generally considered regulated wetlands.
- Wetlands created for mitigation and those modified for approved land-use activities are regulated wetlands.

5 Several local governments in the state have developed admirable wetlands-protection regulatory programs that are consistent with the Authority's recommendations. These programs may prove to be useful examples for local governments in the process of designing wetlands-protection regulation. Please contact the Authority's Wetlands Protection Program for more information regarding these existing programs.

- Ponds under 20 acres, including their submerged aquatic beds, are regulated wetlands.[6]

Artificial wetlands intentionally created from sites that are not wetlands, such as irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, should not be defined as "regulated wetlands."

This definition is consistent with the one used in the federal Clean Water Act and the state Growth Management Act, but has been broadened to include wetlands which are not adequately protected under the state Shoreline Management Act.

c. An established method of delineating wetlands

Local governments should incorporate into their wetlands protection ordinances, a method of determining the presence and establishing the boundaries of individual wetlands.

Ecology's Model Wetland Protection Ordinance references the "Federal Manual for Identifying and Delineating Jurisdictional Wetlands." The 1989 edition of the federal manual is currently being revised; until a new manual has been evaluated for use in Washington state, the 1989 manual should be used. The use of the 1989 edition is consistent with recommendations in the growth management regulations. Local governments in the process of designing regulations for wetland protection should contact Ecology for technical assistance regarding methods for delineating wetlands.

d. A method of categorizing wetlands

Local governments are required by the GMA to classify wetlands in their planning area. To meet this mandate, each local government should adopt a wetlands rating system which differentiates wetlands into categories according to specific characteristics (such as certain vegetative communities) or functional attributes (such as special habitat features). The wetlands rating system provides a basis for ranking efforts to protect wetlands and serves as a guideline for land-use management.

Management decisions that are based upon the rating system include the range of permitted activities, the width of the buffer zones, and the acreage replacement ratios for mitigation projects.[7] A wetlands rating reflects the sensitivity of an individual wetland, and thus provides developers with early notice of potential restrictions and limitations which may be placed upon a proposed

6 Wetlands (marshes, bogs and swamps) associated with lakes 20 acres or greater in size, streams with flows over 20 cfs, and all lands within 200 feet of Shorelines of the State (ordinary high water mark) are protected under the State Shoreline Management Act (SMA) (RCW 90.58). The SMA does not provide adequate protection to isolated wetlands and riparian wetlands associated with lakes and ponds less than 20 acres in size.

7 The wetlands rating system should also be used as a basis for selecting wetlands for acquisition, preservation and restoration purposes. The wetlands belonging in the category which reflects the highest value and function should be the primary targets for preservation efforts.

project. It is important for the rating system to be supported by clear and concise guidelines on how rating decisions are made.

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 Authority 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 which adversely affect wetlands and their associated buffers. These activities should be regulated through a permit system and enforced at the local level.

The Authority recommends that local governments adopt the definition of "regulated activities" used in Ecology's Model Wetland Protection Ordinance:

1. The removal, excavation, grading or dredging of soil, sand, gravel, minerals, organic matter, or material of any kind.

2. The dumping, discharging or filling with any material.

3. The draining, flooding or disturbing the water level or water table.

4. The driving of pilings.

5. The placing of obstructions.

6. The construction, reconstruction, demolition or expansion of any structure.

7. 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.

8. 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 to provide the following functions:

- Stabilize soil and prevent erosion.
- Filter suspended solids, nutrients and harmful or toxic substances.
- Moderate effects of stormwater runoff.
- Moderate system microclimate.
- Support and protect plant and animal species and their habitats.
- Discourage adverse human effects in wetlands.

Local governments should adopt standards which meet or exceed Ecology's Model Wetland Protection Ordinance standards for buffer-zone widths. Local governments which adopt different standards or allow case-by-case adjustment of buffer widths should explain the rationale of their decision in their next Biennial Report to the Authority. This explanation should address the concern that buffer-zone widths 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 functional value 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 (per Executive Order 90-04):

1. Avoid the impact altogether by not taking a certain action or part of an action.
2. 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.
3. Rectify the impact by repairing, rehabilitating or restoring the affected environment.
4. Reduce or eliminate the impact over time through preservation and maintenance operations during the life of the action.

5. Compensate for the impact by replacing, enhancing or otherwise providing equivalent or greater wetland functions.

6. 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:

1. Restoration - actions performed to reestablish a wetland's functional characteristics and processes that have been lost.

2. Enhancement - actions performed to improve the condition of existing degraded wetlands so that the functions they provide are of a higher quality.

3. 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:

- The type, function and wetlands rating of the original and the created or restored wetland.

- The size and location of the original and created or restored wetland.

- The length of time it takes for a created or restored wetland to approximate the characteristics of the original wetland.

- 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.

Ecology's Model Wetland Protection Ordinance includes replacement ratios for creation or restoration which are "in-kind, on-site, timed prior to or concurrent with alteration, and has a high probability of success." The model ordinance also provides guidance on how to adjust these ratios to address specific circumstances. These replacement ratios are based upon the best available scientific information. 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 element W-3.

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.

5. Education

Wetlands education can take many forms. Interpretive centers or trails can educate residents about local wetlands. A volunteer program can be used for many activities such as distributing educational materials, conducting wetland field trips or monitoring the health of wetlands. Wetlands education should also be brought into the local school system.

Educational materials should provide information on the values and functions of wetlands, the importance of wetlands preservation, methods for landowners to protect and preserve wetlands, and a basic overview of the local regulations regarding wetlands. Local governments should make use of materials published by Ecology and materials created pursuant to element W-7, Wetlands Education Strategy.

6. Program Evaluation by Local Government

Each local government should develop means of determining the success of their wetlands protection program. The program evaluation may involve inspection and reporting requirements to monitor the success of mitigation projects; a permit tracking system; measurement of acreage and functions of wetlands lost, and those enhanced, restored and created; a method of calculating (in quantitative and qualitative terms) the wetland resources preserved; and a means of evaluating educational efforts in raising the community's awareness with respect to wetland values.[8]

2.2. Assisting Local Governments In Their Efforts to Achieve Consistency with the W-2 Recommendations

1. The Authority, Ecology and DCTED shall provide assistance to local governments in developing comprehensive wetlands protection programs that are consistent with the recommendations in this element.

2. Local governments should adopt comprehensive land-use plans that are consistent with the Authority's recommendations.

3. Each local government shall provide the Authority with a copy of its draft comprehensive land-use plan during the local public comment period. The Authority, with assistance from Ecology and the DCTED, will review the draft plan and provide comments in order to assist the local government in its effort to achieve consistency with the Authority's recommendations. The Authority's review of the draft plan will be completed within the public comment period.

4. Local governments should adopt comprehensive, wetlands protection programs which contain regulatory and non-regulatory elements and are consistent with the Authority's recommendations.

5. Each local government developing or revising a wetlands protection program shall submit a copy of its draft program or revisions to the Authority during the local public comment period.

6. The Authority and Ecology shall review each local government's wetlands protection program during the public comment period. The Authority, with technical assistance from Ecology, shall provide written comments that describe how the proposed wetlands protection program may be modified to achieve consistency with the Authority's recommendations.

8 See "Monitoring Guidelines" (Guide Sheet 7) in *Development of Guidance for Managing Urban Wetlands and Stormwater*, Final Report, May 1991. Prepared by King County Resource planning Section Environmental Division.

7. Each local government that has enacted a wetlands protection program as of the date of adoption of this Plan element shall submit a copy of its program to the Authority within 90 days of the adoption date of this element. The Authority, with technical assistance from Ecology, shall provide recommendations for future revisions.

8. In the Biennial Report required by RCW 90.70.07(3), each local government shall describe its wetlands protection program and any revisions made during the relevant two-year period.

9. The Authority shall prepare periodic reports on local government efforts to protect wetlands in the Puget Sound region. In addition, the *State of Sound Report* shall include a comprehensive review of the wetlands protection programs established by local governments and their successes and failures. Local governments which are in compliance with the Plan, and those which are not, will be identified. Measures that must be taken to bring each local government into compliance will be specified.

2.3. Tracking Strategy for Local Government Wetlands Protection Programs

The Authority, Ecology and DCTED will work together to define local government responsibilities for providing information to contribute to Ecology's tracking system (see element W-4). This effort will include the development of reporting standards for local governments.

Target Dates: The Authority, with assistance from Ecology and the DCTED, will review and comment on draft comprehensive land-use plans, comprehensive wetlands protection programs and program revisions during the local public comment periods. The Authority will review all final programs established by local governments to protect wetlands for consistency with the Authority's recommendations set forth in this element.

W-3. State Agency Actions

The Authority, with assistance from Ecology, shall provide guidance where necessary to local governments in the preparation of development regulations for wetlands in relation to the Growth Management Act.

State agencies shall take the following actions in coordination with the implementation of Executive Order 90-04:

a. Ecology shall rigorously enforce authorities available to it under the federal Clean Water Act, including Sections 401, 402, 319, 320, and 305(b), and state laws and regulations, including but not limited to SEPA and the Shoreline Management Act, to protect wetlands in the Puget Sound basin to the maximum extent possible. This shall include granting, denying or conditioning of water quality certifications of all federal permits to protect wetlands.

b. Ecology, to the extent authorized by law, shall condition or deny water quality certifications under Section 401 of the federal Clean Water Act to prevent degradation of wetlands and shall re-evaluate Section 401 certification of nationwide permits affecting wetlands at such time as these permits are

revised by the Army Corps of Engineers or when the existing certification expires in 1997, whichever comes first.

c. Ecology shall ensure that water in wetlands is included in the State Water Quality Standards (Chapter 173-201 WAC), and shall explore the feasibility of further application of existing laws (especially RCW 90.48, Water Pollution Act) to protect wetlands.

State agencies shall promote the use of consistent guidance for the design, monitoring and enforcement of compensatory mitigation projects.

The departments of Ecology and Fish and Wildlife shall consider greater flexibility in the review of compensatory mitigation projects to allow for advanced mitigation (mitigation banking), joint mitigation projects, and off-site, out-of-kind projects where the proposed project would result in a greater benefit to the wetlands resource than in-kind, on-site mitigation. Off-site projects should be geographically limited to prevent a cumulative trade-off of wetland functions 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 consideration is given to the following: 1) project effects are proposed to low-quality wetlands with limited functions and values (e.g. monotypic stands of reed canarygrass); 2) on-site mitigation will be hydrologically isolated; and 3) critical habitat may be restored to a watershed through off-site mitigation. Agencies shall work with local governments to identify potential mitigation sites to be included in comprehensive plans.

W-4. Inventory and Tracking of Puget Sound Wetlands

In coordination with the Puget Sound Geographic Information System (element M-4), Ecology shall work with the departments of Natural Resources, Fish and Wildlife, Transportation, and Community, Trade and Economic Development, the Puget Sound River Basin Team, U.S. Fish and Wildlife Service, EPA, Corps of Engineers, and other appropriate entities and agencies to carry out the following tasks:

Establishing standards for inventories: Develop and promote a method for inventorying wetlands at the local level, and a standard for inventory data that is practical for use by local and tribal governments. The draft methodology and data standard shall be developed in collaboration with local and tribal governments and distributed widely for review before adoption. Once established, this inventory methodology should be promoted for use by those local and tribal governments in the Puget Sound basin that have not already done or are updating their wetlands inventories.

Local government training: Establish a training program for local and tribal governments to conduct wetlands inventories consistent with the standards developed. Workshops should be used to distribute and share information among local governments.

Compile inventory data: Inventory data developed at the local level and other agencies data will be compiled on Ecology's GIS (geographic information system) in order to evaluate Puget Sound wetlands resources. Inventory data

that are in a different or incompatible format shall be incorporated where practicable.

Restoration and preservation site identification: Identify potential restoration (in coordination with element W-8) and preservation sites (in coordination with subelement W-1.2) using the GIS database.

Tracking system for no net loss: Use existing inventories, permit tracking systems and other relevant information to establish a pilot monitoring system for evaluating the net losses and gains of wetlands within a given region. Where possible, the system should track effects and mitigation under Hydraulic Permit Approvals, Section 404 and 401 permits, shoreline permits, and local development and land-conversion permits.

Ecology, and participating agencies, shall submit an annual report to the Puget Sound Estuary Program Management Committee on progress in achieving the inventory goal.

Target Date: Ecology to develop a standard method for inventorying wetlands and formatting data by September 1996. Training workshops to begin by December 1996. Compilation of existing compatible inventory data finished by April 1996. Development of watershed assessment model finished by July 1997. Identification of restoration and preservation sites to occur as they arise in the course of the other projects.

W-5. Interagency Coordination and Federal Role

The Interagency Wetlands Review Board (IWRB) shall act as an oversight body to the implementation of the State Wetland Integration Strategy. The IWRB shall ensure that the recommendations from the SWIS work groups are carried out, to the extent possible, by state resource agencies.

Federal agencies shall implement the recommendations of the State Wetland Integration Strategy and undertake the following activities in support of the Puget Sound Wetlands Protection Program:

1. The Seattle District of the U.S. Army Corps of Engineers shall, where feasible:

   a. Ensure that public notices for permits under Section 404 of the federal Clean Water Act and Section 10 of the Rivers and Harbors Act include specific information, such as (i) the size of the wetland to be affected and any associated stream or other body of water; (ii) possible cumulative effects from the proposal in the watershed or estuarine/ nearshore habitat; (iii) a mitigation plan summary based on the system of mitigation sequencing in Chapter 197-11 WAC; and (iv) whether an alternatives analysis is available.

   b. Address the cumulative effects of wetlands losses under the nationwide permit program, applying its discretionary authority to require individual permits for proposals in watersheds in the Puget Sound basin where wetland losses exceed wetland gains.

c. Ensure that 404 permit applications are approved only when they are consistent with state wetlands guidelines and local government wetlands protection programs (element W-2), unless state and local regulations are less protective of wetlands than Corps requirements.

d. Develop partnerships with other federal and state agencies and local and tribal governments to conduct special-area management planning[9] and advanced identification in the Puget Sound basin.

e. Actively seek opportunities for creating and restoring wetlands in Puget Sound.

f. Take whatever action is possible to incorporate local and state comments into the products of the Nationwide Permit Task Force, which is currently considering revisions to the nationwide permit process, and where possible seek local and state involvement in the scheduled review of the nationwide, permit review process in 1997.

g. In administering Nationwide Permit #26, use its discretionary authority to require regional conditions, individual state water quality certifications, or individual Corps Section 404 permits for proposed wetland fills in the Puget Sound basin to ensure the goals of the Wetlands Protection Program are met.

2. The U.S. Fish and Wildlife Service shall, where feasible:

a. Provide challenge grants to state agencies and Puget Sound local governments and private entities for wetlands acquisition, restoration and enhancement projects in coordination with subelement W-1.3 and element W-8.

b. Provide challenge grants or funds for, and participate in, wetland inventories consistent with the state inventory strategy for the Puget Sound basin, and status and trends studies.

c. Provide technical assistance to other federal and state agencies, and local and tribal governments in Puget Sound on fish and wildlife use of wetlands habitats, impact assessment, and mitigation planning.

d. Participate with the Corps of Engineers in the development of special-area management plans in the Puget Sound basin.

e. Assist Ecology in the preparation of the biennial report to the Authority on progress in achieving the goals of no net loss of wetlands in the short term and a measurable net gain in the long term.

9 Special-area management planning is a term used by the U.S. Army Corps of Engineers to describe a collaborative, interagency planning process within a geographic area of special sensitivity. The planning process results in a detailed and comprehensive statement of policies, standards and criteria to guide public and private users of lands and waters.

3. The Environmental Protection Agency shall, where feasible:

   a. Provide technical assistance and funding to Ecology and other state, federal and local agencies in their wetlands protection activities, including the continuation of wetland conservation plans.

   b. Promote Ecology's use of the water quality certification process under Section 401 of the federal Clean Water Act to protect wetlands in Puget Sound.

   c. Develop partnerships with other federal and state agencies and local and tribal governments to conduct special-area management planning and advanced identification in Puget Sound.

   d. Provide technical assistance to other federal and state agencies and local and tribal governments in Puget Sound on fish and wildlife use of wetlands habitats, impact assessment, non-regulatory protection measures, and mitigation planning, through the wetlands conservation grants and other grant programs.

   e. Undertake a study of the implications and appropriateness of wetlands mitigation banking for the Puget Sound planning area. The study will identify the costs and benefits, from a resource conservation perspective, of wetlands mitigation banking, report on the overall potential of regional resources to achieve no net loss as a short term goal, and recommend strategies for mitigation banking. The EPA shall consult with federal and state natural resource agencies, local and tribal governments, and other groups and individuals as appropriate.

4. The Corps of Engineers, USFWS and EPA shall, where feasible:

   a. Provide funds for local government inventories consistent with the state inventory strategy for the Puget Sound basin; identify high-threat areas for which to target funding; research restoration and creation techniques and monitoring protocols; and conduct other studies necessary to achieve the goals of this program.

   b. Assist Ecology in preparing the biennial report to the Authority on progress in achieving the goals of no net loss of wetlands in the short term and a measurable net gain in the long term.

   c. Work cooperatively with other federal and state agencies and local and tribal governments to develop techniques for addressing cumulative effects of wetlands degradation and/or loss and functional assessments of wetlands.

   d. Participate with other agencies to educate the public about wetlands and provide wetlands delineation training.

   e. Provide timely comments or technical assistance on Section 404 permits in Puget Sound to ensure that impacts on wetlands are first avoided, then

minimized to the maximum extent possible prior to approval of compensatory mitigation.

f. Promote consistent guidance for the design and monitoring of compensatory mitigation projects to be used by state and federal regulatory and proprietary agencies.

g. Increase the level of enforcement of compensatory mitigation projects in order to achieve no net loss of wetland functions and values through the regulatory process.

h. Consider greater flexibility in the review of compensatory mitigation projects to allow for advanced mitigation (mitigation banking), joint mitigation projects, and off-site, out-of-kind projects where the proposed project would result in a greater benefit to the wetlands resource than in-kind, on-site mitigation. Off-site projects should be geographically limited in order to prevent a cumulative trade-off of wetland functions 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 consideration is given to the following: 1) project effects are proposed to low-quality wetlands with limited functions and values (e.g. monotypic stands of reed canarygrass); 2) on-site mitigation will be hydrologically isolated; and 3) critical habitat may be restored to a watershed through off-site mitigation. Agencies shall work with local governments to identify potential mitigation sites to be included in comprehensive plans.

Target Date: Federal assignments are ongoing and should be implemented as feasible. Annual meetings should occur with Authority staff and federal agencies.

W-6. Program to Protect Wetlands on State-Owned Lands

For state-owned uplands and aquatic lands managed by the Department of Natural Resources (DNR), the DNR shall use its authorities and programs to ensure that existing wetlands are preserved and protected.

At a minimum, the DNR's program for protecting wetlands on state-owned uplands and aquatic lands managed by the DNR shall:

- Inventory nearshore habitats (element M-2) and wetlands, including wetlands that would benefit from restoration. The DNR shall use data management systems for the inventory that are consistent, to the maximum extent possible, with the Puget Sound Geographic Information System Database management, the Wetlands Protection Program and the Ecology wetlands inventory under element W-4.

- Study the laws, regulations, policies and programs and their implementation pertaining to the DNR's upland and aquatic land management responsibilities to determine their effectiveness in protecting wetlands on lands under DNR management. The DNR shall propose amendments if needed.

- Coordinate with the Authority and Ecology to ensure that the DNR management programs for state-owned uplands and aquatic lands are at least as protective of, and consistent with, the Authority's local government wetlands protection programs (element W-2).

- Be consistent with local government development regulations and comprehensive plans adopted pursuant to the Growth Management Act.

- Consider the use of appropriate wetlands for educational purposes including development of interpretive programs and displays.

- Prepare a strategy and implement a management program for wetlands on state-owned uplands and aquatic lands in the Puget Sound basin. This program shall: (a) be implemented through the DNR's proprietary authorities for state-owned aquatic lands; (b) be based on the element W-4 wetlands inventory and the nearshore habitat inventory under element M-2, and on the Department of Fish and Wildlife's Marine Fish Program results, where appropriate; (c) address habitat protection; (d) consider use of appropriate wetlands for educational purposes, including development of interpretive programs and displays (in coordination with element W-1 and with the wetlands education strategy (element W-7)); and (e) include review of key regulatory actions of other agencies, use of appropriate conditions in aquatic lands leases, and withdrawal of critical aquatic-land areas from leasing.

Progress Report. The DNR shall submit a biennial progress report to the Authority that describes its program for preserving and protecting wetlands on lands managed by the DNR. At a minimum, the report shall include:

- A summary of the programs for protecting wetlands on state-owned uplands and aquatic lands managed by the DNR.

- The types and values of wetlands inventoried on state-owned aquatic lands.

- A description of the procedures developed for complying with local wetlands programs and subelement W-2.1 in the DNR's management of wetlands on state-owned uplands.

- The results of the study of laws, regulations, programs and policies pertaining to the DNR's land management responsibilities, including recommendations, if needed, for strengthening provisions for wetlands protection.

- An estimate of funding required to implement the overall Wetlands Protection Program for state-owned lands under DNR management.

Target Date: The DNR submits biennial progress reports to the Authority beginning April 1, 1995.

W-7. Wetlands Education Strategy

Ecology shall develop and implement a long-range wetlands education strategy that augments Ecology's existing wetlands education program. The strategy

shall involve entities and individuals possessing expertise in the field of wetlands education. These include staff from the U.S. Fish and Wildlife Service, the state departments of Natural Resources and Fish and Wildlife, the Governor's Council on Environmental Education, local and tribal government, and private non-profit conservation groups. The EPA shall assist Ecology in developing the strategy, shall carry out EPA programs consistent with the strategy, and shall use its enforcement program as an educational tool.

The strategy shall target local governments, as well as schools and the general public, groups such as landowners, professional and civic organizations, and interest groups. It shall address wetlands characteristics, functions, values, the Wetlands Protection Program, the need for training wetlands educators, and other important wetlands issues.

Ecology shall work with those federal and state agencies and groups mentioned above to implement the components of the strategy, which may include (a) guidebooks on wetlands protection techniques; (b) wetland resource teams; (c) model and site-specific interpretive programs in coordination with element W-1; and (d) public workshops and field trips. To the extent possible, public libraries shall be provided with wetlands education materials for their patrons.

Target Date: Ongoing.

W-8. Wetlands Restoration Program

8.1. Restoration Projects

Ecology, the EPA and USFWS, in consultation with other agencies, shall take action to implement, concurrently with the overall element W-8 program, an ongoing restoration program for specific wetland sites in Puget Sound. Potential restoration projects shall be assessed, in part, on each site's potential to:

- Contribute to the replacement of critical wetland systems within a watershed.
- Contribute to the enhancement of overall watershed system function.
- Address the removal of exotic plant species (reed canarygrass, *Spartina alterniflora,* purple loosestrife).
- Develop partnerships with a diverse group of public and private interests.
- Contribute to solving nonpoint sources of pollution.
- Remain protected in its natural state as evidenced by local government wetlands protection policies.

8.2 Program Development and Implementation

The departments of Ecology, Natural Resources, and Fish and Wildlife, shall coordinate with the EPA, USFWS, the U.S. Army Corps, tribes, and others to form a work group to develop and implement a program to restore wetlands in

the Puget Sound basin. The goal of the program is to solve appropriate watershed problems (including flooding, habitat loss, water quality degradation, stormwater management, nonpoint source pollution, etc.) through the restoration of natural wetland systems that have been lost or degraded as a result of human activities.

Puget Sound watersheds shall be assessed for restoration needs and potential based on a method established by the existing restoration work group. The methodology shall include:

- Assessment of specific ecological problems associated with human development which have led to a loss of watershed system function.
- Development of a list of sites that are appropriate for restoration projects, including those sites identified by local governments under the local planning process established in subelement W-2.1.
- Identification of potential wetland restoration activities that would contribute to solving identified problems.
- Development of a diverse base of public and private support for wetland restoration.
- Consideration of the long-term potential for protection through local government ordinances and policies.

High-quality sites identified within a watershed as potential preservation sites should be referred to the preservation work group (subelement W-1.2). Watershed-level restoration efforts should be coordinated with habitat protection and restoration activities (element H-2) and local watershed planning (element WP-2).

Target Date: The departments of Ecology, Fish and Wildlife, and Natural Resources, the EPA, USFWS, and Army Corps of Engineers to present the overall program progress to the Authority by May 1, 1995. Watershed assessment in targeted watersheds will be ongoing. Restoration projects will be undertaken as funding becomes available.

W-9. Wetlands Research

A technical working group, comprised of wetland researchers, agency representatives, members of professional wetlands groups such as the Society of Wetland Scientists, and other interested persons shall convene on a regular basis to address issues of needs and priorities for wetlands research.

Some prioritization of research has occurred through the Puget Sound Research Committee and the Society of Wetland Scientists. These efforts should be reviewed, updated and recirculated more broadly to establish consensus and to promote priority needs to funding sources.

The working group shall also consider a process for adopting a standardized functional assessment methodology for Puget Sound wetlands, and promote this effort.

The efforts of this working group should be coordinated with the efforts of the Research Program, which focuses more broadly on research priorities for Puget Sound.

MAJOR PUBLIC ACTIONS FOR AUTHORITY REVIEW

1. Ecology's preservation list (subelement W-1.2).
2. The DNR's program for wetlands on state-owned land (W-6).
3. Ecology's wetlands education strategy (element W-7).
4. Wetlands restoration program (element W-8).

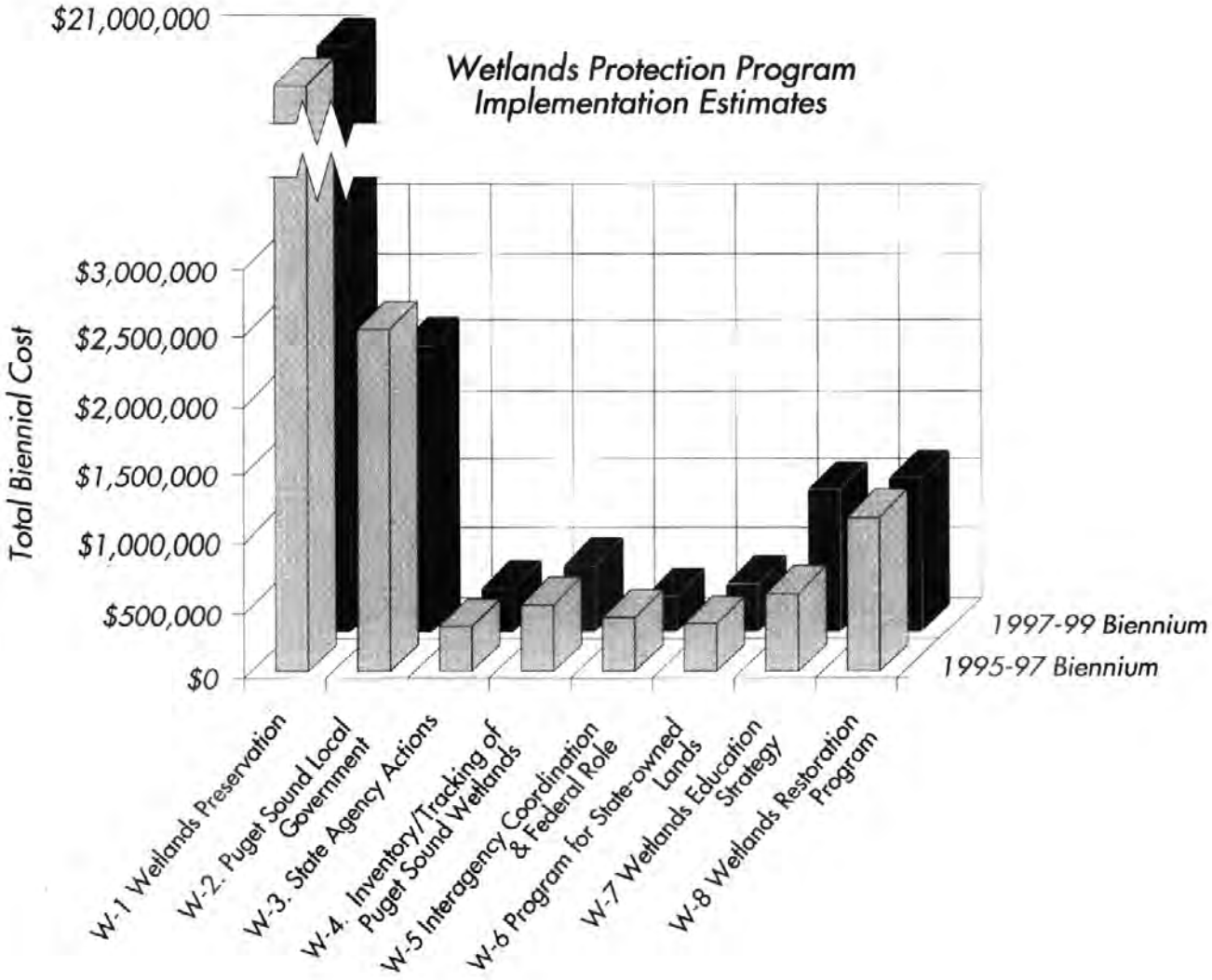
LEGISLATION REQUIRED

Some amendments to existing statutes may be recommended to provide funding for local government wetlands programs and to implement other aspects the program.

ESTIMATED COST

Fully implementing the Wetlands Protection Program is estimated to cost $26.7 million during the 1995-97 Biennium and $26.4 million during the 1997-99 Biennium. Twenty million dollars of these costs are targeted to acquire priority wetlands. The remainder would be directed at managing the wetlands acquired and those located on state lands, assisting local governments in developing and implementing wetlands-preservation strategies, developing and maintaining an inventory of Puget Sound wetlands, educating the public about wetlands, and conducting wetlands restoration efforts. Much of the planning by local governments to preserve wetlands that is called for in the Plan is expected to occur under their growth management planning efforts.

The private sector will also experience costs associated with this program. For instance, there will be costs associated with performing wetlands mitigation projects as part of construction permits and there will be some land that will be undevelopable as a result of wetlands being present. These private sector costs are not estimated as part of the program costs. There are also certain financial advantages of having wetlands on ones property that are also not included. For instance, the City of Bellevue provides a major stormwater fee reduction for property owners who preserve wetlands, and wetland owners can also qualify for conservation easements to reduce their property taxes.


Wetlands Protection Program
Implementation Estimates
Total Biennial Cost
$21,000,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$0
1997-99 Biennium
1995-97 Biennium
W-1 Wetlands Preservation
W-2. Puget Sound Local Government
W-3. State Agency Actions
W-4. Inventory/Tracking of Puget Sound Wetlands
W-5 Interagency Coordination & Federal Role
W-6 Program for State-owned Lands
W-7 Wetlands Education Strategy
W-8 Wetlands Restoration Program

MUNICIPAL AND INDUSTRIAL DISCHARGES PROGRAM

PROGRAM ELEMENT DIRECTORY

PROBLEM DEFINITION

Industries and municipal sewage treatment plants release about 900 million gallons of waste water, or effluent, to Puget Sound every day.[1] Municipal and industrial wastewater discharges are often referred to as "point sources" of pollution because they are discharged to water bodies at a specific point by a pipe or ditch.

1 This volume would cover an area of 4.3 square miles to a depth of one foot. It is approximately equal to the average daily discharge of the Green/Duwamish River.

Continuing efforts to control conventional pollutants from point sources[2] with wastewater discharge permits have proved increasingly successful. Water quality problems related to these pollutants are now relatively rare in Puget Sound.[3]

Toxic pollutants are a greater threat to Puget Sound. Of greatest concern are toxicants that are persistent (existing long enough to accumulate and cause harm) and those that concentrate in sediments and organisms and are passed through the food chain.

Many toxicants discharged by point sources bind to particles and settle out to become part of the sediment layer. The concentration of toxicants found in recent sediments from Puget Sound's urban bays is up to 100 times the levels in the cleanest rural bays. Toxicant concentrations in sediments from the central basin and rural bays are much lower but are still elevated over pre-industrial levels. Lesions, tumors, inhibited reproductive cycles and other adverse biological conditions have been associated with high concentrations of toxic contaminants in urban bays. Because humans are part of the food web, toxic substances may also pose health risks to those who eat Puget Sound seafood.

Current effluent monitoring is insufficient to accurately estimate toxicant contamination from point source discharges relative to other sources such as storm water, combined sewer overflows (CSOs) and nonpoint sources of pollution. Approximately half the toxics loading in Puget Sound is estimated to be from municipal and industrial point sources, while the other half may be related to nonpoint pollution sources such as storm water, household hazardous waste and runoff from improper agricultural activities.

Industrial pretreatment programs are designed to remove many of the toxicants before they enter municipal treatment plants. Without pretreatment, toxicants can interfere with plant operation, expose workers or equipment to damaging substances, and pass through the system to contaminate a water body, the air or sludge.

While toxic pollution of sediments has become a dominant concern, recent reports show that the surface of marine waters, or the microlayer, may be contaminated with toxicants in sufficient concentrations to kill or cripple larvae and fish eggs[4]. The water column also sometimes shows toxicant concentrations that exceed the U.S. Environmental Protection Agency's (EPA) criteria for protecting marine life from adverse chronic effects.

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2 The federal Clean Water Act divided pollutants into categories with varying requirements. Conventional pollutants are oxygen-depleting substances, suspended solids, fecal coliform bacteria, pH, and oil and grease. Toxic pollutants include 13 heavy metals, 111 organic compounds (such as pesticides and polychlorinated biphenyls, or PCBs), asbestos, and cyanide. All other pollutants are classified as nonconventional pollutants.

3 Water quality problems related to conventional pollutants from point sources in Budd Inlet are an example of an exception to this generalization. Overflows from combined sewers are another exception. Where such problems do occur, they are generally localized and transient.

4 EPA, 1990. Puget Sound Microlayer Workshop: Summary Report. EPA 910/9-90-008.

The rate of sediment contamination by some highly regulated toxicants (e.g., lead, pesticides such as DDT and industrial compounds such as PCBs) is decreasing. However, the same cannot be said for all toxicants. Without continuing efforts to address this problem, toxic contamination may become more severe as population and industrial activity increase. The persistence of many toxic substances makes restoration or contaminated waters difficult.

INSTITUTIONAL FRAMEWORK

The 1972 federal Clean Water Act established the institutional framework for controlling municipal and industrial discharges by declaring national water quality goals and creating the National Pollutant Discharge Elimination System (NPDES) permit process. The Department of Ecology was delegated authority to administer NPDES permits in 1973.

Under the system to control point sources of pollution: (1) a permit is required for any point source discharge; (2) the permit establishes specific limits on the quantity and concentration of contaminants allowed to be discharged (or on the overall toxicity of the effluent), together with other requirements (for monitoring, spill prevention and others); (3) dischargers must monitor their effluent and report compliance with the conditions of the permit; and (4) the administering agency periodically inspects the facility and takes enforcement action as necessary. Effluent limits in permits must include minimum technology-based limits (generally based on criteria of best available technology from federal law or all known, available and reasonable methods of treatment from state law) plus more stringent limits where necessary to meet state water quality standards.

In 1986, the permit system for point source discharges was in place, but not working effectively because of weaknesses at many points in the regulatory system. The problems ranged from poorly trained permit writers to lack of enforcement and a need for improved regulations and guidelines.

As of 1994, many of the problems in the permit system have been addressed, with a few exceptions, such as a lack of felony provisions for serious, intentional violations. Ecology's activities have emphasized: (1) developing criteria, guidance and procedures necessary to set new standards and improve permits; (2) initiating more frequent sampling inspections for certain types of dischargers; (3) training permit writers; (4) implementing new permit-free laws that increase program resources; and (5) managing major and complex changes to the program.

The federal Clean Water Act (CWA) and Washington state law have established a strong institutional framework for controlling municipal and industrial discharges. Direct dischargers must obtain a NPDES permit from the Department of Ecology (Ecology) for nonfederal facilities or the EPA for federal facilities. Ecology also administers state permits for discharges to sewers (and related pretreatment requirements) and to the ground.

Protection against toxic releases is called for under Section 101 (a) (3) of the Clean Water Act, which states that, "it is the national policy that the discharge of toxic pollutants in toxic amounts shall be prohibited." The CWA and EPA

regulations authorize and require the use of an integrated strategy to address toxic pollutants. This integrated strategy involves the use of three control approaches: chemical-specific effluent limitations, whole-effluent toxicity limitations, and biological assessment of the receiving environment.

AUTHORITY'S APPROACH

In the 1987 Puget Sound Water Quality Management Plan (Plan), the Authority identified a number of weaknesses in the management of municipal and industrial discharges and called for a series of changes throughout the permit system. The program also emphasized control of toxicants from municipal and industrial discharges.

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.

STRATEGY

The strategy for achieving this goal is to: (1) require that all waste discharge permits include appropriate monitoring requirements and limitations on toxicants and other pollutants of concern; (2) 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; (3) allocate substantially increased resources to urban bay action teams and pretreatment; (4) devote substantially increased resources to the inspection and enforcement of waste discharge permits for industrial and municipal dischargers; and (5) discover and control unpermitted discharges.

PROGRAM ELEMENTS

Standards

P-1. Adopt EPA Water Quality Criteria

To assure better control of toxicants, Ecology shall adopt numerical water quality criteria which are relevant to Washington state and equivalent to those published in the EPA's Quality Criteria for Water (for the protection of aquatic life). These criteria may be adopted by reference, after which a summary of the criteria (including the numerical values) shall be appended to copies of the state water quality standards distributed by Ecology. As the EPA adds toxicants or updates toxicant limits in its Quality Criteria for Water, Ecology shall similarly update the state water quality standards no later than the next triennial review of these standards 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: (1) implementation procedures for an antidegradation policy, and

(2) biocriteria which are consistent with EPA national guidance. Ecology shall submit draft biocriteria to the Authority for comment.

Target Date: Updates to be completed as appropriate for Ecology's triennial reviews.

P-2. Standards for Classifying Sediments Having Adverse Effects

Ecology shall develop and adopt, 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. The standards may use physical, chemical and biological tests, and shall clearly identify pass and fail standards for the prescribed tests. Because methodologies to assess the human health risks of chemical contamination of sediments are not well developed, the initial standards may deal only with adverse effects on biological resources. The standards shall be revised to incorporate information on human health risks as it becomes available. Ongoing work by the EPA and the Puget Sound Dredged Disposal Analysis (PSDDA) to develop sediment quality values may be used as the technical basis for these standards.

Various technical and legal issues will be considered by Ecology during the development of these standards, including the selection of appropriate methods for measuring or predicting harm, the relationship of these standards to existing state and federal permit programs, and the possible need to allow sediment mixing (or impact) zones.

In developing these sediment standards, Ecology shall form an advisory committee which shall include representatives of environmental and public interest groups, ports, industry, appropriate state and federal agencies, and local and tribal governments.

The standards shall be reviewed and updated as necessary, at least every three years. If apparent effects threshold (AET) values are used as a basis for establishing the standards, the AET values shall be recomputed periodically to incorporate new data.

Ecology shall use these standards as the desired goal for sediment quality in implementing the Municipal and Industrial Discharges Program (see element P-7), the Stormwater and Combined Sewer Overflows Program (element SW-2), and the Nonpoint Source Pollution Program. These standards shall also be used as a basis to manage the disposal of dredged material (elements S-3 and S-4), and to identify locations with sediment contamination (elements S-7 and S-8). In implementing these programs, Ecology will consider other appropriate factors, including the availability and reasonableness of treatment and control methods. This consideration of other factors may prevent this goal from being achieved in the near term. In particular, municipal, industrial, and stormwater discharges, and combined sewer overflows (CSOs) may not be able to meet these standards initially without the application of sediment mixing (or impact) zones (elements P-3 and P-6).

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 PSDDA open-water disposal sites (element S-3) or the requirements for confined disposal to be developed under element S-4 (which may include in-water as well as upland disposal methods). Sediments that exceed the sediment standards shall not be used as cap material for dredged-material disposal or remedial actions.

Ecology may determine that it is not cost-effective to cap, treat or remove all sediments that exceed the standards developed under this element. Ecology may identify higher (more contaminated) levels that would result in cleanup actions or define cleanup levels (element S-7).

Target Date: Human health criteria for sediments shall be adopted by December 31, 1995. Implementation of the standards shall be ongoing.

P-3. Water Column and Sediment Mixing-Zone Criteria

[This element has been completed. Water column mixing-zone requirements have been adopted in Chapter 173-201A WAC and sediment impact-zone requirements have been adopted in Chapter 173-204 WAC.]

P-4. Discharger Fees

4.1. Revised Permit Fee Rule

Ecology shall 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.

4.2. Variable Permit Fee Study

[This subelement has been completed.]

4.3. Efficiency Report

Ecology shall continue efforts to improve efficiency and streamline the permit program while still ensuring a high degree of environmental protection.

4.4. Aquatic-Lands Leasing Rate

The Authority encourages the Department of Natural Resources (DNR) 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.

Target Date: Subelement 4.3: Ecology submits efficiency reports per schedule set by Efficiency Commission. Subelement 4.4: Authority encourages the DNR to review the aquatic lands leasing program by December 31, 1994.

P-5. 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 which ensures: (1) development of consistent policies and communication of them to all permit writers in the Puget Sound basin; (2) implementation quality assurance reviews of permits prior to issuance; (3) coordination and resolution of cross-program issues; (4) acceptance of permit applications from dischargers only if they are fully complete; (5) equally stringent requirements for municipal and industrial permits to the extent practicable; and (6) implementation of pollution prevention through waste minimization.

5.1. 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 and used by permit writers in determining appropriate effluent limits, particulate contamination limits (element P-7), 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 addressing all stormwater runoff from permitted facilities. Procedures for coordination of permits with the urban bay action plans (element P-13) shall also be included. The permits shall also address any significant issues raised in the fact sheet (subelement P-6.2).

The permit writers manual shall incorporate other requirements of the 1994 Plan related to permit writing, including water quality and sediment standards (elements P-1 and P-2); enhanced information in public notices and fact sheets pertaining to draft permits (element P-6); particulates and solids (element P-7); monitoring requirements, including provisions for tiering (element P-8); spill control (element P-9); explanation of changes in discharge limitations (element P-10); 401 certifications (element P-11); assuring inspection access, assuring that inspection results are provided to permit writers and that permit modifications are made if necessary (element P-14); pretreatment program enhancements (element P-22); and pollution prevention through waste minimization (element P-27). 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 Plan were met and procedures in the permit writers manual were followed during preparation of the permit.

5.2. Technical Assistance and Quality Control

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

5.3. Inspector's Manual

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

5.4. 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-26).

5.5. NPDES Rule Revision

Ecology shall revise or adopt rules governing NPDES permits (WAC 173-220, WAC 173-205) to include the Plan's permit improvements as appropriate.

Target Dates: Subelement 5.1: Permit writers manual updated as necessary. Subelement 5.2: Complete and submit to the Authority for approval the comprehensive permit quality control and internal, technical assistance plan by June 30, 1995. Complete implementation by June 30, 1996. Subelement 5.4: Agencies and tribal governments initiate review of permits by December 31, 1995.

P-6. Toxicant Effluent Limits in Permits

6.1. Discharge Limits

The objective of toxicant effluent limits in permits is to control the sources of toxicants in wastewater discharges through the use of all known, available and reasonable methods of treatment.[5] In issuing or reissuing NPDES or state waste discharge permits, Ecology permit writers shall follow the procedures set out in the permit writers manual developed under element P-5, and shall review the dischargers' operations and incorporate permit conditions which 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.[6] At a minimum, discharge limits, including an appropriate mixing zone, shall be established for all toxicants which 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.

Permit writers shall take into consideration, subject to Ecology policy, the background levels of pollutants in setting discharge limits. For stormwater runoff, Ecology shall determine appropriate discharge limits which are based on best management practices implemented to the maximum extent practicable and consistent with state and federal law.

6.2. Fact Sheets and Public Involvement

The objective of enhancing the fact sheets is to facilitate meaningful public review. In the fact sheet accompanying each draft major permit, 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

5 Ecology has considered the following criteria, among others, in determining reasonable methods: (1) status of planning needed to proceed with the proposed method, (2) environmental or siting constraints, and (3) economic factors. The Pollution Control Hearings Board has upheld Ecology's use of these criteria and confirmed that water quality considerations are irrelevant to the selection of the technology to be imposed (see PCHB Nos. 84-178, 84-206, 84-211).

6 Significant amounts may be determined from the permit application or monitoring results, or may be expected from land-use types, pretreatment evaluations, best professional judgment, technical literature, and sediment, water quality or ambient environmental problems.

and/or overall effluent toxicity should be included in the permit (also see element P-28, Reporting Requirements). It is the Authority'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 which 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.

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

Target Date: Subelements 6.1 and 6.2: Ongoing activity.

P-7. Particulate Contamination and Solids Handling

7.1. Particulate Contamination in Effluents

For purposes of addressing particulate contamination in NPDES permits, Ecology shall research and shall obtain and review information on particulate contamination in the applicants' effluents (looking at similar data for comparable effluents) and shall include specific conditions which 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 Ecology. Major permits shall be written with conditions that address particulate contamination consistent with the procedures contained in the chapter of the permit writers manual on sediments.

The EPA shall carry out this element with respect to every NPDES permit issued by the EPA in the Puget Sound basin (see also element P-11).

7.2. Solids Handling and Disposal

NPDES, pretreatment and federal facilities permits shall include solids handling and disposal plans which 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.

Ecology shall evaluate the current disposal and utilization mechanisms, laws, policies and issues relating to municipal and industrial dischargers' sludge, including biosolids and solid by-products. For material to be managed as

biosolids, Ecology shall develop guidelines for managing biosolids and shall promulgate a "biosolids management rule" that incorporates changes needed to implement federal standards for the use or disposal of sewage sludge. Ecology shall also prepare a report to ensure proper handling of other types of sludge. In preparing the report, Ecology shall involve local governments and other interested parties. The report shall address: (a) municipal sludge not managed as biosolids; (b) pretreatment sludges; (c) land disposal of contaminated sediments (element S-5); (d) vactor waste solids recovered when maintaining stormwater drainage (element SW-3); (e) changes needed to state statutes and rules; (f) coordination with NPDES, pretreatment and stormwater permitting programs; (g) technical assistance to landfill permitting authorities and NPDES and pretreatment permit writers; and (h) adequately overseeing and enforcing proper solid waste disposal and utilization.

Target Date: Subelement 7.1: This element shall be initiated by June 30, 1992 and shall be ongoing thereafter. Subelement 7.2: Complete biosolids management guidelines by March 31, 1995. Complete biosolids management rule adoption by March 31, 1995. Submit report to Authority by June 30, 1996. Continue phasing into permits and complete by June 30, 1999.

P-8. Monitoring Requirements in Permits

In issuing, modifying or reissuing NPDES permits (municipal, industrial and storm water), Ecology 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 initial (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.

Ecology shall develop (and revise as necessary) guidelines for the frequency and methodology of these tests and for reporting requirements and format. The guidelines shall include the tiered approach described above.

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. 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, the EPA, the Authority, and others as appropriate.

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. 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 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:

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

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

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

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

5. 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.

If, for a given test, Ecology finds that there is no analytical protocol reasonably available, or if there is no public or private laboratory capable of carrying out the test, Ecology may suspend the testing requirement for that test until such time as such a protocol and/or laboratory capability becomes available. Ecology shall promote the development of protocols and laboratory capability in cases where these are not available for the types of monitoring tests listed earlier (see also elements L-1 and L-2). If a discharger believes there is no protocol reasonably available, they may request a review of it by Ecology. Ecology shall then report the results of the review to the Authority.

Ecology, in cooperation with the EPA, shall prepare a list of the highest priority permits (based on the probability of effluent containing a significant

quantity of toxic pollutants of concern) to be reopened prior to expiration for inclusion of these monitoring requirements. Ecology shall submit this list to the Authority with a schedule for completion of permit modifications to include these requirements.

Every major and minor permit issued or reissued by Ecology before the monitoring guidelines are implemented shall include a "reopener provision" allowing modification of the permit to incorporate monitoring requirements in accordance with this element. Every permit issued or reissued by Ecology shall include a reopener clause allowing Ecology 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. the EPA shall include similar reopener provisions in every NPDES permit issued by the EPA in the Puget Sound basin.

Target Dates: Include reopener language in all permits issued or reissued after March 31, 1987. Continue to include appropriate monitoring requirements in permits issued or reissued after December 31, 1988. Submit a list of high-priority permits and a schedule for completing modifications by June 30, 1995. Review the monitoring guidelines and update annually as necessary.

P-9. Spill Control Plans Required

Every major permit issued or reissued, and minor permits as appropriate, shall include conditions requiring 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: (1) track and improve requirements in dischargers' spill control plans; (2) follow up on and improve upon dischargers' compliance with spill control plans; and (3) ensure adequate staff to perform on-site compliance inspections for spill control plans and to 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: Ecology shall incorporate improved spill control plan requirements into new and revised permits on an ongoing basis.

P-10. 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 implementing this program element. (See also element P-28)

Target Dates: The notification and explanation process are ongoing activities.

P-11. Enhanced Requirements for EPA-Issued Permits and Ecology Certifications

11.1. 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 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.

11.2. 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 numeric limits and other conditions required to comply with all applicable water quality and sediment standards and other elements of this 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: This element shall be applied to Ecology 401 certifications in a phased manner, beginning April 30, 1988. All appropriate guidance from the permit writers manual (element P-5), monitoring guidelines (element P-8), and sediment standards (element P-2) shall be used as those products are completed.

P-12. Reevaluate Allocation of Permits into Major and Minor Categories

The EPA shall give special consideration to early completion of its re-evaluation of the major and minor permit classification for permits in the Puget Sound basin. Ecology shall communicate to the EPA any discrepancies it is aware of in the classification of permits in the Puget Sound basin. As soon as is feasible, Ecology shall use its discretionary authority to reclassify, where appropriate, minor dischargers to majors and upgrade their permits, along with EPA-reclassified majors.

Target Date: Complete upgrading of reclassified major permits by June 30, 1996.

Compliance Assurance

P-13. Urban Bay Action Teams (UBATs)

The Authority recognizes the urban bay approach as an essential part of a comprehensive strategy to control sources of toxic pollution and requests the EPA to continue providing resources for the urban bay programs. Additional support for the sediment-related tasks of the urban bay action teams is contained in the Contaminated Sediments and Dredging Program (element S-8).

For each area where an urban bay program is undertaken, an urban bay action plan shall be prepared that describes conditions and problems in the study area and contains an integrated program of actions to be undertaken by federal and state agencies, local and tribal governments, and dischargers to solve problems (see also subelement S-8.4). Federal and state agencies and local and tribal governments shall implement their portion of the adopted UBAT plans. Each urban bay action plan shall be reviewed by the Puget Sound Estuary Program (PSEP) Management Committee, and following such review, the plan shall be transmitted to the Authority. Ecology shall report on the progress of the UBAT programs in the written and verbal reports required in element P-28.

Ecology shall track progress toward implementation of each UBAT program. For those UBAT programs for which Ecology is the lead agency, Ecology shall ensure coordination and consistent implementation among the programs. UBAT coordination shall include an evaluation and resolution of barriers to the success of the UBATs.

Target Dates: Submit each urban bay action plan to the PSEP Management Committee when completed.

P-14. Inspections

Ecology shall conduct a significant number of Class I inspections[7] 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 prearranged means for Ecology inspectors to obtain unannounced samples of effluent on a 24-hour basis.

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

7 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

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 (including lab data, see element P-16) 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-28, Ecology shall submit a report to the Authority 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: Ecology to meet the inspection schedule when full funding becomes available.

P-15. Study of Independent Verification of Self-Monitoring

Ecology shall submit an assessment report to the Authority on the adequacy of self-monitoring by dischargers based on review and comparison of monitoring data reported by dischargers and similar data obtained from effluent samples collected during Class II inspections of major dischargers. The report shall conclude whether or not there are major discrepancies in self-monitoring data.

If major discrepancies are found, Ecology shall submit to the Authority the results of a study evaluating alternative methods of carrying out independent verification of self-monitoring reports submitted by dischargers, together with Ecology's proposed plan, schedule and estimated costs for implementing a verification program. Possible methods to be evaluated may include combining the independent verification function with the quality assurance and quality control procedures specified under the laboratory certification program (see elements L-1 and P-16).

The study should also examine the possibility of arranging for an independent organization to conduct some or all of the monitoring activities (especially those involving sampling outside the effluent pipes—e.g., monitoring types 1, 4 and 5 listed under element P-8) for some dischargers in lieu of the individual dischargers performing this monitoring themselves, to be funded by a surcharge on the NPDES permit fee paid by these dischargers. The study shall estimate the amount of the fee surcharge that would be necessary to support this alternative and whether the overall cost to dischargers would be reduced. The study shall also address whether the quality of information derived under

such an alternative would be improved. This study shall not be construed as authorizing any delay in the implementation of the monitoring requirements described in this element.

Target Date: Submit assessment report by December 31, 1995; if applicable, submit alternatives study by June 30, 1996.

P-16. Lab Support and Certified Labs for Self-Monitoring

Ecology shall ensure that its own laboratory adheres to the Quality Assurance Management Plan described in element L-4.1 and provides timely turnaround of samples to inspectors on all compliance samples associated with the discharge permit program, as specified in the laboratory capacity plan (element L-2).

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 (QA/QC) procedures (see Laboratory Support Program). Before implementing this requirement of permittees, Ecology shall ensure that the laboratory certification program is operational (element L-1) and that a sufficient number of certified labs are available to carry out needed analyses. Labs owned and operated by individual industrial and/or municipal dischargers shall be eligible for certification. Ecology shall report to the Authority (element P-28) and the Lab QA/QC Working Group (subelement L-4.2) on the progress in meeting the lab support goals associated with the permit program.

Target Dates: Dischargers to use labs participating in the accreditation program in accordance with Chapter 173-50 WAC.

P-17. Data Management

Ecology shall evaluate its data management needs to implement the Puget Sound Plan's Municipal and Industrial Discharges Program and its current data management system and submit to the Authority a plan to upgrade the system as appropriate.

Ecology shall complete the initial loading of data related to state (pretreatment) and minor NPDES permits and begin incorporating routine self-monitoring data for these permits into the Wastewater Permit Life Cycle System (WPLCS). Ecology shall ensure that the WPLCS system incorporates results of Class I and Class II inspections.

Ecology shall store monitoring data of the five types outlined in element P-8 submitted by dischargers in a manner compatible with information in the Puget Sound Ambient Monitoring Program (element M-6). 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) (element M-4).

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

Target Dates: Continue to load as much data as is possible with the current system and resources.

Enforcement

P-18. Adopt Enforcement Policies as Regulations; Report on Enforcement; Encourage Compliance

The objective of this element is to develop a more effective enforcement program which 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 Authority 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 agency-wide. Guideline topics shall include: (a) differences between simple and innovative settlements; (b) what types of proposed activities 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.

Target Date: Enforcement training and reporting shall be ongoing.

P-19. Training for Inspectors and Permit Writers

In addition to the technical assistance provided under element P-5.2, Ecology shall establish an ongoing, vigorous program of training for inspectors and 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 inspectors' and permit writers' time is allocated to training activities. Ecology shall provide specialized training sessions on checklist items of the permit writers manual, setting discharge

limits for toxicants, setting sediment standards, biomonitoring, pretreatment, conducting inspections, taking samples, data management, enforcement procedures, and waste minimization. Ecology shall establish minimum training requirements for permit writers, 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 the EPA, to the maximum extent practicable.

Target Date: This program is ongoing.

P-20. Search for Unpermitted or Illegal Discharges

In coordination with the urban bay action teams, 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 storm water 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 Authority on the number and characteristics of unpermitted discharges discovered though this element and through the urban bay action teams, together with any analysis and recommendations that the department may have.

Target Date: Ecology to submit report by June 30, 1996.

P-21. Felony Provisions

The Authority 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: Resubmit to 1993 or subsequent Legislature.

Pretreatment

P-22. Pretreatment Program Enhancements

Ecology shall assign sufficient staff to fully carry out the pretreatment program, including permitting (with appropriate conditions for monitoring and control of toxicants in accordance with elements P-5 through P-8), 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 which accept pre treated industrial waste water; federal and other state agencies; tribal governments; and

interested citizens, Ecology shall coordinate and implement the pretreatment program and address the following issues:

1. Ensuring program consistency across jurisdictions in order to eliminate the creation of pollution-tolerant zones for indirect dischargers.

2. Ensuring the adequacy of staffing and funding resources.

3. Coordinating with the pretreatment, sludge-disposal program developed as part of element P-7.

4. 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.

5. 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.

6. Developing computerized tools for tracking and managing program data to effectively track compliance with minimum pretreatment program requirements.

7. 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.

8. Submitting to the Authority for approval recommendations and an implementation schedule for further pretreatment program enhancements.

Ecology shall report to the Authority twice a year on the status of the pretreatment program and the progress in implementing the enhancements.

Target Dates: Complete program enhancements by June 30, 1996.

P-23. Municipal Operator Training

The Waterworks and Wastewater Certification Board 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. The Board shall consult with the Authority and affected groups of wastewater treatment plant operators in drafting any additional test questions related to these topics. The Board shall also assist the Department of Ecology in the preparation of handouts identifying up-to-date pretreatment rules, regulations, and technology. Such handouts shall be mailed to all certified operators at least annually. The Board shall encourage certified operators to attend pretreatment workshops, conferences and courses for credit toward the mandatory professional growth requirement.

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

Target Date: Annual mailings are ongoing.

P-24. Certify Industrial Treatment Plant Operators

In conjunction with its technical outreach to dischargers under element P-27, 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 Authority, and other interested individuals and groups in Washington and other states.

Target date: Phase in implementation of voluntary program by June 30, 1996. Phase in mandatory program by June 30, 1997.

P-25. Employee Education Assistance

(See also subelement EPI-5.1.) 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: Begin implementation by December 31, 1995.

Public Involvement

P-26. Public Outreach

Ecology shall establish a public outreach position to act as a central clearinghouse for the public to contact regarding permits, and to 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, this person 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 person 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. This position shall also assist citizens and environmental groups, as well as federal and state agencies and local tribal governments upon their request (Washington departments of Natural Resources, Fish and Wildlife, and Health, State Parks, etc.) in reviewing NPDES

permits (subelement P-5.4), 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 (element EPI-3) of this plan.

Target Date: Centralized outreach mechanisms for permits shall be ongoing. Establish criteria for deciding when a public hearing will be held for a permit by June 30, 1995.

P-27. Technical Outreach to Dischargers, and Prevention, Reduction and Minimization Strategies

(This element constitutes a part of subelement EPI-5.1. The target audience is municipal and industrial dischargers.)

Ecology shall develop (or contract with an appropriate organization to develop), and submit to the Authority for approval, a program plan to provide technical outreach to dischargers on the new permit improvements required by the permit writers manual, with which they are expected to comply, 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 the 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. In developing the program, Ecology shall consult with staff who operate similar functions in other states. 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's Office of Waste Reduction and Recycling and Point Source Section, the Authority 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 Authority shall

coordinate efforts to disseminate the results of the technology institute's work. In conjunction with Ecology, the Authority shall investigate appropriate mechanisms for long-term funding of the institute including the State General Fund, taxes or permit fees. The Authority shall also research funding mechanisms to assist businesses with implementation of strategies for controlling pollution.

Experience gained in providing consolidated information to dischargers shall be transmitted to agency staff responsible for program development to ensure that environmental programs are consistent with each other.

Target Date: Authority to initiate the Technology Institute by September 30, 1997.

P-28. Ecology Reporting Requirements

In addition to the biennial reporting requirement under RCW 90.70.070, Ecology shall publish a report annually 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 which fully met the minimum checklist requirements (subelement P-5.1 and element P-22).

c. Inspections performance: The number and types of inspections (element P-14); the average and maximum turnaround times for inspection reports to dischargers and permit writers, and for compliance-sample lab data (element P-16).

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

e. High-priority elements: Major accomplishments toward implementing elements P-1 through P-4.1 (rules), P-4.3 (efficiency improvements), P-5.2 (quality assurance), P-9 (spill plans), P-13 (UBATs), P-16 (lab support), P-17 (data management), P-19 (training), P-22 (pretreatment), P-26 (public outreach, and P-27 (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 Date: Submit report by June 30, 1991, and annually thereafter.

P-29. Alternatives for Reducing Effects of Sanitary Discharge to Marine Waters

Ecology shall adopt a policy promoting alternatives in the treatment and disposal methods practiced for sewage treatment plant discharges to marine water 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 for sanitary treatment projects.

Target Date: Ecology to adopt the policy by June 30, 1995.

MAJOR PUBLIC ACTIONS FOR AUTHORITY REVIEW

1. Revision to water quality standards rule (element P-1).
2. Adoption of sediment standards rule (element P-2).
3. Revisions to the permit writers manual and permit quality-control plan. (element P-5).
4. Revisions to monitoring guidelines (element P-8).
5. Employee education program (element P-25).
6. Report on waste discharge permits (element P-28).

LEGISLATION REQUIRED

1. Ecology to consider making recommendations to the Legislature for removing the municipal permit-fee cap (subelement P-4.1).
2. The DNR encouraged to recommend legislation that would modify leasing rates for aquatic lands.
3. Ecology to consider recommending legislation to revise revisions to solid waste and hazardous waste statutes (element P-7).
4. Authority to resubmit felony provisions (element P-21) in 1993 or subsequent legislative sessions.

ESTIMATED COST

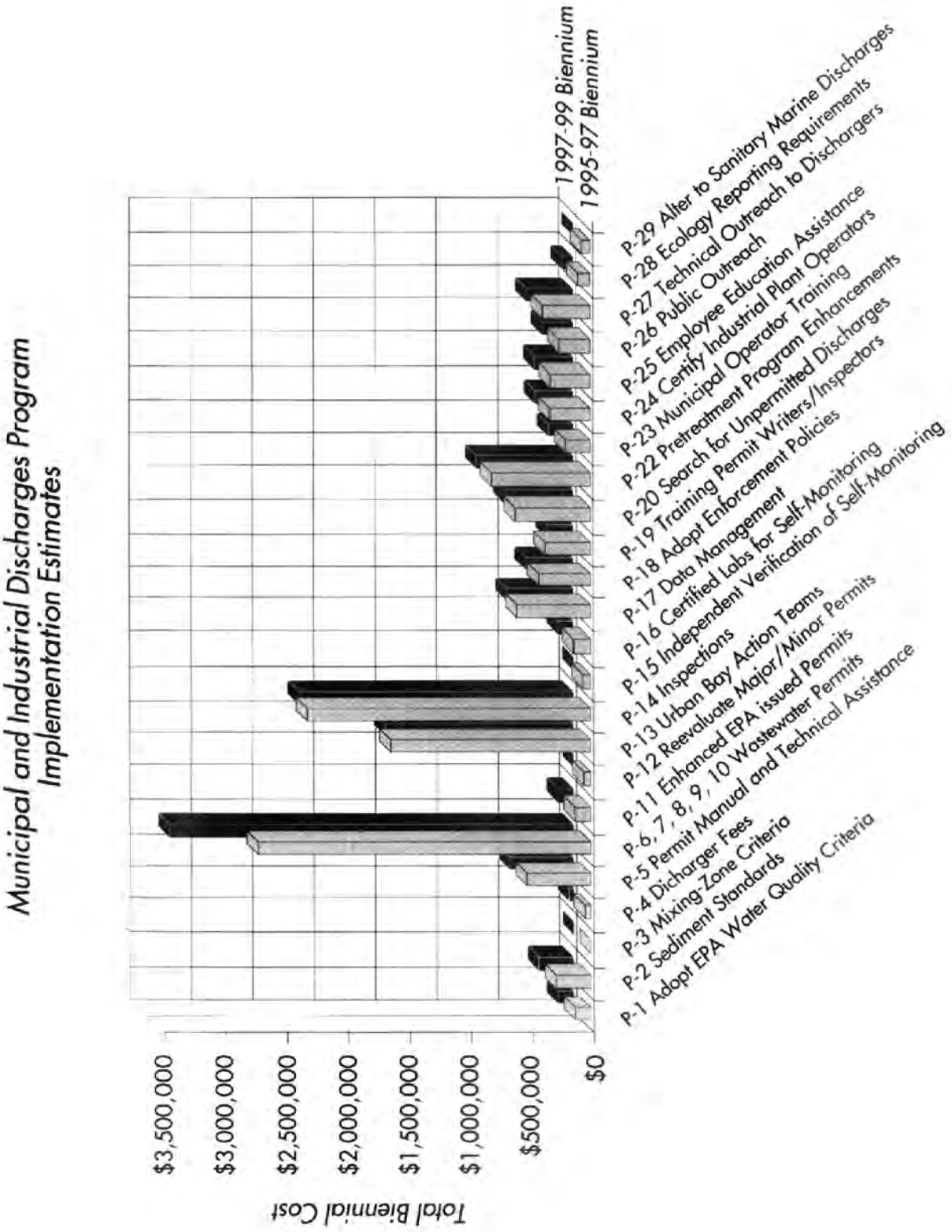
Fully implementing the Municipal and Industrial Discharges Program is estimated to cost $12.6 million during the 1995-97 Biennium and $12.5 million during the 1997-99 Biennium. Approximately two-thirds of these costs would be eligible for the permit fee account. Activities that are not fee-eligible as defined in RCW 90.48.465, as well as any fee-eligible activities that exceed the fee revenues collected, would be funded from other sources such as the State General Fund. The elements with the largest costs include strengthening effluent limits and monitoring requirements in permits (elements P-6 through P-10), increased staffing for the urban bay action program (element P-13),

inspections (element P-14), pretreatment (element P-22), and adopting and implementing enforcement policies (element P-18).

The cost estimates for this program do not include private sector costs for complying with the more stringent monitoring requirements, permit limits, and other elements of the Plan. Most dischargers would incur increased costs for the additional monitoring required under element P-8. Some dischargers would also have new or more stringent limits imposed on the discharge of specific toxicants (in the dissolved or particulate phase) or on the overall toxicity of the effluent. The cost of meeting more stringent limits would depend not only on the specific limits that are chosen by Ecology, but also on the particular circumstances of the plant involved.

Other elements of the program may also affect costs to dischargers. Permit fees under this program have increased substantially. Many financial incentives are included which would significantly increase costs for polluters and decrease costs for those in compliance. Laboratory costs will increase due to the requirement to use certified labs. Operators of industrial treatment plants would incur some cost in complying with certification requirements to be established and in paying certification costs. Some dischargers would incur costs as a result of enforcement action taken when violations are detected through increased inspections and compliance review efforts by Ecology. Finally, dischargers would incur some increased costs to comply with requirements for controlling spills and stormwater at plant sites.

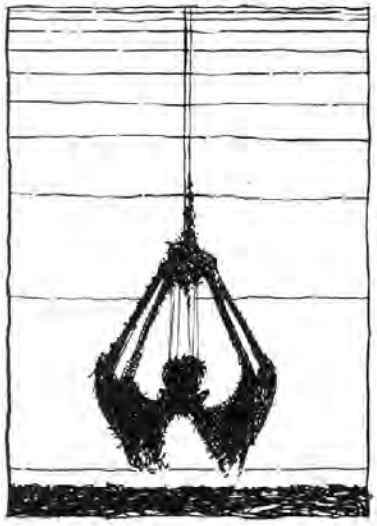
A new element has been added to the 1994 Plan—element P-29, Alternatives for Reducing Effects of Sanitary Discharge to Marine Waters. It requires Ecology to develop a policy for alternatives to sanitary discharges to marine waters, such as land disposal and wastewater reuse. It is intended to help communities select the optimal choice for wastewater treatment effluent.


Municipal and Industrial Discharges Program
Implementation Estimates
Total Biennial Cost
$3,500,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$0
1997-99 Biennium
1995-97 Biennium
P-29 Alter to Sanitary Marine Discharges
P-28 Ecology Reporting Requirements
P-27 Technical Outreach to Dischargers
P-26 Public Outreach
P-25 Employee Education Assistance
P-24 Certify Industrial Plant Operators
P-23 Municipal Operator Training
P-22 Pretreatment Program Enhancements
P-20 Search for Unpermitted Discharges
P-19 Training Permit Writers/Inspectors
P-18 Adopt Enforcement Policies
P-17 Data Management
P-16 Certified Labs for Self-Monitoring
P-15 Independent Verification of Self-Monitoring
P-14 Inspections
P-13 Urban Bay Action Teams
P-12 Reevaluate Major/Minor Permits
P-11 Enhanced EPA issued Permits
P-6, 7, 8, 9, 10 Wastewater Permits
P-5 Permit Manual and Technical Assistance
P-4 Dicharger Fees
P-3 Mixing-Zone Criteria
P-2 Sediment Standards
P-1 Adopt EPA Water Quality Criteria

CONTAMINATED SEDIMENTS AND DREDGING PROGRAM

PROGRAM ELEMENT DIRECTORY

PROBLEM DEFINITION



Toxic contaminants bind to particles and are retained as sediments. Toxic compounds are found in a wide range of concentrations in recently deposited surface sediments around Puget Sound. Although contaminant levels in some surface sediments have started to decrease since pollution controls were established in the last few decades, contamination levels in the deep central Puget Sound basin are still significantly higher than estimated pre-industrial levels. In urban areas, present levels of contamination are much higher—up to 100 times the levels in the cleanest rural bays. As a result, accumulation of toxicants in sediments and the resulting damage to natural populations are recognized as serious threats to marine and estuarine ecosystems.

The Department of Ecology (Ecology) compared chemical concentrations in sediments at 1,054 Puget Sound stations with chemical criteria in the Interim Sediment Quality Evaluation Process for Puget Sound Sediments[1]. According to the report, more than 400 stations contained contaminants exceeding the sediment quality criteria[2]. Forty-eight different chemicals exceeded the allowable levels of chemical substances at one or more stations.

Sediment samples collected in recent years from many locations in Puget Sound, such as Bellingham Bay, Commencement Bay, Port Gardner Bay, Elliott Bay and Eagle Harbor, were very toxic to bioassay organisms. These samples were usually collected from the top two centimeters of sediment—the material that had accumulated within the past one to five years—indicating recent or ongoing sources of contamination.

The benthic (bottom-dwelling) populations at many locations are also considered damaged (significantly altered in composition or seriously reduced in total abundance) by sediment pollution.

Toxicants reach the water from many sources, but principally from unpermitted discharges, stormwater runoff, raw sewage discharges (e.g., combined sewer overflows), and permitted point source discharges (industrial and municipal

1 Issued December 1989.

2 The sampling stations are concentrated in urban bays and are not representative of the overall distribution of contaminants in Puget Sound.

outfalls). Air pollution appears to be a large contributor of toxicants to Puget Sound. Some of the airborne contaminants enter the water directly; others are washed off the land by runoff. In addition, dredging and disposal can disturb and redistribute materials.

INSTITUTIONAL FRAMEWORK

Dredging and the disposal 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 Section 404 of the federal Clean Water Act and Section 10 of the Rivers and Harbors Act. The U.S. Environmental Protection Agency's (EPA) Region 10 office, the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) review permits issued by the Army Corps of Engineers. Ecology administers the state's Shoreline Master Program, regulating coastal development. The Department of Natural Resources (DNR) 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.

Sediment contamination is generally regulated by programs aimed at protecting water quality. But because toxicants tend to concentrate in sediments rather than the water column, harmful sediment contamination can occur even when the water is not seriously contaminated. Prior to adopting the 1987 Puget Sound Water Quality Management Plan (Plan), regulatory programs lacked clearly stated goals or policies for preventing sediment contamination.

Sediment standards were developed under the Plan's Municipal and Industrial Discharges Program in order to regulate discharges, manage dredging and the disposal of dredged material and identify and rank contaminated sediment sites for cleanup. Contaminated sediment particles suspended in effluent also need to be addressed through sediment standards.

Dredged material with low levels of contamination may be disposed of at open-water sites, while material with higher levels must be disposed of at confined-disposal sites. The Puget Sound Dredged Disposal Analysis (PSDDA), a cooperative effort by the Army Corps of Engineers, the EPA, Ecology and the DNR, 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. Additional work is needed to establish multi-user disposal sites for sediments containing more contaminants.

Areas identified as having serious sediment contamination are being addressed through the EPA-Ecology Urban Bay Action Program and Superfund investigations. The NOAA has notified a number of dischargers and property owners around Puget Sound that they may be held liable for natural resource damages associated with sediment contamination. Although it is now possible to inventory areas with contaminated sediments, funding remains a problem.

AUTHORITY'S APPROACH

The 1987 Plan introduced a comprehensive, sediment-quality program that included sediment-quality goals and criteria, directions for contaminant source controls, dredging and disposal goals, steps for developing of a requirement to conduct dredged-material disposal standards, a feasibility study of multi-user disposal sites for sediments, and an expanded urban bay program that included guidelines to identify and respond to sites with high levels of sediment contamination. The program was designed to be implemented in concert with elements of the Municipal and Industrial Discharges Program and the Stormwater and Combined Sewer Overflows Program.

Revisions to this Plan program in 1989 and 1991 were few; only a public involvement, education and technical assistance element was added. The majority of the Authority's effort so far has focused on implementation.

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.

STRATEGY

The strategy for achieving this goal is to: (1) classify sediments that cause adverse biological effects and significant human health risks; (2) implement Soundwide controls on sources of contaminants causing sediments to fail the sediment standards; (3) provide rules and sites for disposal of dredged materials; and (4) expand the urban bay program to provide for additional source control and consideration of cleanup actions for existing areas of high sediment contamination levels.[3]

PROGRAM ELEMENTS

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.[4]

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3 The first two elements of this strategy—classification of contaminated sediments and source controls—are included in the Municipal & Industrial Discharges Program and the Stormwater & Combined Sewer Overflows Program.

4 The intent of this policy is that dredging and disposal contribute to cleanup of the Sound by allowing unconfined open-water sites to have only low levels of contamination and to dispose of more contaminated sediments in a manner that prevents continued exposure of organisms to adverse effects. For proposals where dredging will expose contaminated sediments, project-specific mitigation measures may be required.

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.[5]

S-2. Program for Unconfined Open-Water Disposal

[Element Completed]

S-3. Unconfined Open-Water Disposal Sites

The Authority adopts by reference the following portions of the "Management Plans for Unconfined Open Water Disposal Phase I and Phase II".

- Selection of dredged-material disposal sites at or near Everett, Seattle, Bellingham, Port Angeles, Port Townsend, Rosario Strait, Anderson and Ketron Islands, and Tacoma to serve as regional sites for disposal of dredged material that meets the PSDDA evaluation procedures (page 4-5 of the PSDDA Phase I Management Report and Chapter 5 of the PSDDA Phase II Management Report).

- Selection of disposal guidelines based on site condition I for the dispersive sites at Rosario Strait, Port Angeles and Port Townsend and less restrictive disposal guidelines based on site condition II for the remaining non-dispersive sites (page 4-5 and Chapter 5 of the PSDDA Phase I Management Report and Chapter 4 and Exhibit A of the PSDDA Phase II Management Report).

It is the Authority's long-term goal that dredged-material disposal sites have no chemical adverse effects. The Authority concurs with the PSDDA selection of site condition II (minor adverse effects) at the non-dispersive sites for the near term because: (1) the sites were selected to minimize the resources affected; (2) the sites will receive large of amounts of material that would be cleaner than the dispersive site guidelines of site condition I, which will moderate the potential effects of the material that falls between conditions I and II; and (3) the program of monitoring and reevaluation will allow protective adjustments to the evaluation procedures if problems develop. The Authority also adopts the following portions of the management plans.

- Evaluation procedures (Chapter 5 and Appendix A of the PSDDA Phase I Management Report and Chapter 5 and Exhibit A of the PSDDA Phase II Management Report).

- Management plans for disposal sites (Chapter 6 of both the PSDDA Phase I and Phase II Management Reports). The Authority supports model shoreline master program language proposed by the PSDDA for adoption by local governments and suggests that local governments consider amending their programs but is not requiring them to do so.

5 Element S-7 directs Ecology to develop a decision process which will resolve the question of when cleanup actions are reasonable.

- Environmental monitoring of disposal sites (Chapter 7 of both the PSDDA Phase I and Phase II Management Reports).
- Data management (Chapter 8 of both the PSDDA Phase I and Phase II Management Reports).
- Annual review and program update (page 9-6 of both the PSDDA Phase I and Phase II Management Reports).

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

Changes to any of these PSDDA recommendations are considered major public actions subject to Authority review.

Target Dates: As described in PSDDA Management Reports.

Confined Disposal

S-4. Confined-Disposal Standards for Sediments

Ecology shall develop an approval process and technical manual of standards for confined disposal of dredged material. Ecology shall adopt regulations necessary to implement the approval process and use of these standards. The standards shall address reuse or disposal of dredged material that exceeds the sediment standards developed under element P-2 and that will not be disposed of at unconfined open-water disposal sites established by the PSDDA process. These standards for confined disposal will be used by Ecology, shoreline jurisdictions and local health departments in approving or denying permits for the use or disposal of dredged material that exceeds the P-2 standards. 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.

In developing the standards Ecology shall consult with agencies and other parties with technical expertise and shall provide a public education/public involvement program. The standards shall address treatment as well as in-water and upland confined-disposal methods.

Target Dates: Complete the approval process, technical manual and required rule making by June 30, 1995.

S-5. Revision of Rules and Programs

After the adoption by Ecology of disposal standards for sediments that exceed sediment standards (S-4), the Authority shall review the standards and consider the degree to which local governments and other state agencies should conform their programs to the Ecology standards so that the use or disposal of sediments in compliance with the disposal regulations is not unreasonably precluded. Shoreline master programs, solid waste rules, and the hydraulics permit rules may be affected. The Authority may then amend the Puget Sound Water

Quality Management Plan to direct state agencies and local governments to revise their programs. If required, these revisions shall occur no later than two years after final action by the Authority. Any agency or local government that cannot meet this deadline shall request, at the earliest possible time, an extension from the Authority.

Target Dates: Begin review of the standards on July 1, 1995. Propose new plan language, if necessary, by December 1, 1995. Complete state and local revisions by March 1, 1998.

S-6. Multi-User Confined-Disposal Sites Study

[Completed portions of this element have been deleted.]

Ecology shall convene an interagency management committee consisting of representatives from the departments of Ecology, Health and Natural Resources, the Puget Sound Water Quality Authority, tribes, the Army Corps of Engineers, the EPA, and other appropriate agencies. The management committee shall direct the development of the Puget Sound Sediment Disposal Action Plan. This action plan will be prepared for development of a multi-user disposal site, and shall be completed within one year of funding. The action plan shall: 1) detail the disposal siting process; 2) define the means for managing site liabilities; 3) include provisions for evaluating human health considerations; 4) provide a management agreement listing institutional responsibilities; 5) define stakeholder and public participation roles; and 6) identify funding sources and mechanisms for future siting and construction steps.

The siting process addressed in the action plan should establish the following: (1) criteria for identifying potential disposal sites; (2) procedures for screening and ranking these potential sites; (3) an outline of technical studies required to ensure site technical viability; (4) a preliminary inventory of potential candidate sites that have not been screened or ranked; (5) a plan for public participation; and (6) an outline of any needed siting authorities.

In addition to the management committee, Ecology shall convene an advisory group to be involved in development of the action plan and to facilitate widespread review and comment on the action plan. The advisory group shall provide comments on the scope of the action plan to the management committee prior to development of the action plan, and will review and comment on draft products. The advisory group shall, at a minimum, consist of representatives from local environmental health agencies, local solid waste agencies, the Department of Fish and Wildlife, ports, tribes, environmental groups, the Office of the Attorney General, and the potentially affected private sector. The National Oceanic and Atmospheric Administration, the U. S. Fish and Wildlife Service, and the U.S. Coast Guard shall be invited to send representatives to the advisory group.

The management committee shall review the need for draft legislation that should be developed as an essential feature of the action plan. The legislation should clarify the state's interest in addressing the sediment disposal problem and should address liability management, siting and funding as required. The

management committee shall coordinate development of legislation with appropriate legislators and their staffs.

As an interim measure to address confined-disposal needs, Ecology shall facilitate multi-user disposal access to appropriate disposal projects. In facilitating such access, Ecology shall investigate options for liability management and indemnification of landowners. Such access should be promoted if it is compatible with the development schedule of projects, if liability management and indemnification issues can be addressed, and if such access results in more expedient and cost-effective cleanup actions.

Target Dates: Convene interagency management committee and advisory group by July 1, 1995. Submit final action plan to the Authority for review and approval prior to implementation by June 30, 1996. Propose draft legislation, if needed, by September 30, 1996.

S-7. Guidelines for Sediment Cleanup Decisions

To establish a uniform decision process concerning what to do about sediment contamination, Ecology shall develop guidelines for deciding whether existing sediments that exceed the sediment standards developed under element P-2 should be capped, excavated or otherwise treated, or whether no action should be taken. In developing the guidelines, Ecology shall consult with agencies and parties with expertise in these issues and provide a public education and public involvement program. Development of 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. Development of the guidelines should include a process for ranking sediments with high levels of contamination by relative potential risk posed to human health and the environment.

Target Dates: Guidelines for sediment cleanup decisions are contained in the sediment management standards adopted in 1991. Implementation of the guidelines shall be ongoing.

S-8. Investigations and Cleanup of Contaminated Sediments

This element constitutes an expansion of the ongoing EPA and Ecology program of investigations and pollution source-control efforts in urban bays and other areas of the Sound where sediment contamination is known or suspected. This element deals with sediment contamination in three tiers. In subelement 8.1, specific sample locations that exceed sediment standards are inventoried. In subelement 8.2, Ecology uses the inventory and other information to identify bays or other similarly sized areas for further investigation under subelements 8.3 and 8.4. In subelement 8.6, Ecology identifies specific sites that should be considered for cleanup actions under subelements 8.6 and 8.7, using ranking criteria developed in subelement 8.5.

Element P-13 in the Municipal and Industrial Program provides additional detail on the Urban Bay Action Program.

Although this element contains specific directives and assignments, the Authority intends that the EPA, Ecology and other agencies and local governments exercise flexibility in resolving contaminated sediment problems. The EPA is requested to continue or increase existing support for this effort through various programs including the national funding for estuary programs, federal Superfund activities and federal funding for Ecology's water quality and hazardous waste programs. To organize and coordinate the program, Ecology, in cooperation with the EPA, shall undertake an integrated program consisting of the guidelines called for in element S-7 and the following components:

8.1. Inventory of Locations with Contaminated Sediments

To provide information to the Authority 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 which violate the sediment standards developed under element P-2. 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 the Puget Sound Geographic Information System (GIS) and used to update the Puget Sound Environmental Atlas if possible. This inventory shall be updated every two years and made available using the data transfer formats developed under element M-4. The Authority 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: Establish computerized inventory and make data available to the Puget Sound GIS annually or when required for specific projects.

8.2. Contaminated Sediment Area[6] Priority List and Investigation Schedule

Ecology shall develop decision criteria for identifying areas of Puget Sound where locations with sediment contamination have been identified or are suspected and where investigations should be undertaken to control sources and consider cleanup actions. These criteria will be used to establish a priority list of areas to be investigated, allocate resources for contaminated sediment investigations, and establish a schedule for these investigations. (Under element P-13, Ecology is to prepare a long-term implementation plan for the Urban Bay Action Program.) 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. Ecology shall provide the Puget Sound Estuary Program

6 An "area" is a bay or similar-sized region where sediment contamination might be studied and an effort made to control sources of contamination. A "site" is smaller than an "area" and defines a specific "hot spot" that might be caused by a single source and considered for cleanup action.

Management Committee an opportunity to review and comment on the priority list of areas.

Although this element focuses urban bay action programs on areas with sediment contamination, Ecology may include other factors in selecting areas for inclusion in the plan for urban bay action programs.

Target Date: The priority list of areas to be investigated is to be completed within 12 months of final adoption of sediment standards under element P-2.

8.3. 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 element 8.2. Investigations shall be designed on a case-by-case basis using Elliott Bay and Commencement Bay studies as the 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.

8.4. Action Teams and Source Control

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 controls. The teams should include Ecology regional office inspectors and permit writers who normally handle the area. The DNR shall participate in each urban bay action team as part of its efforts to reduce contamination of state-owned aquatic lands. Each team's activities shall be integrated with the Municipal and Industrial Discharges Program by focusing activities under that program in areas associated with contaminated sediment areas. Also, in some urban bays, bay wide planning efforts are being promoted by the Department of Natural Resources. Bay-wide planning is encouraged as a tool to balance cleanup, habitat development and other water dependent activities. Because the urban bay action teams include representatives of many of the appropriate parties, the bay wide planning efforts shall be integrated with the activities of the urban bay action teams. The lead for a baywide planning initiative however, might be a public port or the Department of Natural Resources.

Urban bay action teams shall carry out various source control, cleanup and investigative actions including:

- Review existing discharge permits and compliance with them.
- Reopen and modify discharge permits of sources in the vicinity to control toxicants identified at problem levels in the sediments.
- Search for unpermitted discharges and take enforcement actions.
- Investigate contamination in storm drains or ground water and search for sources of such contamination.

- Take other actions to control sources of sediment contamination by seeking to achieve full compliance with applicable laws and regulations in locations that drain into the contaminated area.
- Identify sites within the area that should be considered for cleanup.
- Assist in ensuring that cleanup actions take place.
- Develop urban bay action plans for each urban bay. (The development and adoption of action plans is described in element P-13.)
- Coordinate with applicable baywide planning efforts.

Ecology and the EPA are encouraged to make use of industry scientists, engineers and other experts to assist in these efforts.

8.5 Ranking Method Study

[This subelement has been completed.]

8.6. Sediment Site-Cleanup Actions

Following the guidelines developed under element S-7, when sites with high levels of sediment contamination are identified, Ecology shall consider the feasibility and reasonableness of sediment cleanup actions, coordinating with the DNR 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 developed under element S-7. Ecology shall maintain a priority list of specific sediment sites where cleanup will be considered.

Target Date: Establish initial priority list of sites by January 1, 1995.

8.7. Responsible Parties

The Authority recognizes that identifying the parties responsible for sediment contamination is generally difficult. Often neither the underlying property owner nor the abutting property owner is responsible for the contamination. But cases have occurred and will occur where responsible parties can be identified. Where 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. The DNR 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: Ongoing activity.

S-9. Public Involvement, Education and Technical Assistance

Ecology shall increase staffing for public involvement for sediment program issues including sediment standards (element P-2). A staff person will be assigned to coordinate Ecology's public outreach and education on sediment issues and improve the response to technical inquiries. This element will be coordinated with the development of educational materials on sediments under element EPI-3.1.

Target Date: Establish staff position by December 1995.

MAJOR PUBLIC ACTIONS FOR AUTHORITY REVIEW

1. Changes to PSDDA recommendations adopted by reference in element S-3.
2. Adoption of sediment management standards which include the sediment quality standards (element P-2) and maximum allowed cleanup levels and site-specific cleanup requirements (element S-7 and subelement S-8.6).
3. Adoption of disposal standards for contaminated sediments (element S-4).
4. Priority list for investigation of contaminated sediment areas (subelement S-8.2).

LEGISLATION REQUIRED

New legislation may eventually be required to allow the establishment of multi-user disposal sites for dredged material.

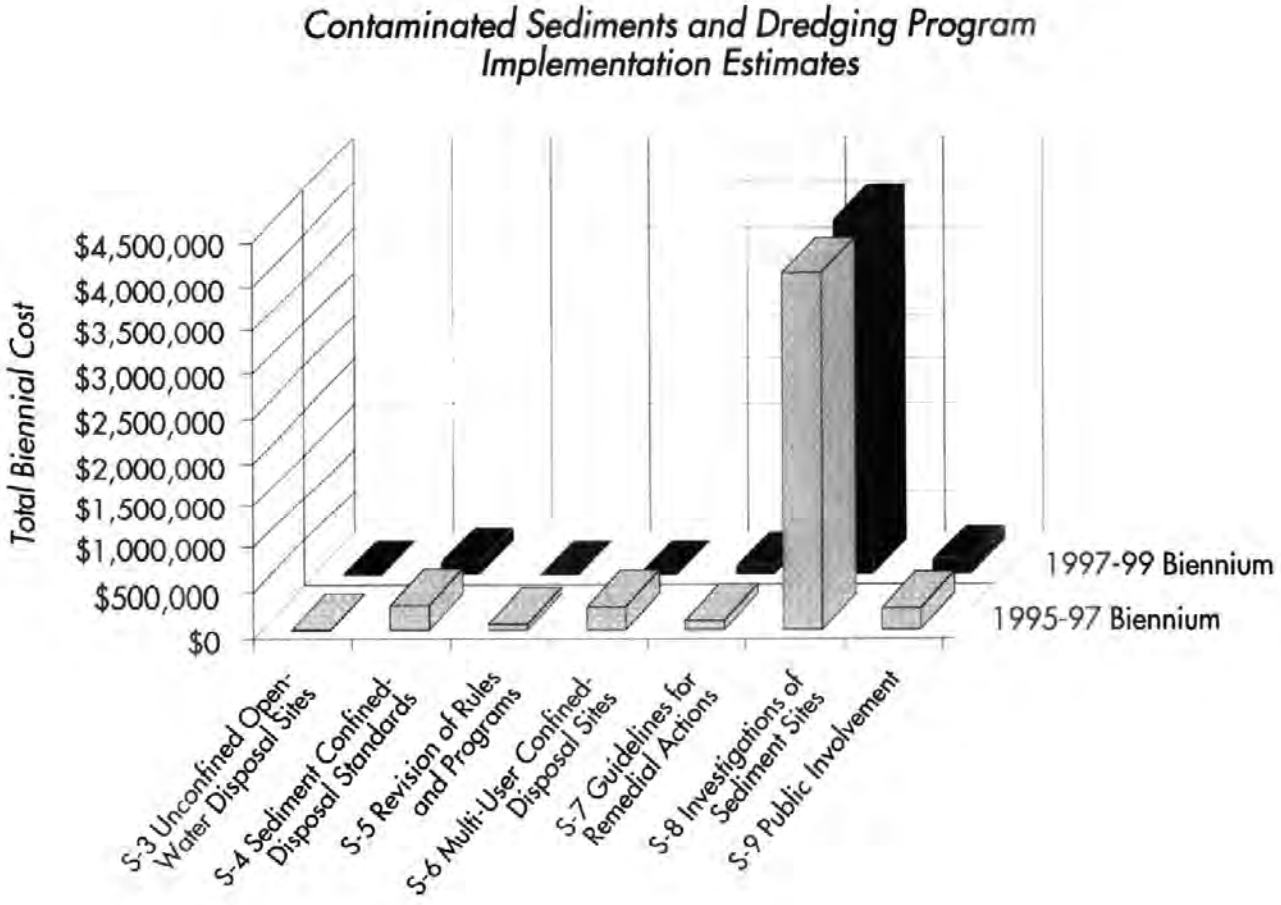
ESTIMATED COST

Full implementation of the Contaminated Sediments and Dredging Program is estimated to cost close to $5 million during the 1995-97 Biennium and $4.5 million during the 1997-99 Biennium. The program's largest cost, comprising over 80 percent of the total, is the investigation and cleanup of contaminated sediments (element S-8). Funding at this level would allow some progress on site investigations and source control but does not include public funds that might be needed to clean up contaminated sediments. Such costs could run in excess of $100,000 per acre for removal or treatment and at least $5,000 per acre for capping. Estimates of costs to dredge and dispose of sediment hot spots in Commencement Bay ranged from $8 to $79 per cubic yard depending on the type of disposal required.

Large public and private sector costs are currently associated with dredging or disposal of dredged material. In 1984, dredging and open-water disposal of clean material cost only $2 to $3 per cubic yard. Now testing of material suspected of being contaminated has cost an additional $1 per cubic yard. In addition, disposal fees have increased and will increase more in the future. Disposal of dredged material that cannot go to open water now costs anywhere from $15 to $40 per cubic yard. Disposal of highly contaminated material has been estimated, as discussed above for cleanup actions, at up to $79 per cubic yard. Since annual dredging volumes are in the hundreds of thousands of cubic yards, most of it clean material, these are significant costs for the region.

Private sector costs associated with investigating and dealing with contaminated sediments sites may also increase. This would occur when responsible

parties are required to investigate and remedy sediment hot spots resulting from their discharges. These costs are not included in the overall cost estimates.

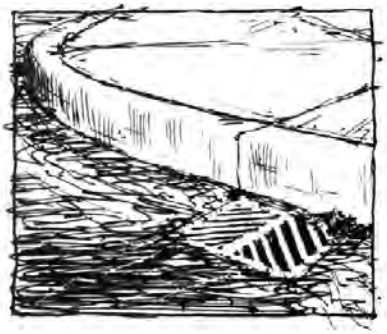


STORMWATER AND COMBINED SEWER OVERFLOWS PROGRAM

PROGRAM ELEMENT DIRECTORY

PROBLEM DEFINITION

Storm Water



Storm water, or urban runoff, is defined as rainfall that falls on impervious surfaces and is routed into natural or artificial drainage systems.[1] Pollutants in storm water can include sediments, nutrients, bacteria, oils, grease, metals and other toxicants. These contaminants can harm biological populations, destroy fish and wildlife habitat, contribute to restrictions on shellfish harvesting and swimming, and contaminate sediments. Sources include motor vehicles; fertilizers, pesticides and herbicides; runoff from urban development; construction sites; businesses and industries; pet feces; and poor management of other wastes.

The potential for significant pollution from storm water has been increasingly recognized. The Environmental Protection Agency's (EPA's) 1992 Water Quality Inventory (Clean Water Act Section 305b) stated that urban runoff impairs 43 percent of estuarine miles, 11 percent of river miles, and 24 percent of lake acreage in the United States. The average stormwater concentrations exceeded chronic water quality criteria for cadmium, copper, lead, nickel and zinc. The concentrations of metals did not appear to be different among the three basic land-use types sampled—residential, commercial and industrial.

Runoff from freeways, however, was consistently higher for most metals. Compared to effluent from secondary sewage treatment, urban runoff in Bellevue contained higher concentrations of lead and zinc. Runoff data from the Nationwide Urban Runoff Program[2] showed that average concentrations of total suspended solids, chemical oxygen demand, and nitrate/nitrite were higher

1 Impervious surfaces include rooftops, driveways, streets, parking lots and highways. Lawns are found to be almost as impervious as some paving.

2 The Nationwide Urban Runoff Program was a five-year study (1978-82), sponsored by the EPA and many cooperating federal, state, regional and local agencies, which addressed the quality of urban runoff, the significance of the urban runoff problem, and the effectiveness of best management practices.

than the annual mean concentrations in secondary treated effluent from the Renton treatment plant.

Runoff is greatest in urban and suburban areas due to population density and the high percentage of impervious surface area that prevents absorption. The atmosphere in urban areas contains particles and associated contaminants from cars, factories and wood stoves. When it rains, these particles—and pollutants—may be deposited on the water, or they may be deposited on the land and washed into the nearest stream, lake, or bay. Not surprisingly, storm water is a significant source for pollutants concentrated in the sediments of urban bays. Some storm drains in Seattle were found to be major sources of lead and PCBs (a group of industrial compounds banned in the 1970s) in the sediments of Puget Sound.

Without controls, stormwater volume and peak flows can impair the ability of anadromous species to migrate through obstructions and changes in flows. Peak flows scour gravel beds needed for spawning. Natural and artificial wetlands are being used to store and treat storm water. Preliminary data from Puget Sound Wetlands and Stormwater Management Research Program shows that unmanaged storm water has a detrimental effect on wetlands in certain areas.[3]

Population in the Puget Sound basin is projected to grow by more than one million people by the year 2010. Development associated with this growth requires adequate stormwater control. Without proper management, storm water will continue to degrade water quality and harm biological resources.

Combined Sewer Overflows (CSOs)

Combined sewer systems collect sanitary sewage, industrial waste water and storm water in a single sewer system. During large storms, part of the system's effluent is discharged before being treated because the system's pipes and sewage treatment plant cannot handle the full volume of waste water. Nine cities around Puget Sound have combined sewer systems that discharge directly into Puget Sound during large storms. Metro (King County Metropolitan Services) in King County handles waste water from combined sewers but does not own a combined system.

Except for Metro and Seattle, basic information about frequency, quantity and effects has been lacking for most CSOs discharging into Puget Sound. In an average year, Metro and Seattle have discharged about 2.8 billion gallons of raw sewage, untreated storm water and industrial effluents from about 110 CSOs in the Seattle area. This volume is approximately six percent of the annual discharge from the West Point treatment plant. Although the volume of effluent of CSOs is relatively small compared to the discharge of sewage treatment plants, CSO discharges are untreated and many are in close proximity to sensitive shoreline areas. Metro and Seattle are working to reduce their CSO discharges.

3 Puget Sound Wetlands and Stormwater Management Research Program, 1993. Research Summary VI. Sensitive Plant Communities in the Puget Sound Region: Forested Wetlands, Bogs/Fens, and Sedge Meadows.

The discharges from CSOs frequently contain large amounts of fecal coliform bacteria, nutrients, suspended solids, and sometimes toxicants. Sediment samples around the Denny Way CSO in Seattle showed highly elevated concentrations of heavy metals and organic toxicants. Metro has since capped those sediments. The biota around the CSO was harmed by the discharge, and the area is closed to swimming due to high concentrations of fecal coliform.

INSTITUTIONAL FRAMEWORK

Since the mid-1950s, the U.S. Environmental Protection Agency's (EPA) policy, and standard engineering practice, has been to install separate sanitary and storm sewers for newly developed areas. CSOs are now regulated under the National Pollutant Discharge Elimination System (NPDES) program, with discharges required to meet all applicable requirements. In 1985, the Washington State Legislature passed a law requiring all municipalities with CSOs to develop plans for the greatest reasonable reduction at the earliest possible date. Implementation of those plans is under way.

In 1986, a handful of local governments had established stormwater utilities based on their general legal authorities, but at that time storm water was primarily addressed as an issue of water quantity in permits. The 1987 Clean Water Act reauthorization and subsequent revisions established new procedures, requirements and deadlines for regulation of storm water. The Department of Ecology (Ecology) established a stormwater program in 1988.

The federal Clean Water Act, and state statutes RCW 90.70 and RCW 90.48 establish federal and state authority for stormwater management in the Puget Sound basin. Ecology administers (NPDES) stormwater permits for municipal and industrial dischargers, and the state Department of Transportation. The EPA issues NPDES permits to federal facilities and tribal lands located in the state. The Authority, under RCW 90.70, directs local governments to adopt stormwater regulatory programs. Ecology developed minimum standards for stormwater programs, a technical guidance manual and a model ordinance for local governments implementing stormwater programs.

AUTHORITY'S APPROACH

The Authority recognized that because of the pervasiveness of stormwater problems, any viable solutions would require the cooperation of diverse segments of society: the development community, government, businesses and individuals. Programs to control and prevent storm water needed to be developed at the local level, with guidance and assistance from state and federal agencies.

The 1987 Puget Sound Water Quality Management Plan (Plan) called for: (1) stormwater programs to be developed in urbanized areas of the Sound in a phased program, starting with the largest cities; (2) all cities and counties to develop operation and maintenance programs, adopt ordinances for new development, and develop stormwater education programs; and (3) all cities with CSOs to develop and implement plans providing for the greatest reasonable reduction of overflows each year.

The Plan called for Ecology to develop technical manuals, guidelines, regulations and model ordinances; the Department of Transportation to develop a program to control highway runoff; and the EPA to include stormwater controls in NPDES permits issued to federal facilities.

Revisions to the Plan in 1989 added no new program elements; effort was focused instead on implementing existing elements. However, amendments to the 1991 Plan included several key changes, including: recognizing the importance of implementing the most effective best management practices; calling on Ecology to include minimum requirements in its "stormwater technical manual"; coordinating stormwater programs with Growth Management Act planning; and increasing technical assistance and outreach to local governments.

The 1994 Plan calls for the departments of Natural Resources and Fish and Wildlife to adopt the stormwater technical manual, adds performance criteria for BMPs (best management practices) to help track performance, emphasizes coordination among watersheds, addresses vactor waste, and better integrates stormwater controls with Growth Management Act (GMA) requirements.

PROGRAM GOAL

To protect shellfish beds, fish habitat and other resources; to prevent the contamination of sediments from urban runoff and combined sewer overflows; and to achieve standards for water and sediment quality by reducing and eventually eliminating harm from pollutant discharges from storm water and combined sewer overflows (CSOs) throughout Puget Sound.

STRATEGY

The pollution control strategy for achieving the program's goal is to implement the most appropriate best management practices first, assess their effectiveness, and as necessary, require further water quality controls.

The implementation strategy for achieving this goal is to: (1) require that all cities and counties meet minimum requirements for a basic stormwater program; (2) develop stormwater programs in urbanized areas of Puget Sound in a phased program starting with the largest cities; (3) develop NPDES permits for municipal storm water that incorporate the Plan's stormwater requirements and federal requirements, and phase in additional NPDES permits for municipal storm water for smaller jurisdictions as further U.S. Environmental Protection Agency EPA regulations are promulgated; (4) schedule the development of additional Puget Sound stormwater programs on a priority basis; (5) provide technical assistance to both local governments and businesses; and (6) require all cities with CSOs in the Puget Sound basin to develop and implement plans which provide the greatest reasonable reduction of CSO events.

PROGRAM ELEMENTS

SW-1. Basic Stormwater Programs for All Counties and Cities

The pollution control strategy for achieving the program's goal is to implement the most appropriate best management practices (BMPs) first, assess their effectiveness, and, as necessary, require further water quality controls.

1.1. Minimum Requirements for Basic Stormwater Programs

All cities and counties shall adopt stormwater programs which include the minimum requirements for new development and redevelopment[4] and other basic stormwater controls contained in the Plan and in guidance developed by Ecology. All counties and cities in the Puget Sound basin shall adopt ordinances requiring stormwater controls for new development and redevelopment.

The basic stormwater program shall include ordinances that address, at a minimum: (1) the control of off-site water quality and quantity effects; (2) the use of best management practices for source control and treatment; (3) the effective treatment, using best management practices, of the storm size and frequency (design storm) as specified in the manual for proposed development; (4) the use of infiltration, with appropriate precautions and maintenance, as the first consideration in stormwater management; (5) the protection of stream channels, fish, shellfish habitat, other aquatic habitat; and wetlands; (6) control of erosion and sedimentation for new construction and redevelopment projects; and (7) local enforcement of these stormwater controls.

Local governments should monitor compliance with stormwater requirements and publish the results of the monitoring in watershed "report cards" or in other forms.

Ecology shall publish guidance, as required under element SW-4, for meeting these requirements.

This program shall not affect Ecology's authority to require appropriate corrective action (pursuant to Chapter 90.48 RCW) whenever existing facilities cause or contribute to violations of state water quality standards.

1.2. Operation and Maintenance Programs

Each county and city shall also develop and enforce, within local governments' authority, operation and maintenance programs and ordinances for new and existing public and private stormwater systems. Each county and city shall maintain records of public and private storm drainage systems and appurtenances. Counties are responsible for the stormwater programs in unincorporated residential, commercial and industrial areas. Ecology's guidance shall ensure that all appropriate areas are included in these programs.

All programs and ordinances developed under this subelement shall be consistent with the plan guidance and model ordinances developed under elements SW-3 and SW-4. Each city and county shall adopt ordinances consistent with

4 Ecology shall define re-development in the technical manual.

the model ordinances (element SW-4) requiring stormwater controls for new development and redevelopment and requiring and enforcing maintenance of privately owned stormwater systems.

1.3. Technical Manuals

In conjunction with the runoff control ordinances for new development and redevelopment, each jurisdiction shall adopt a stormwater management manual containing best management practices. A local government may adopt the manual prepared by Ecology under element SW-3 or prepare its own manual as long as it has substantially equivalent technical standards to those in Ecology's manual. Ecology shall review alternative manuals of local governments for substantial consistency with the Plan and Ecology's manual and guidance.

When Ecology updates its manual, local governments must, within one year of receipt, make any appropriate changes to their manuals.

1.4. Education Programs

Basic stormwater programs should include education programs to inform citizens and businesses about storm water and its effects on water quality, flooding, and fish/wildlife habitat, and to discourage dumping of waste material or pollutants into storm drains. When possible, these program should coordinate with the Education and Public Involvement Program the Household Hazardous Waste Program and the Nonpoint Source Pollution Program. Compliance and monitoring "report cards" (subelements SW-1.1 and SW-3.1.2) should be used to publicize progress in controlling storm water.

1.5. Growth Management Planning and Interlocal Coordination

Each city or county which adopts a comprehensive land use plan and development regulations under the provisions of Chapter 36.70A RCW (the Growth Management Act) shall incorporate its local stormwater program into the its comprehensive plan and shall incorporate the ordinances required by this program into its development regulations. Accordingly, cities and counties shall also incorporate and implement the provisions of the stormwater program through: ordinances to protect critical areas, capital facilities plans, concurrency strategies, watershed action plans, drainage or basin plans, urban bay action tasks, the State Environmental Policy Act (SEPA) reviews, environmental priorities, or utilities. Any utilities which are developed should be designed to address a broad spectrum of stormwater- and nonpoint source pollution-related water quality problems.

Consistent with the Growth Management Act and RCW 90.70, and in keeping with the intent of Chapter 39.34 (the Interlocal Cooperation Act), each local jurisdiction in the Puget Sound basin shall cooperate with neighboring jurisdictions in stormwater, growth management, and basin or watershed planning. Jurisdictions sharing common watersheds should cooperate in analyzing the effects and control of stormwater runoff and adopt coordinated and compatible programs for stormwater management. This coordination should also achieve the most efficient and effective protection of fish, shellfish, aquatic habitat, wetlands, and other aquatic resources within their shared watersheds.

In setting priorities for stormwater control, cities and counties should consider the list of critical watersheds prepared by the Department of Fish and Wildlife (WDFW) under subelement SW-7.2 as well as information from approved, watershed action plans, basin plans, and urban bay action plans. Based on these priorities, cities and counties should identify sensitive areas that may need even stronger stormwater controls.

Ecology, the Authority, and the Department of Community, Trade and Economic Development (DCTED) shall provide local governments with technical assistance on managing stormwater runoff during the growth management planning required under the Growth Management Act.

1.6. Compliance Monitoring

Ecology shall monitor compliance with these requirements, reviewing the status of city and county basic stormwater programs every two years to ensure consistent and adequate implementation and report to the Authority. When Ecology finds that a local program is not in compliance with these requirements, Ecology is encouraged to provide technical suggestions to improve implementation and to allow maximum flexibility and creativity for local governments to resolve site-specific stormwater problems in accordance with their land-use and other local policies.

1.7. Enforcement

If local governments fail to prepare and implement the required programs under this element, the Authority shall follow procedures in RCW 90.70 and request written explanations for the shortfalls, together with their proposed remedies. After monitoring compliance under subelement SW-1.6, Ecology may take enforcement actions against stormwater discharge violations under RCW 90.48 (the State Clean Water Act) or by issuing NPDES discharge permits (see subelement SW-2.3).

Target Date: All cities and counties shall incorporate the Puget Sound Plan's stormwater considerations into critical areas ordinances, countywide policies, comprehensive plans and implementation regulations; adopt ordinances and stormwater manuals, and comply with the basic stormwater program requirements by January 1, 1995. By the same date, cities and counties with ordinances and operation and maintenance programs predating Ecology guidance under element SW-4 shall bring their ordinances and programs into compliance with provisions of this element. By May 1, 1997, Ecology shall complete the first round of biennial reviews.

SW-2. Comprehensive, Urban[5] Stormwater Programs

Starting with the larger cities in the basin that are named in the EPA stormwater NPDES regulation and eventually expanding to cover all urbanized areas, each city and unincorporated urbanized area shall develop and implement a stormwater management program consistent with the requirements of elements SW-1 and SW-2, guidance under element SW-4, and appropriate

5 Urbanized areas are as defined by the United States Bureau of the Census. Counties are responsible for the comprehensive, urban stormwater programs (element SW-2) in unincorporated urbanized areas. Ecology shall ensure that all appropriate areas are included in these programs.

stormwater NPDES regulations. This program shall not affect the Ecology's authority to require appropriate corrective action (pursuant to Chapter 90.48 RCW) whenever existing facilities cause or contribute to violations of state water quality standards. The local government stormwater program shall be submitted to Ecology for review for consistency with the Plan and compliance with stormwater NPDES regulations. Ecology shall provide appropriate assistance to correct local program deficiencies. Ecology shall schedule the development of stormwater management programs by the remaining cities and counties.

The pollution control strategy for achieving the program's goal is to implement the most appropriate best management practices first, assess their effectiveness, and, as necessary, require further water quality controls.

2.1. Purposes of the Urban Stormwater Program

The purposes of the comprehensive programs for managing storm water in urban areas shall be:

1. To control erosion and manage the quantity and quality of stormwater runoff from public and private activities and to protect stream channels, aquatic habitat, wetlands, fish, shellfish, and other aquatic resources.

2. To protect and enhance water quality, and achieve water quality and sediment quality standards.

3. To reduce the discharge of pollutants and eliminate harm to the environment.

4. To protect beneficial uses, as described in Washington state's water quality standards, 173-201 WAC.

5. To achieve purposes 1 through 4 in a manner that makes efficient use of limited resources to address the most critical problems first.

2.2. Scheduling

Ecology shall use the following ranking criteria to schedule development of additional stormwater programs for urbanized areas:

1. Population size.

2. Rate of growth, in absolute numbers.

3. NPDES regulations developed by the U.S. EPA for storm water.

4. Water quality and quantity considerations, including but not limited to, sediment quality, beneficial uses of clean water, shellfish protection, priorities identified by watershed action plans developed pursuant to WAC 400-12 and other watershed planning programs, groundwater management areas, aquifer protection areas, sensitive areas for fish, shellfish, and other aquatic resources, wetlands, or flooding (see subelement SW 7.2).

Ecology shall notify affected jurisdictions at least one year prior to the scheduled start date. Comprehensive programs for managing storm water in urbanized areas shall be completed and fully implemented within five years after notification by Ecology to proceed.

2.3. Coordination with Stormwater NPDES Permits

Starting with the Puget Sound areas designated under the EPA's NPDES Permit Application Regulation for Storm Water Discharges (40 CFR Parts 122, 123 and 124), Ecology shall review permit applications and write watershed-based permits for urbanized areas of Puget Sound that are consistent with these regulations and the requirements of elements SW-1 and SW-2. Permits will be issued using procedures identified in the state's permit writers manual (see element P-5). Additional permits shall be written and phased in as EPA issues additional stormwater regulations under NPDES.

Ecology will assess the federal regulations and the requirements of the Plan and determine whether the state's NPDES rule should be amended or a new rule written to implement these requirements.

When EPA promulgates stormwater regulations for smaller jurisdictions, Ecology shall write NPDES permits for these jurisdictions consistent with the state's permit writers manual, federal regulations, and element SW-1 and SW-2 requirements.

Ecology shall write permits for stormwater discharges associated with industrial activities, including land-disturbing activities of five acres or more, according to requirements of the EPA's NPDES regulation for storm water. These permits shall be consistent with procedures under Ecology's state permit writers manual (see P-5).

2.4. Program Requirements

Each urban stormwater program shall seek to control the quality and quantity of runoff from public facilities and industrial, commercial and residential areas, including streets and roads, consistent with manuals and guidance provided by Ecology under elements SW-3 and SW-4. Where local programs are not effectively solving stormwater problems, Ecology shall ensure compliance with elements SW-1 and SW-2 through its oversight role or through issuance and enforcement of individual or watershed-based NPDES permits.

Ecology shall coordinate development of its stormwater program with other state programs and activities affecting storm water, i.e., the Coastal Nonpoint Pollution Control Program, wetlands protection, floodplain management, nonpoint source pollution programs, underground injection control, growth management planning, and the sediment management-standards program.

Each city or urban area shall have the flexibility to design its own program, but the content, priorities and deadlines for compliance with the program shall be subject to review by Ecology for consistency with provisions of the Plan and the NPDES regulations.

In addition to the provisions of element SW-1, each urban stormwater program shall, at a minimum, include:

a. Identification and ranking of significant pollutant sources and their relationship to the drainage system and water bodies through an ongoing assessment program.

b. Investigations and corrective actions of problem storm drains, including sampling.[6]

c. Programs for operation and maintenance of storm drains, detention systems, ditches and culverts.

d. A water quality response program, to investigate sources of pollutants, and respond to citizen complaints or emergencies such as spills, fish kills, illegal hookups, dumping, and other water quality problems. These investigations should be used to support compliance and enforcement efforts.

e. Assurance of adequate local funding for the stormwater program through surface-water utilities, sewer charges, fees or other revenue-generating sources.

f. Local coordination arrangements within watersheds, such as interlocal agreements, joint programs, consistent standards, or regional boards or committees to address the requirements of subelement SW-1.5.

g. Ordinances requiring implementation of stormwater controls for new development and redevelopment as defined by elements SW-3 and SW-4.

h. A program aimed at educating residents, businesses and industries in the urban area about storm water.

i. Inspection, compliance and enforcement measures.[7]

j. An implementation schedule.

k. If, after implementation of the control measures listed in a-j, there are still discharges that cause significant environmental problems, retrofitting of existing development and/or other water quality controls of discharges from new and existing development may be required.

The quality of storm water in public stormwater systems in commercial and industrial areas shall have a high priority in city and county programs. Ecology shall determine, in compliance with EPA regulations and in consultation with local governments, the appropriate approach to controlling stormwater discharges from industrial and commercial facilities that are not currently required to have stormwater NPDES or point-source discharge permits.

Jurisdictions which annex an area from another jurisdiction shall manage stormwater runoff consistent with the standards designated for the area prior to the annexation. Any new development or retrofitting of existing systems shall

6 The Elliott Bay Revised Action Program: Storm Drain Monitoring Approach, March 1988, Tetra Tech, for EPA Region 10 presents an approach particularly suited to industrial areas.

7 Local governments may request Ecology's assistance with enforcement measures.

meet the most stringent standards. Areas that incorporate shall adopt standards at least as strict as those in place prior to incorporation.

Target Dates: Schedules for stormwater NPDES permits are established by the EPA. By the year 2000, all urbanized areas in the Puget Sound basin identified by Ecology shall implement urban stormwater programs. Ecology shall review and track the ordinances, manuals and other program requirements for each city or county program for substantial progress toward implementation of the elements listed above within two years of its initiation and report to the Authority every two years.

SW-3. Technical Manuals and Assistance on Stormwater and Erosion Controls

3.1. Technical Manual

Ecology shall maintain a technical manual that implements the requirements in elements SW-1 and SW-2 for use by local jurisdictions in stormwater planning. In updating this manual Ecology shall use existing information where possible. The technical manual shall also incorporate the requirements of the Coastal Nonpoint Pollution Control Program and shall provide technical guidance and define minimum requirements for implementing local programs (elements SW-1 and SW-2). The technical manual shall include, but is not limited to:

a. Best management practices for controlling erosion and sedimentation from construction sites, including guidance for operation, maintenance and inspection procedures.

b. Procedures for hydrologic analysis, including selection of design storms and estimates of runoff.

c. Design, operation and maintenance standards for public and private retention/detention facilities and conveyance systems. Emphasis shall be placed on systems that will maximize water quality benefits as well as water quantity control, such as the inclusion of biofiltration techniques where practicable.

d. Techniques for reducing or eliminating pollutants in runoff from problem land uses.

The manual should encourage the use of innovative technologies which have been adequately tested. The manual shall be closely coordinated with the guidance and model ordinances for stormwater programs (element SW-4). Ecology shall review the manual and revise it as needed. Ecology is encouraged to publish supplemental guidelines relating to new technologies for managing storm water when new information becomes available between manual revisions. Ecology shall promptly notify local jurisdictions of changes

to the manual and shall provide technical assistance on its contents to local jurisdictions, citizens and businesses.

Updates of the manual shall incorporate performance standards (percentage of pollutant removal) for best management practices for stormwater runoff and information on the effectiveness of BMPs. The performance standards are intended to promote the most effective stormwater controls through selection, design, operation and maintenance. The failure of a best management practice to meet its performance standards may indicate the need for additional controls, but should not be considered a water quality violation.

Ecology shall establish a review board or use appropriate existing groups composed of representatives from interested and affected entities to review innovative BMPs, and to provide feedback on the manual, its revisions and its implementation.

3.1.1. Vactor Waste

Ecology shall incorporate into the manual a workable, coordinated program for stormwater maintenance (vactor) waste disposal for local governments, the Washington State Department of Transportation (WSDOT), private contractors and others. Ecology shall include reasonable, affordable disposal options for jurisdictions in both sewered and unsewered areas. The program should address testing, classification, disposal and reuse of decant water and solids from stormwater systems in sewered and unsewered areas. Ecology shall seek to resolve any conflicting regulations. The vactor waste program shall be developed in consultation with state, local and tribal governments, and contractors. Local governments shall implement Ecology's guidance on vactor-waste disposal procedures. Ecology shall provide technical and financial assistance to local governments for the handling and disposal of vactor wastes.

3.1.2. Monitoring Guidance

Ecology shall incorporate guidance into the manual on how to monitor stormwater runoff compliance and the effectiveness of best management practices. Ecology shall provide technical assistance to local governments and private industry. The guidance shall be developed using EPA and other related guidelines in cooperation with local governments and private industry. Monitoring guidance should be coordinated with NPDES requirements and be targeted to respond to specific local concerns about water quality and to minimize administrative burdens and costs. When appropriate, the guidance shall include protocols that are consistent with the Puget Sound Ambient Monitoring Program (PSAMP) and related data entry methods. The guidance should include recommendations on publicizing the resulting information, including the use of watershed "report cards" (subelement WP-7.2).

Local governments are encouraged to submit stormwater monitoring results and data on the effectiveness of best management practices to Ecology and the University of Washington Center for Urban Water Resources.

3.1.3. Stormwater Manual Concurrence and Regulatory Streamlining

To ensure state coordination and to simplify requirements, Ecology shall submit drafts of the manual for review and approval to the departments of Fish and Wildlife, Health, and Natural Resources. This review and approval is to ensure that the manual is adequate to protect fish and shellfish habitats, wetlands, and other aquatic habitats and resources and to prevent sediment contamination from stormwater runoff.

After consulting with interest groups, and other agencies, Ecology shall include in the manual, guidance to state and local stormwater permitting agencies, on how to coordinate stormwater permits. The guidance shall minimize overlapping or differing requirements for industrial and municipal NPDES permits, Hydraulics Project Approval permits (HPAs), aquatic land-use authorizations, and local permits. Ecology, the Authority, and the Department of Community, Trade and Economic Development (DCTED) shall also develop guidance to encourage coordinated requirements within a shared watershed, as outlined in subelement SW 1.5. Local governments and other permitting agencies shall make every effort to follow this guidance and defer to other agencies' permits when those permits already provide adequate stormwater controls.

3.2. Stormwater Assistance Service for Local Governments

Ecology shall develop a technical assistance service for storm water. The service should assist local governments, tribes and private industry with: (1) the design and implementation of stormwater programs at the local level; (2) current best management practices for storm water; (3) local basin characteristics; (4) coordination with local government growth management planning activities; (5) vactor waste handling; and (6) habitat protection. The service should be staffed with people who have up-to-date, hands-on experience.

The Authority, Ecology, the Department of Fish and Wildlife, and other agencies, as appropriate, shall offer briefings to elected officials, citizens and other interested and affected groups on the effects of stormwater runoff on stream channels, wetlands, fish and other aquatic habitats and resources.

Ecology, in consultation with local governments, the Association of Washington Cities, the Washington State Association of Counties, the Center for Urban Resources Management, the County Road Engineers Group, and other interested parties, shall develop curricula to train local government and Ecology staff. Training shall include an explanation of state requirements, development and implementation of local programs, and use of the state technical manual. Ecology shall provide the curricula to interested public and private schools.

3.3. NPDES Coordination

Ecology shall provide technical assistance to local governments that are required to obtain stormwater NPDES permits, and to WSDOT and industrial stormwater permittees. Technical assistance shall cover coordination of federal stormwater requirements, the Plan's Stormwater and Combined Sewer Overflows Program, and Ecology's watershed permits for storm water, as well as coordination with other related programs such as HPA permits, the Coastal Nonpoint Pollution Control Program, and locally developed watershed action plans.

Ecology is encouraged not to require stormwater permits for Puget Sound cities or counties unless the following apply: (1) they are subject to the element SW-2 program; (2) a specific water quality problem related to stormwater runoff is identified; or (3) federal laws or regulations require a permit. Ecology shall give each city or county adequate notice of its intent to require a permit. Where Ecology chooses to include more than one local government in a watershed-based permit, it should give the affected local governments a reasonable time to negotiate interlocal agreements.

Target Dates: Ecology completed the first stormwater manual in June 1992 and shall regularly update the manual as necessary. The Vactor Waste Program shall be established by June 30, 1995. Technical assistance is ongoing.

SW-4. Guidance and Model Ordinances for SW-1 and SW-2

Ecology shall review and update guidance and model ordinances for the basic stormwater programs for all cities and counties (element SW-1) and for comprehensive urban stormwater programs (element SW-2) consistent with the Plan.

Ecology shall consult with cities, counties, the Association of Washington Cities, the Washington State Association of Counties, the Municipal Government Research Center, developers, citizens' groups, and other interested parties when it updates the guidance and model ordinances. The guidance shall provide minimum program requirements and shall be consistent with NPDES requirements. Ecology shall develop, as appropriate, additional supplemental guidance for stormwater programs to remain consistent with applicable NPDES requirements. The model ordinances shall be developed with local government assistance and shall be accompanied by useful methods and examples which will assist local governments in adopting these minimum requirements into their regulations. Ecology shall also provide technical assistance to local jurisdictions (element SW-3) during preparation and implementation of their stormwater programs.

Ecology's Water Quality Financial Assistance Program shall ensure that stormwater-related projects are awarded state grants only if they are consistent with the goals of this program and include design elements that implement best management practices consistent with Ecology guidance. The Authority encourages Ecology to offer financial assistance to projects that meet these criteria.

4.1. Guidance for SW-1 and SW-2

The guidance for elements SW-1 and SW-2 shall include:

a. Procedures for developing local programs, including procedures for review of programs and manuals.

b. Minimum requirements for runoff controls and system maintenance required in local ordinances.

c. Minimum requirements for control of private sector maintenance of private drainage systems.

d. Minimum requirements for the operation and maintenance programs, including record-keeping for new drainage systems and facilities, and handling of vactor waste.

e. Methods to assure practical and appropriate disposal procedures for decant water, solids and other substances from cleaning out and maintaining drainage systems. Methods shall address catch basins, oil/water separators, pipelines, swales, detention/retention basins, and other related drainage elements.

Additionally, the guidance for the comprehensive, urban stormwater programs (element SW-2) shall include:

f. Procedures for identifying and ranking significant pollutant sources and their relationship to the drainage system and water bodies.

g. Procedures for source-tracing investigations, including sampling of problem storm drains.

h. Procedures for investigations, implementing spill control measures, enforcement, and remedial actions.

i. Methods to assure adequate local funding for the urban stormwater program.

j. Provisions for agreements with neighboring jurisdictions when storm water and watersheds do not follow jurisdictional boundaries.

k. Requirements for public education programs.

l. Requirements for retrofitting and/or treatment measures, if necessary.

m. Procedures for inspection, compliance and enforcement measures.

n. Requirements for implementation schedules.

o. Methods to coordinate stormwater management with other watershed, habitat protection, and growth management activities.

The guidance shall lay out approaches to control storm water from new development and redevelopment, such as water quality policies for use in SEPA, NPDES and other permit decisions; density controls to limit development in sensitive areas; development standards to limit the amount of impervious surfaces; regional detention ponds; oil separators or other treatment facilities; grading and drainage ordinances; erosion control programs; buffers next to waterways; preservation of wetlands; and other appropriate elements.

In the guidance for elements SW-1 and SW-2, Ecology shall address the issue of responsibility and procedures for dealing with direct discharges of storm water from industrial and commercial facilities into the waters of the state.

4.2. Model Ordinances

The model ordinances for elements SW-1 and SW-2 should describe how local governments can meet or exceed the minimum requirements and shall include at least the following elements:

1. A drainage element which: (a) sets policy; (b) defines the role of surface-water management; (c) defines water quality criteria and standards; (d) provides local enforcement authority; (e) provides for inspection and maintenance of private drainage facilities; (f) authorizes administrative development of operation and maintenance standards, development standards, and spill response procedures; and (g) generally integrates the management of surface waters with other appropriate codes affecting water quality (i.e., the Uniform Fire Code, public health codes, and land-use codes).

2. A clearing and grading element which defines authority to control erosion and provides for inspection and enforcement.

3. An element which ensures protection of streams and wetlands.

Target Date: Ecology has completed the guidance and model ordinances. Regular updates are required as necessary.

SW-5. Puget Sound Highway Runoff (WSDOT)

The Washington State Department of Transportation (WSDOT) shall carry out a program to control runoff from freeways and highways in the Puget Sound basin. This program shall continue to be consistent with Ecology's Puget Sound Highway Runoff Rule (Chapter 173-270 WAC) as described below.

Ecology shall maintain the rule for the Puget Sound Highway Runoff Program and shall continue to coordinate with the WSDOT in its development of a runoff program. Ecology shall provide technical assistance to the WSDOT and local jurisdictions during development and implementation of this program.

Any revisions to this rule shall maintain requirements for:

a. Controlling and/or treating runoff from highways in the Puget Sound basin.

b. Implementing best management practices (BMPs) and/or treatment facilities for new construction.

c. Using BMPs that address the control of water quality and quantity using pesticides in highway rights-of-way, and using de-icing chemicals.

d. Complying with Ecology and local stormwater programs. Ecology shall seek to provide consistent requirements for the highway program in different jurisdictions.

e. Phasing in the runoff program. A priority ranking system will be developed in consultation with Ecology and local and tribal governments for retrofitting water quality BMPs so they factor in vehicle use and site-specific constraints of implementing best management practices. Additional criteria

may be considered. Opportunities for public involvement in the process shall be provided.

f. WSDOT funding of construction and operation and maintenance of local or private stormwater systems receiving highway runoff. Such funding shall be in accordance with RCW 90.03.525, which governs financial contributions from state highway rights-of-way to stormwater facilities. The WSDOT is encouraged to negotiate its appropriate share of specific or private stormwater facilities receiving highway runoff, as allowed for in RCW 90.03.525.

g. Determining site-specific constraints in implementing best management practices and/or treatment measures for existing highways.

h. An implementation schedule.

Ecology shall, consistent with federal stormwater regulations, write a general Puget Sound basinwide permit for the WSDOT highway system to implement the requirements of the Puget Sound Highway Runoff Rule.

Ecology shall evaluate the WSDOT's existing operation and maintenance programs to ensure that measures are taken by the WSDOT to implement high-priority measures first.

Target Date: Puget Sound Highway Runoff Rule (Chapter 173-270 WAC) was completed June 21, 1991. Implementation is ongoing.

SW-6. Runoff from Federal Facilities

As part of the state certification process under Section 401 of the federal Clean Water Act, Ecology shall require that all NPDES permits for federal facilities, including military bases, written by the EPA contain stormwater controls that: (1) are at least as stringent as those required for industrial facilities in Municipal and Industrial Discharges Program (element P-5), including all toxicant and particulate limits and requirements for monitoring, spill control and public notice; and (2) are consistent with the wetlands protection policies under the Plan. The EPA shall review existing EPA-issued permits and modify any permit as necessary to include such limits and requirements. (See Municipal and Industrial Discharges Program elements P-5 through P-11.) Before considering a Clean Water Act Section 401 certification for a federal facility permit, Ecology shall seek to be familiar with the facility site through joint site visits or inspections with the EPA or through other means (for discharges of waste water from federal facilities, see Municipal and Industrial Discharges Program, element P-11).

Target Date: Ongoing as federal permits are prepared.

SW-7. Stormwater-Related Research and Sensitive Areas

Ecology shall conduct a comprehensive search of the literature to identify and rank stormwater research needs, in collaboration with the Research Program (see element R-1), and report the results.

7.1. Stormwater-Wetlands Research

Using the expertise of state universities and local governments as appropriate, Ecology, in coordination with the wetlands inventory element, shall continue to fund and participate in research on short- and long-term effects of stormwater quality and quantity on wetland values and functions. Ecology shall cooperate with state and local agencies that are participating in the Puget Sound Wetlands and Stormwater Management Research Program developed by King County, and in the Urban Water Resources Management Program. Ecology shall encourage a research program designed to obtain the data necessary to develop and support policy and regulatory decisions regarding water quality and the management of stormwater discharges entering wetlands that are consistent with wetlands protection policies in the Plan. Results from this research shall be integrated in the updates of the technical manual (element SW-3) and the model ordinances (element SW-4).

7.2. Stormwater-Related Habitat Damage and Sensitive Areas

The Department of Fish and Wildlife, in consultation with the departments of Health and Natural Resources, local governments, and tribes, shall periodically prepare a listing of habitats of fish, shellfish and other aquatic resources that have been damaged by stormwater runoff and combined sewer overflows, and shall identify the most sensitive areas for stormwater and CSO controls. Where possible, sensitive areas should be identified by stream segment. The Department of Fish and Wildlife shall provide this information to the Authority, Ecology and local governments.

7.3. Stormwater, Wetlands, Fisheries, Growth Policy Assessment

In consultation with the EPA, the state departments of Ecology, Transportation, Fish and Wildlife, Natural Resources and Community, Trade & Economic Development, and local and tribal governments the Authority shall promote the development of policies to resolve conflicts regarding competing stormwater management, wetlands protection, and fishery protection program mandates.

Target Date: Ecology's participation in the wetlands research project is ongoing. The Department of Fish and Wildlife shall provide the first listing of sensitive areas by June 30, 1995, and update it as frequently as necessary.

SW-8. CSO Reduction Guidelines

The goal of the guidelines for reducing CSOs shall remain to achieve the greatest reasonable reduction of pollutants from both storm water and sanitary sewage in CSOs. If local governments choose stormwater separation as a CSO reduction technique, best management practices, including a pollution source-control program, shall be required and the effects of storm water on receiving waters shall be monitored by the municipality as required by Ecology. Ecology shall also update the guidelines as necessary and provide technical assistance to local governments implementing the guidelines (element SW-9).

SW-9. CSO Reduction Plans by Cities (or Sewer Districts)

As required by the state Clean Water Act (RCW 90.48.480), each city, sewer jurisdiction or other entity with CSOs[8] shall carry out its plan to achieve

8 Deadline set by current state law. All CSO deadlines in this program are based upon the need to comply with current state law requiring CSO reductions. Cities known to have CSOs, and therefore affected by this requirement, are Seattle (and Metro), Anacortes, Bellingham, Bremerton, Everett, Mount Vernon, Olympia, Port Angeles and Snohomish.

greatest reasonable reduction of CSOs consistent with Ecology guidelines. The plans should include priority ranking of CSOs, implementation schedules, and provisions for funding the corrections. Ecology will continue to review the plans, develop compliance schedules and modify NPDES permits.

Target Dates: The controls are to be implemented according to a compliance schedule negotiated between Ecology and each jurisdiction. Ecology will ensure compliance as necessary.

MAJOR PUBLIC ACTIONS FOR AUTHORITY REVIEW

1. Ecology guidance for urban stormwater programs (element SW-4).

2. Ecology's model ordinances and guidance (element SW-4) and technical manual (element SW-3).

3. Program for Puget Sound highway runoff (element SW-5).

4. Compliance with the Stormwater and Combined Sewer Overflows Program by local governments, tribes, businesses, industries and federal facilities.

5. Listings of sensitive areas and damaged habitats under subelement SW-7.2.

LEGISLATION REQUIRED

None.

ESTIMATED COSTS

The incremental cost beyond other Clean Water Act requirements of fully implementing the Stormwater and Combined Sewer Overflows (CSOs) Program is estimated to be $90.8 million during the 1995-97 Biennium and $130.8 million during the 1997-99 Biennium. This makes it the most expensive program in the Plan. It should be noted that local governments, industry and business have already made substantial investments to address their stormwater problems. The costs are greatest for elements SW-1, Basic Program and Ordinances, SW-2, Urban Stormwater Management Program, and SW-5, the Puget Sound Highway Runoff Program. Most of these costs are borne by local governments and the state department of transportation.

Although some of the local costs may be supported by the Centennial Clean Water Fund, the bulk of the costs are expected to be funded through the formation of local drainage or utility districts. Comprehensive control of storm water from non-NPDES permitted industrial or commercial facilities is a potentially expensive task, not currently included in cost estimates for the stormwater or municipal and industrial discharges programs. Some additional costs would be borne by private industry and developers ranging from a few thousand dollars for simple erosion and source controls to hundreds of thousands of dollars for stormwater detention and treatment systems.

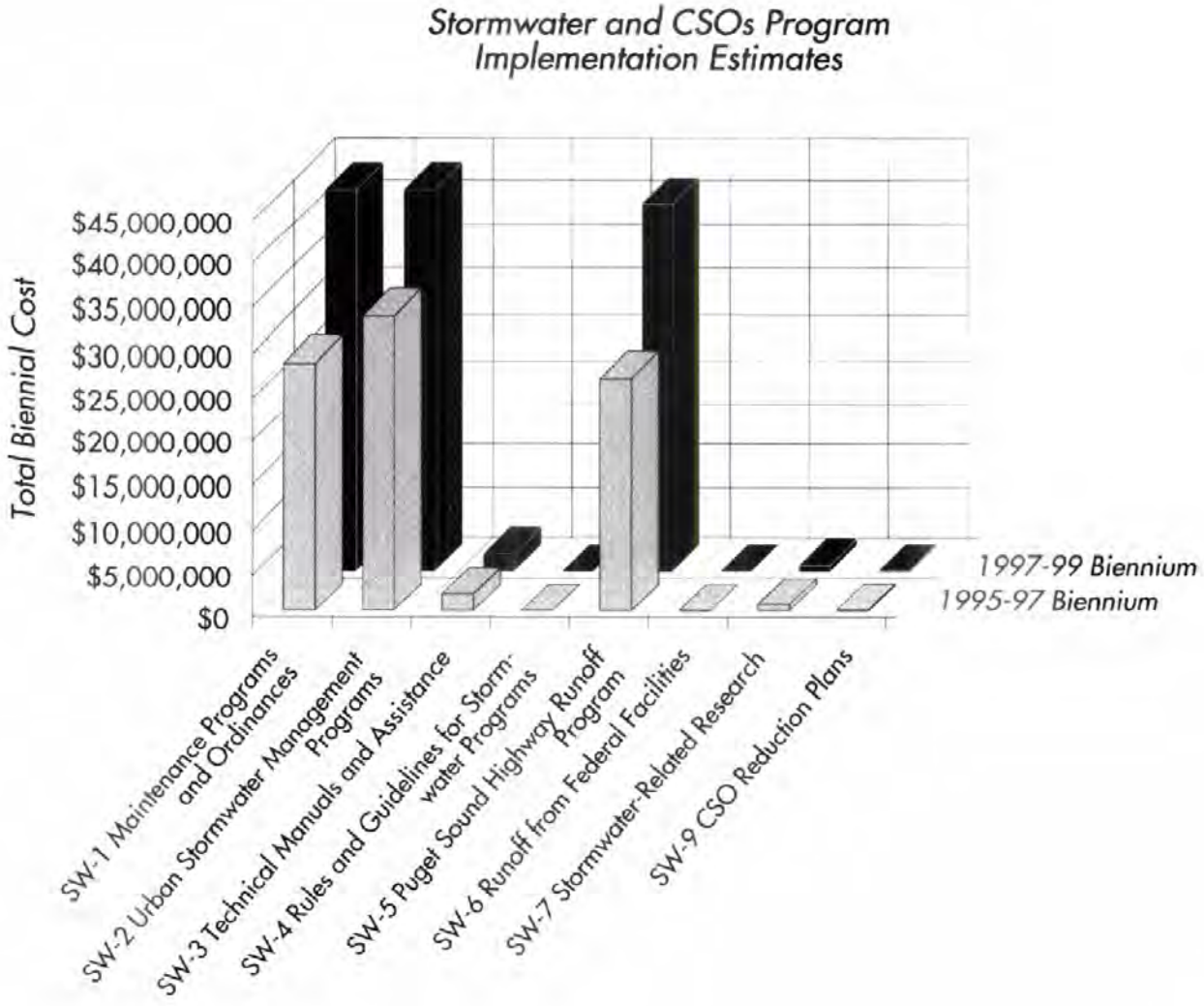
CSOs

The CSO control programs are expensive. Metro, Seattle and Everett estimated the costs of eliminating their CSOs. Total costs for these cities to control

CSOs to the ultimate goal of one overflow per year would be approximately $425 million, of which $289.5 million would be for Metro. Ecology estimated the cost of eliminating CSOs in other cities at $230 million. These costs are a result of existing legal requirements; this Plan does not impose new requirements on CSOs.

Growth Management and NPDES

Many of the costs associated with the Stormwater and Combined Sewer Overflows Program are also called for in growth management planning requirements and under the stormwater NPDES permit program. Both of these factors have resulted in more jurisdictions using Ecology stormwater guidance to comply with the Puget Sound Plan stormwater requirements.



LABORATORY SUPPORT PROGRAM

PROGRAM ELEMENT DIRECTORY

PROBLEM DEFINITION

Many of the programs in the Puget Sound Water Quality Management Plan (Plan), such as Monitoring and Shellfish Protection, depend on accurate and timely laboratory analyses. Laboratories provide information on the presence, concentrations and effects of contaminants in Puget Sound. Lab information is needed to design programs that remedy the effects of contaminants and prevent or limit future contamination.

Many lab analyses are conducted pursuant to federal, state or local laws designed to prevent water quality degradation and threats to human health. For example, the federal Clean Water Act requires routine monitoring of municipal and industrial wastewater discharges. The state Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA) rely on lab results to assess compliance with the law and specific permit requirements, and to determine whether enforcement action is necessary. The state Department of Health (DOH) relies on results of water quality and shellfish tissue analyses to determine whether levels of fecal coliform bacteria are within specific levels designed to protect human health. Laboratory analyses also are conducted for routine ambient monitoring to establish trends and for investigations associated with specific research projects.

Standardized protocols (procedures) for collecting and analyzing many types of environmental samples within Puget Sound exist, but their use is not uniform. The Puget Sound Estuary Program Protocols and Guidelines (PSEP Protocols and Guidelines) were developed to standardize sample collection and analysis within the Sound so that data may be compared and long-term environmental trends determined. Although many agencies increasingly are using the protocols and guidelines, data are still collected that are not comparable.

Standardized, clearly defined quality assurance and quality control (QA/QC) procedures are necessary for many types of analyses. However, when they exist, there is no method for determining the extent to which they are followed, or whether the procedures are uniformly applied across different programs and among different agencies. Consequently, lab results may come into question and may not be helpful.

Analyses of environmental samples within Ecology are performed or contracted by Ecology's environmental laboratory at Manchester. Improvements have been made in sample tracking, management systems, turnaround time, information flow and training of lab users and personnel at the laboratory. However, additional improvements are needed in areas such as predicting how many employees are needed. Samples exceeding laboratory capacity are sent to private (and sometimes public) laboratories for analysis.

AUTHORITY'S APPROACH

The 1987 Plan called for developing a laboratory certification program to certify the accuracy of laboratory sample collections, and laboratory support for agency sampling programs. A laboratory certification plan would be developed to certify labs in a phased manner.

Revisions to the Plan in 1989 and 1991 directed the Authority, with EPA and Ecology, to develop Puget Sound protocols to assure quality and consistency in handling samples. In addition, Ecology was directed to develop a QA/QC plan and program for sampling and analyses and establish a QA/QC work group to provide continuing oversight.

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: (1) establish a laboratory certification program administered by Ecology that will review the capability of environmental laboratories to generate data of known quality; (2) assure that adequate laboratory support exists for agency and other sampling programs; (3) develop and update protocols and guidelines to standardize data collection, analysis and transfer within Puget Sound, and to encourage their use uniformly for all data collected in Puget Sound; and (4) develop and encourage the use of uniform quality assurance guidelines for data collected under all Puget Sound programs.

PROGRAM ELEMENTS

L-1. Laboratory Certification Program

[Completed portions of this element have been deleted.]

Ecology shall continue to implement a laboratory certification (also referred to as "accreditation") program. As a part of the certification program Ecology shall adopt rules requiring all certified laboratories to use approved field and laboratory protocols and to comply with specified quality assurance and quality control procedures. Ecology shall inform all certified labs that the use of adopted PSEP Protocols and Guidelines (element L-3) is required for many Puget Sound plan programs. Ecology shall implement the PSEP Protocols and Guidelines in the Ecology laboratory at Manchester.

Target Dates: Ecology is to continue its ongoing efforts to carry out the lab accreditation program.

L-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 accept-

able holding times[1] 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 a 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 Authority an updated laboratory plan that includes: (1) a revised estimate of the number and types of analyses needed to support Ecology programs; (2) 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 (3) an updated analysis of the additional laboratory capacity needed to carry out these analyses within the target turnaround times which Ecology shall specify.

In preparing the laboratory plan, Ecology shall consult with other state agencies, including the departments of Health, Agriculture, and Labor and Industries, and tribal and local governments to incorporate their laboratory needs and capabilities related to the Puget Sound Plan in the reports.

Target Dates: Ecology to submit biennial updates to the laboratory plan.

L-3. Puget Sound Estuary Program Protocols and Guidelines

Ecology, in consultation with the EPA and the Authority, shall develop and implement a process for the review and adoption of PSEP Protocols and Guidelines (element L-1). 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 which 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 QA/QC needs for the use of each updated protocol. Ecology shall recommend the PSEP Protocols and Guidelines to the Puget Sound Estuary Program Management Committee for adoption.

New protocols and guidelines shall be developed and existing protocols and guidelines revised as needed and reviewed biennially.

Target Dates: Ecology shall ensure that the existing Puget Sound Estuary Management Protocols and Guidelines are reviewed and revised by July 1995.

1 Turnaround time is the time between submittal of sample to laboratory and receipt of results (after quality assurance) by the requester.

L-4. Quality Assurance/Quality Control

Ecology has prepared a Quality Assurance Management Plan that addresses quality assurance and quality control issues related to the collection of environmental data in support of Ecology programs and projects. The plan shall be used to ensure uniform quality assurance practices are incorporated into all of Ecology's activities to develop data. Implementation of the plan should include requirements for (1) QA project plans; (2) training in, and technical assistance with, QA/QC principles and practices; and (3) QA audits of selected projects. Ecology QA project plans shall require the use of PSEP Protocols and Guidelines and of data qualifiers and formats for data transfer specified in element M-4 where appropriate.

The QA/QC program shall include the following:

- Establishment of guidelines for the preparation of quality assurance project plans as required by the state/EPA agreement.[2] The guidelines shall include establishment of specific objectives and development of sampling and analysis plans commensurate with objectives for major surveys.
- Audits of data quality (based on selected QA project plans), 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.
- Training for Ecology 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.
- QA/QC assistance to the Ecology staff, including guidelines for use by regional office and industrial section staff in reviewing discharge monitoring report (DMR) data, guidelines for use by regional and environmental investigations staff in their evaluation of environmental laboratories, and technical guidance to Ecology staff concerning QA/QC in general.
- Other appropriate measures resulting from issues identified during the planning process.

Target Dates: Ecology provides annual reports on the implementation of the Quality Assurance Management Plan to the Authority beginning July 1, 1994.

MAJOR PUBLIC ACTIONS FOR AUTHORITY REVIEW

1. Revisions to Ecology's QA/QC management plan (element L-4).

LEGISLATION REQUIRED

None.

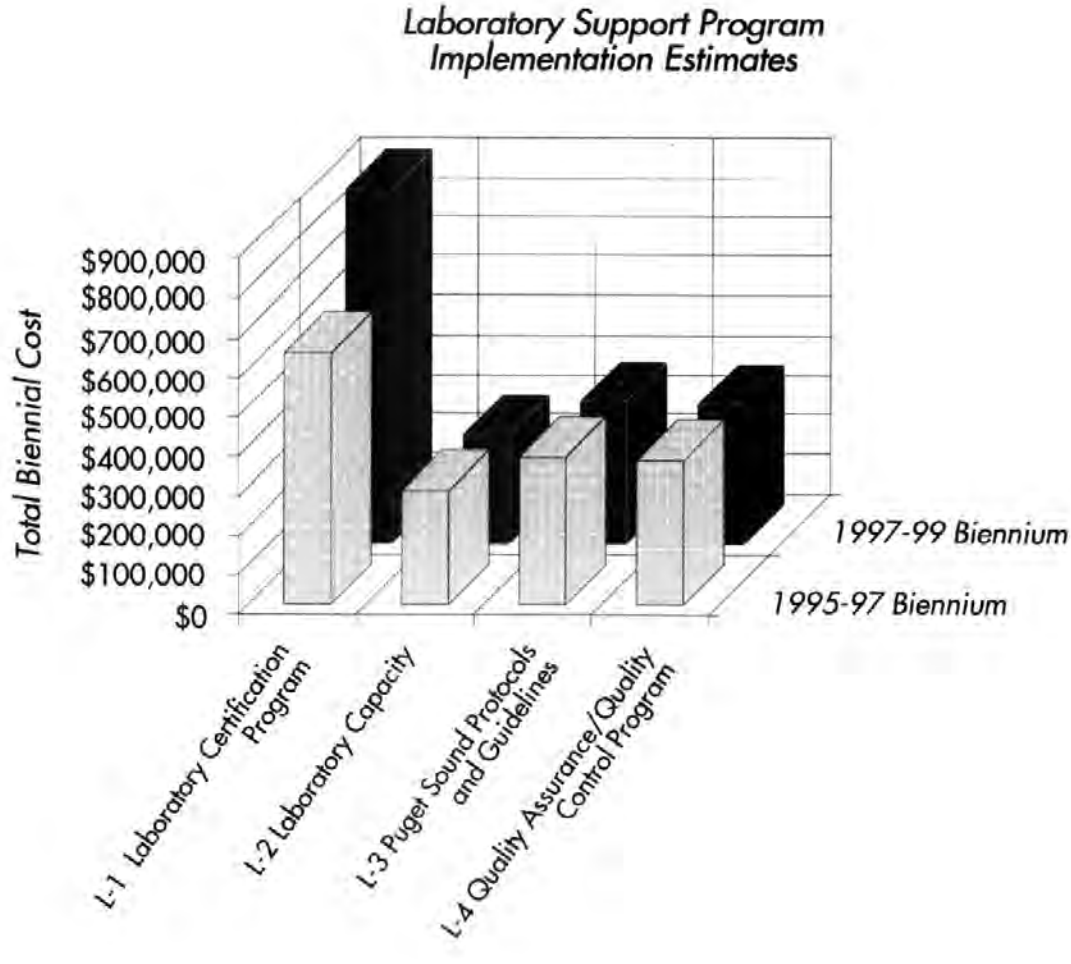
2 An agreement negotiated annually between the Department of Ecology and the EPA (known as the State/EPA agreement).

ESTIMATED COST

To fully implement the Laboratory Support Program would cost an estimated 1.7 million during the 1995-97 Biennium and $1.9 million during the 1997-99 Biennium. This money will cover the lab accreditation (certification) program, conducting an ongoing assessment of the needs for laboratory capacity and making recommendations on how to provide for this, and maintaining and updating lab protocols and a quality assurance and quality control program.

Ideally the costs for conducting the certification program (element L-1) will be raised charging fees for lab accreditation reviews. These fees currently generate about $1.3 million statewide. Any increase in fees will be subject to Initiative 601 limitations.

The laboratory certification program may entail private sector costs (beyond the certification fees) to those NPDES (National Pollutant Discharge Elimination System) permit holders not participating in an EPA-approved quality assurance program, to private laboratories and to others who utilize private laboratories. These costs will vary depending upon several factors, including the current quality of the equipment and staff of the lab applying for certification and the protocols called for in the certification program.



Chapter 3.
The Unfinished Agenda

INTRODUCTION

The action plan contained in Chapter 2 of this document represents a comprehensive program to protect Puget Sound. The Plan consists of 13 programs that address the major threats to the Sound. A number of other issues affecting the health of the Puget Sound environment were reviewed by the Authority as part of the initial scoping of the Puget Sound Plan and during public reviews of the 1989, 1991 and 1994 Puget Sound Water Quality Management Plan. This chapter contains a complete list of unfinished agenda items to be considered by the Authority and the public in the future.

UNFINISHED AGENDA ISSUES, DECISIONS AND CURRENT STATUS

The following topics have been identified as issues the Authority should consider for possible inclusion in future Puget Sound plans:

Aquaculture

Aquaculture in the state of Washington involves the controlled cultivation and harvest of aquatic animals and plants such as shellfish, finfish and edible "sea vegetables" (marine algae). This industry utilizes a number of different methods to produce a wide variety of species, including tideland cultivation, off-bottom culture (for oysters), open-water suspension, net-pen rearing, and pond or tank culture.

There has been substantial public controversy over some aspects of the aquaculture industry, particularly over the floating culture of salmon, shellfish and nori. Opposition to the siting of these aquaculture facilities has focused on potential conflicts with boating, fishing and aesthetic values (such as residential views). Other concerns are related to the potential effects on water quality and bottom organisms. There have been some additional questions about the introduction of disease, antibiotics and competition with natural fishery stocks.

Contamination of the Sea-Surface Microlayer

The sea-surface microlayer, located at the interface between the water and the air, is only about 0.002 inches (50 micrometers) thick. It is composed of a complex mixture of natural and (sometimes) synthetic substances which float on the surface of the water. The sea surface is a highly productive habitat, supporting an abundance of bacteria, microalgae and planktonic animals that feed on these sources of food. At certain times in their development, the eggs and larvae of many marine animals (e.g., crabs, sole, flounder, cod and hake) are buoyant and may be exposed to contaminants in the sea-surface microlayer.

Contaminants with low solubility in water and contaminants associated with floating particles can become concentrated at the sea surface. Concentrations of contaminants can be orders of magnitude greater in the microlayer than the concentrations of the same contaminants in the underlying water. Substances that have been found to concentrate in the microlayer in Puget Sound include both natural and anthropogenic PAHs, PCBs, pesticides, metals, oils, greases, inorganic nitrogen compounds, and bacteria. Sources of contamination to the sea-surface microlayer may include the atmosphere, petroleum or fuel spills, disposal of dredged material, recreational and commercial boating activities, stormwater runoff and other nonpoint pollution sources, and the water column (e.g., floatable oil and grease and organic matter from wastewater treatment plants or industrial outfalls).

The Environmental Protection Agency (EPA) sponsored a microlayer workshop in 1989. Since being released, the results of that workshop have guided further research.

Effects of Air Pollution on Water Quality

Examples of sources of air pollution include industrial smokestacks, motor vehicle exhausts, woodstoves, aerial spraying of pesticides, evaporation from waste treatment plants, slash burning, landfill gases, incinerator emissions, and release of volatile substances from dry cleaners. Pollutants may enter Puget Sound waters through precipitation or direct fallout. Pollutants may also enter Puget Sound via surface-water runoff that picks up air pollution contaminants that have been deposited on the ground.

Recent studies indicate that atmospheric deposition is a major pathway by which toxic pollutants, such as metals, pesticides, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) enter the upper Great Lakes. In some coastal areas (such as the southern California Bight) measurements show that up to half of the PAHs and particulate metals entering the water come from direct atmospheric deposition. An EPA-funded study to evaluate atmospheric deposition of toxic contaminants to Puget Sound was completed in 1991 but no immediate actions were recommended.

Freshwater Use and Availability

There are many competing interests for the use of fresh water. Some interests require that water remain in the streams or rivers. For example, fish production depends on adequate in-stream flows and habitat conditions. Hydroelectric power and some recreational activities (such as boating and fishing) also depend on adequate in-stream water supplies. Other activities require diver-

sion of the water for out-of-stream uses. Industrial, commercial, residential and agricultural users compete for the water that is withdrawn from the stream.

Authority activities have been limited to reviewing and commenting on significant activities, such as the recommendations of the Joint Select Committee on Water Resource Policy and the Water Use Efficiency Study Committee.

Groundwater Contamination

Contaminated groundwater can carry pollutants to the waters of Puget Sound. Groundwater basins can be hydrogeologically linked both to surface waters in the basin and to the Sound itself. Thus, pollutants in ground water can affect water quality in the Sound. Contaminants can reach ground water from a variety of sources including improper disposal of solid or hazardous wastes, failing on-site sewage disposal (septic) systems, spills and accidents, and other activities that allow potential contaminants to migrate underground.

Ground water carrying contaminants to Puget Sound has been confirmed in Commencement Bay, Eagle Harbor and Budd Inlet. Both sites involve wood preserving operations where creosote and other organic compounds have built up in the ground over time and are now visibly seeping into Puget Sound. The direct link between contamination of surface water and ground water is illustrated in the Nooksack River where applications of the pesticide EDB to farm fields has contaminated both surface and ground water.

Hazardous Materials Spill Prevention and Response

Large quantities of petroleum and other hazardous substances are produced, stored and used in the Puget Sound basin. There are thousands of shipments of these substances every year by barge and tanker on Puget Sound, and by air, tank, truck, rail car, and pipeline over and around the Sound. Although the Plan's Spill Prevention and Response Program was revised in the 1994 Plan, the issues related to upland spills have not been addressed in the Plan.

Human Health Risks

Human health risks associated with Puget Sound and its resources can be categorized into two general areas: (1) human health implications associated with direct physical contact with the shorelines or waters of the Sound and (2) health implications associated with the recreational and commercial harvest and ingestion of sea vegetables, shellfish and fish from the Sound.

Concentrations of biological and chemical contaminants are typically highest in urbanized embayments around the Sound. Algae, shellfish and groundfish living near these polluted areas have been found to contain high levels of certain contaminants. While most of the seafood captured in the Sound is probably consumed with no unpleasant or dangerous side effects, the routine ingestion of large quantities of contaminated seafood over a lifetime may pose a health risk to a consumer of Puget Sound resources.

Northwest Straits Marine Sanctuary

By direction of Congress, the National Oceanic and Atmospheric Administration (NOAA) is conducting a study of northern Puget Sound for possible designation as a national marine sanctuary. The study area under consideration

includes, in general, the waters surrounding the islands of San Juan County; waters off Cherry Point and Lummi Bay in Whatcom County; waters surrounding Cypress Island in Skagit County; waters surrounding Smith and Minor islands and Partridge Banks in Island County; waters surrounding Protection Island in Jefferson County; and waters up to the high-water mark in Discovery Bay, Sequim Bay, and Dungeness Bay and surrounding Dungeness Spit in Clallam County. The proposed western boundary of the study area follows longitude 123° 10' west to the Canadian border. Some or all of the study area could be included if a sanctuary is established.

Title III of the Marine Protection, Research and Sanctuaries Act of 1972 authorizes the Secretary of Commerce to designate specific marine areas as national marine sanctuaries to protect their distinctive conservation, recreational, ecological, historical, research, educational, and aesthetic qualities. The Act is administered by the NOAA through the Office of Ocean and Coastal Resource Management, Marine and Estuarine Management Division.

The planning process for a national marine sanctuary involves the preparation of a draft environmental impact statement/management plan (DEIS/MP) and specific regulations. The DEIS/MP will examine the impacts of designation of northern Puget Sound as a sanctuary, including an analysis of alternatives for protecting and managing the proposed sanctuary's resources. Subsequent steps in the designation process include public hearings on the DEIS/MP and preparation and submission of a prospectus to Congress. If the prospectus is approved by Congress, the final step will include the preparation of a final management plan/environmental impact statement and the development and issuance of sanctuary designation determination and findings. All final terms of the plan must be approved by the governor of Washington.

The proposed boundaries of the Northern Puget Sound Marine Sanctuary lie within the planning area of the Puget Sound Water Quality Management Plan. These overlapping state and federal jurisdictions raise a number of important questions regarding management authorities, responsibilities, and coordinating functions.

Nutrient Effects

Sewage effluent discharged into the fresh and marine waters of the Puget Sound area contains high levels of both organic and inorganic forms of nitrogen and phosphorus. Other sources of excess nutrients include fertilizers, animal wastes, and on-site sewage disposal systems. These nutrients can, in certain instances, stimulate the growth of phytoplankton, sediment microalgae, macroalgae, kelp, seagrasses, and marsh plants, particularly in vertically stratified bays and inlets and along shorelines where nutrients might otherwise be limiting. Excessive phytoplankton growth from human-caused introduction of nutrients can lead to oxygen depletion in the bottom waters. Fish kills and other biological effects may occur as a result of this depleted oxygen.

Although there have been few recent reported fish kills in the marine waters of the Sound, there may be other biological effects from nutrient enrichment that are currently not well understood or are not being detected. For example, there is some evidence that the growth and population dynamics of the plank-

tonic dinoflagellate *Gonyaulax catenella*, the organisms that causes paralytic shellfish poisoning (PSP), may be influenced in some cases by anthropogenic additions of nutrients. Nutrient inputs may shift the natural population patterns of phytoplankton species and have effects further up the food chain. In addition, macro-algal growth may be enhanced by nutrient additions in the nearshore and shoreline areas of the Sound.

Nutrients may be contributed to the Sound from a variety of sources other than sewage treatment plants. These include storm water, on-site sewage disposal systems, nonpoint runoff from heavily fertilized agricultural and forestlands, industrial discharges (e.g., pulp and paper mills), and atmospheric deposition.

The increased population projected for the Puget Sound area will result in increased nutrient loadings to Puget Sound. Nutrient effects in shallow, stratified bays and inlets around the Sound may increase unless sources of excess nutrients are detected and controlled.

Plastic Debris in Marine Waters

Because of their durability, plastics are causing substantial pollution of marine waters. Plastics have become the most common objects sighted at sea. They typically comprise one-half to two-thirds or more of all surface objects sighted. Studies have indicated that the coasts of Oregon and Washington have one of the highest concentrations of marine plastic debris in the world. In fact, a Japanese survey concluded that the Washington coast had a higher percentage of floating debris than anywhere else in the Pacific.

The most serious concern of plastic debris in marine waters, however, is the harm to marine life though entanglement or ingestion. Entanglement can lead to drowning, starvation, strangulation or predation. Loss of limbs through infection from entanglement is also common.

In December 1988, the Marine Plastic Debris Action Plan for Washington state was released by the Department of Natural Resources. Prepared by the Marine Plastic Debris Task Force, it contains 20 action recommendations for how to reduce and respond to plastic marine debris. The Authority is committed to continuing work on this issue, including possibly adding program language in future plans.

Transboundary Pollution

Washington state and the Canadian province of British Columbia share the Strait of Juan de Fuca and part of the Strait of Georgia. Contaminants entering British Columbia's waters from point and nonpoint sources often end up in the Strait of Georgia and can be transported into Puget Sound. It is unclear exactly how much pollution is transported either way between British Columbia and Washington, but the 1994 report of the B.C./Washington Marine Science Panel identifies increasing threats to the marine waters of British Columbia and Washington.

Treatment of Domestic Wastes

Many elements of the Puget Sound Plan and regulatory programs administered by Ecology and the EPA deal with the treatment of domestic wastes. Howev-

er, there are a number of issues that deserve further review. Some of these include: the production, treatment, use, and disposal of domestic sludge; the use and effects of chlorine in the wastewater treatment process; and water reuse.

Municipal sewage sludge is the semi-solid material left over after treatment of sewage, while septage is the semi-solid material pumped from septic tanks and marine holding tanks. Sludge may be treated to reduce its volume and to lessen risks to public health and the environment. Treated sludge is a useful fertilizer, and most sludge in the Puget Sound area is applied to the land for silviculture, land reclamation, and composting. Certain risks are associated with the use of sludge due to its contamination with heavy metals, pathogens, and toxic organic compounds. Cadmium in sludge can be taken up by plants and potentially could poison animals or humans. Excessive use of sludge can also contaminate ground water or surface water with nitrates.

Chlorine is applied to waste water in the final stages of treatment to kill bacteria, viruses and protozoans that may be harmful to humans. However, chlorination of sewage effluent may create other problems in the fresh and marine waters where treated waste water is discharged. Chlorine can chemically combine with organic substances in the effluent and form highly toxic chlorinated organic compounds. Chronic toxicity effects have been detected in fish exposed to low concentrations of residual chlorine compounds in water.

Chlorination may kill the microbial organisms (usually fecal coliform and fecal streptococci bacteria) that serve as indicators of the potential presence of harmful organisms while allowing pathogenic viruses and other microorganisms to pass through the treatment process unharmed by the chlorine and undetected (depending on the degree and type of chlorination treatment used). Researchers have found that chlorine-treated wastewater effluent may contain viruses even though no fecal coliform bacteria are present. This is a public health concern because viruses cause many of the diseases that are spread through the presence of domestic waste water, and most of the more dangerous viruses cannot be easily measured with existing technology.

Urban water supply and disposal systems generally take in drinking water from the mountains or from ground water and, after treatment, discharge it to salt water. This water bypasses the rivers, streams, wetlands, lakes and aquifers of the freshwater system with poorly understood effects. Additional consideration should be given to opportunities for reuse and for putting treated wastewater back into the freshwater system.

INCENTIVES

As environmental regulations have become more common, their cost has become apparent to two major groups. Businesses have found that it is very expensive to comply with regulations, particularly when they are very rigid, allowing for little in terms of innovative responses. Government regulators have also found that enforcement of the regulations and the monitoring of compliance is costly. In fact, inadequate resources to fund these activities is a chronic difficulty for government.

This situation has caused many regulators, environmental planners and business groups to seek new approaches to environmental policy that are at least as effective as traditional regulatory approaches to preventing degradation of the environment. One approach is using market-based incentives to reach predetermined pollution abatement goals. Environment 2010 prepared an issue paper on this topic.

This approach, also called environmental economics, is a way of harnessing the forces of the marketplace in order to most effectively and efficiently achieve specific environmental goals and standards. Government regulators (and the public) establish specific environmental goals. Then mechanisms are brought into play which take advantage of the forces of the marketplace in our economy.

Two types of market-based incentives that have been used or proposed elsewhere are subsidies, to provide a positive inducement to do something, and taxes or fees, which provide a negative incentive.

Subsidies

Subsidies can be both direct and indirect. Government can provide direct financial backing or technical assistance to businesses as they work to develop more efficient and cost-effective practices which generate less waste. This direct form of assistance can be tailored so that it will not be provided unless the business first makes a "good faith" effort on its own. The proposal for a university-based institute to develop pollution control technologies included in the Municipal and Industrial Discharges Program (element P-27) represents a proposed state subsidy of technology development. Indirect subsidies can be provided through various sorts of tax breaks for costs associated with waste reduction. Washington state provides tax benefits for pollution control equipment in certain cases.

Taxes and Fees

Taxes and fees are a way of providing a negative incentive so that a business will be motivated to seek a way of decreasing the amount of wastes that are being generated. The fees would be levied by government in addition to the costs that have to be paid for treatment, storage, or disposal of the waste. Economic theory would hold that this fee or tax should be high enough that it would reasonably cover all of the social costs incurred as a result of the long-term environmental effects of the existence of the waste. The business decision to produce, or continue producing, the waste would then be based on the true costs controlled by the decision. Many of these costs are not normally accounted for today.

It is important to recognize that a market-based incentive system cannot be successful without a major commitment by regulators to enforce the program. Since permits would be for a set quantity of discharge, and the marketable system gives a significant economic value to the exact quantity discharged, monitoring the exact amount discharged by each outfall would be more necessary than with the current technology-based permit system. The method also includes an assumption that it is the total quantity discharged, regardless of its location or form, that affects the environment. Yet in Puget Sound we

have a pattern of sediment "hot spots" associated with individual discharge points. So a system of marketable discharge permits for Puget Sound would need an additional mechanism to account for the locations of discharges.

OTHER ISSUES

Other issues that have been identified include the special needs of islands, improved and expanded public access to Puget Sound shorelands, protection of sole-source aquifers, and the issue of fecal coliform bacteria contamination generated by seal populations.

Appendix A. Acronyms

AET—apparent effects threshold

AKART—all known, available, and reasonable treatment

BMP—best management practice

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

CSO—combined sewer overflow

CWA—Clean Water Act

CZARA—Coastal Zone Act Reauthorization Amendments

CZM—coastal zone management

CZMA—Coastal Zone Management Act

DCTED—Department of Community, Trade and Economic Development

DEIS/MP—draft environmental impact statement/management plan

DMR—Discharge Monitoring Report

DNR—Washington Department of Natural Resources

DOD—Department of Defense

DOH—Washington Department of Health

DSHS—Washington Department of Social and Health Services (currently known as Washington Department of Health)

EIS—environmental impact statement

EPA—U.S. Environmental Protection Agency

FDA—U.S. Food and Drug Administration

FTE—full-time equivalent

FY—fiscal year

GIS—geographic information system

GMA—Growth Management Act

HCCC—Hood Canal Coordinating Council

HPA—Hydraulic Project Approval

IPM—Integrated Pest Management

ITAT—Interagency Technical Assistance Team

K-12—kindergarten through 12th grade

MGD—millions of gallons per day

MMC—Monitoring Management Committee

MOU—memorandum of understanding

MSD—marine sanitation device

MTCA—Model Toxics Control Act

NEP—National Estuary Program

NEPA—National Environmental Policy Act

NOAA—National Oceanic and Atmospheric Administration

NPDES—National Pollutant Discharge Elimination System

NPS—National Park Service

NRCS—U.S. Natural Resource Conservation Service

OFM—Office of Financial Management

OMS—Office of Marine Safety

OSC—Outer continental shelf

PAH—polycyclic (polynuclear) aromatic hydrocarbon

PCB—polychlorinated biphenyl

PCHB—Pollution Control Hearings Board

PIE FUND—Public Involvement and Education Fund

POTW—publicly-owned treatment works

PSAMP—Puget Sound Ambient Monitoring Program

PSDDA—Puget Sound Dredged Disposal Analysis

PSEP—Puget Sound Estuary Program

PSP—Paralytic Shellfish Poisoning

PSWQA—Puget Sound Water Quality Authority

QA/QC—quality assurance and quality control

RCRA—Resource Conservation and Recovery Act

RCW—Revised Code of Washington

RMRP—(Pacific Northwest) Regional Marine Research Program

SAO—sensitive areas ordinance

SEPA—State Environmental Policy Act

SMA—Shoreline Management Act

SPCC—spill prevention control and countermeasure

SPI—Superintendent of Public Instruction

TAC—technical advisory committee

TFW—Timber/Fish/Wildlife Project

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 Department of Fish and Wildlife

WDIS—Wastewater Discharge Information System

WSDOT—Washington Department of Transportation

WPLCS—Wastewater Permit Life Cycle System

WSU—Washington State University

Appendix B. 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.

AMPHIPODS
Small shrimp-like crustaceans such as sand fleas and related forms. Many live on the bottom (i.e., are benthic) and feed on algae and detritus.

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.

APPARENT EFFECTS THRESHOLD (AET)
The highest sediment concentration of an individual chemical contaminant which is not associated with adverse biological effects. Samples with concentrations of contaminants above the AET have always shown adverse biological effects.

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.

BIVALVE
An aquatic invertebrate animal of the class *Bivalvia*. Bivalves, such as clams and oysters, have two shells (valves) and most are filter feeders.

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.

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.

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. ElSs 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.

FULL-TIME EQUIVALENT (FTE)

The work one person does in one year—used to estimate costs and people needed to perform certain actions.

FUNGICIDE

A substance that destroys or inhibits growth of fungus.

GEOGRAPHIC INFORMATION SYSTEM

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.

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.

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.

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 AUTHORITY (AUTHORITY)
The state agency which is responsible for development and oversight of the Puget Sound Water Quality Management Plan.

REGULATED WETLANDS
See section W-2.1.

REGULATORY FRAMEWORK
A particular set of laws, rules, procedures, and agencies designed to govern a particular type of activity or solve a particular problem.

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 Authority is incorporated in the code as Chapter 90.70 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 (as distinct from a salmonoid which is merely a fish that resembles a salmon). 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.

STORM WATER
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.

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.

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 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.

TRIBUTYL TIN (TBT)
An organic-metal compound used as an additive in many marine antifoulant paints used to prevent algal and barnacle growth. Tributyl tin is highly toxic to many marine organisms.

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.

WASHINGTON DEPARTMENT OF ECOLOGY (ECOLOGY)
The state agency which is responsible for developing, implementing, and enforcing many environmental protection laws and policies, including the state Clean Water Act and the Shoreline Management Act. Note that the abbreviation DOE is confusing because the federal Department of Energy uses the same term. Ecology is the preferred term for referring to the Department of Ecology.

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.

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 on the first page of the Wetlands Protection Program.

ZONING
To designate by ordinances areas of land reserved and regulated for different land uses.

Appendix C.
Alphabetical guide to program elements

SP: Spill Prevention and Response

SW: Storm Water

W: Wetlands Protection

Appendix D.

Links between the Growth Management Act and the Puget Sound Plan

Growth Management Act (direction on water quality)	1994 Puget Sound Water Quality Management Plan Element (direction on land use)
Comprehensive Plan "Where applicable, the land-use element shall review drainage, flooding and stormwater run-off in the area and nearby jurisdictions and provide guidance for corrective actions to mitigate or cleanse those discharges that pollute waters of the state, including Puget Sound or waters entering Puget Sound." (RCW 36.70A.070) Identify lands useful for public purposes, such as stormwater management, and a list of lands and their estimated acquisition dates, all to be reflected in the capital budget. (RCW 36.70A.150) Identify open space corridors, including lands useful for wildlife habitat and connecting critical areas. (RCW 36.70A.160)	Wetlands 2.1—Guidance on protecting wetlands through comprehensive plans. Nonpoint 2—Guidance on using the GMA to protect water quality from nonpoint pollution and for incorporating watershed action plans into comprehensive plans. Storm Water 1.5—Guidance for incorporating the local stormwater program into the comprehensive plan. Shellfish 2—Guidance on using comprehensive plans to protect commercial and recreational shellfish areas.
Development Regulations Each county and city shall adopt development regulations that protect critical areas, including wetlands, critical aquifer-recharge areas, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas. (RCW 36.70A.060) Critical areas are to be designated by adopting a policy statement and locating them (classifying, describing general distribution, location and extent) or describing them through performance standards and identified during the permit process. (WAC 365-190-040)	Wetlands 2.1—Guidance on adopting development regulations to protect wetlands. Nonpoint 2—Guidance on implementing watershed action plans by using development regulations. Storm Water 1.5—Guidance for incorporating local stormwater programs into development regulations. Shellfish 2—Guidance on protecting commercial and recreational shellfish areas through development regulations.
Public Involvement Counties and cities shall involve the public in classifying and designating critical areas. (WAC 365-190-040)	Public Involvement 1—Guidance for local governments on public involvement in implementing the Puget Sound Plan.

Growth Management Act (direction on water quality)	1994 Puget Sound Water Quality Management Plan Element (direction on land use)
Interjurisdictional Coordination "The comprehensive plan of each county or city...shall be coordinated with, and consistent with, the comprehensive plans...of other counties or cities with which the county or city has, in part, common borders or related regional issues." (RCW 36.70A.100)	Nonpoint 2—Guidance for jurisdictions sharing common watersheds to cooperate in analyzing the effects of pollution coming from diffuse sources and to adopt coordinated and consistent programs. Storm Water 1.5—Guidance for jurisdictions sharing common watersheds to cooperate in analyzing the effects of stormwater runoff and to adopt coordinated and consistent programs for managing storm water.

Appendix E

Section 6217 Coastal Nonpoint Management Measures Addressed through the Puget Sound Water Quality Management Plan

Management Measure	Related Puget Sound Plan Elements*
Agriculture	
Sediment/erosion control	AG-1, AG-3, WP-2, WP-4, WP-5, WP-6, EPI-2, EPI-8
Confined animal facility	AG-1, AG-2, AG-3, WP-2, WP-4, WP-5, WP-6, SF-2, SF-8, EPI-2, EPI-8
Nutrient management	AG-1, AG-3, WP-2, WP-4, WP-5, WP-6, EPI-2, EPI-8
Pesticide management	AG-1, AG-3, PS-2, WP-2, WP-4, WP-5, WP-6, EPI-2, EPI-8
Livestock grazing	AG-1, AG-3, WP-2, WP-4, WP-5, WP-6, EPI-2
Irrigation	AG-1, AG-3, WP-2, WP-4, WP-5, WP-6
Forestry	
Preharvest planning	FP-1, FP-2, FP-3, WP-2, WP-4, WP-6
Streamside Management Areas	FP-1, FP-3, WP-2, WP-4, WP-6, H-4
Road construction/repair	FP-1, WP-2, WP-4, WP-5, WP-6
Road management	FP-1, WP-2, WP-4, WP-6
Timber harvesting	FP-1, FP-3, WP-2, WP-4, WP-6
Site preparation/forest regeneration	FP-1, FP-3, WP-2, WP-4, WP-6
Fire management	N/A
Revegetation of disturbed areas	FP-1, FP-3, WP-2, WP-4, WP-6
Forest chemical management	FP-1, FP-3, WP-2, WP-4
Wetland forest management	WP-2, WP-4, WP-6
Urban	
New development	SW-1, SW-2, SW-3, SW-5, WP-2, WP-4, WP-6, SF-2
Watershed Protection/Site Development	WP-1 through WP-7, SW-1 through SW-5, SF-2, SF-8, FP-2, FP-3, NP-2, EPI-8
Construction erosion/sediment control	SW-1, SW-2, SW-3, SW-4, WP-2, WP-4, WP-6, EPI-5
Construction site chemical control	SW-1, SW-3, WP-2, WP-4
Existing development	SW-1, SW-2, SW-3, SW-4, WP-1 through 7, SF-8
New on site treatment systems	OS-1, OS-3, OS-4, OS-5, SF-2, WP-2, WP-4, WP-6, NP-2
Operating on-site treatment systems	OS-1, OS-2, OS-3, OS-4, OS-5, SF-8, WP-2, WP-4, EPI-2, EPI-5, EPI-8
Pollution prevention	EPI-1, EPI-2, EPI-5, EPI-8, HHW-1, HHW-2, OS-2, OS-3, PS-1, PS-2, WP-2, WP-3, WP-4, WP-6

* See Appendix C. Alphabetical Guide to Elements on page 257 for a description and location of element numbers.

Management Measure	Related Puget Sound Plan Elements*
Siting roads, highways and bridges	SW-5
Construction projects for roads, highways and bridges (RHBs)	SW-5
Construction-site chemical control - RHBs	SW-5
Operation/maintenance for RHBs	SW-5
Runoff systems for RHBs	SW-5
Marinas & Recreational Boating	
Marina flushing	MB-2
Water quality assessment	MB-2, MB-7
Habitat assessment	MB-2, MB-7
Shoreline stabilization	N/A
Stormwater runoff	MB-2
Fueling station design	N/A
Sewage facilities	MB-2, MB-3, MB-4, MB-5, EPI-8
Solid waste	MB-3, MB-4, EPI-5, EPI-8
Fish wastes	N/A
Liquid material	MB-3, MB-4, EPI-2, EPI-8
Petroleum control	MB-4, EPI-2, EPI-8
Boat cleaning	MB-2
Public education	MB-1, MB-3, MB-4, EPI-1, EPI-2, EPI-8
Maintaining sewage facilities	MB-2, MB-3, MB-5
Boat operation	N/A
Hydromodification *Channel modification (dams, dikes, dredging, etc.)*	
Physical and chemical characteristics of surface waters	W-3, H-5, WP-2, WP-4
In-stream and riparian habitat restoration	W-8, H-2, H-5, H-6, SW-7, WP-2, WP-4
Dams	
Erosion and sediment control	N/A
Chemical and pollutant control	N/A
Protection of surface water quality and in-stream and riparian habitat	N/A
Streambank and Shoreline Erosion	
Streambank and shoreline erosion	W-1 through W-9, H-1 through H-6, M-2, WP-2, WP-4
Wetlands	
Protection of wetlands and riparian areas	W-1 through W-9, WP-2, WP-4
Restoration of wetlands and riparian areas	W-8, H-2, WP-2, WP-4
Engineered vegetated treatment systems	SW-3, SW-7, WP-2, WP-4

* See Appendix C. Alphabetical Guide to Elements on page 257 for a description and location of element numbers.

Appendix F. Index

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